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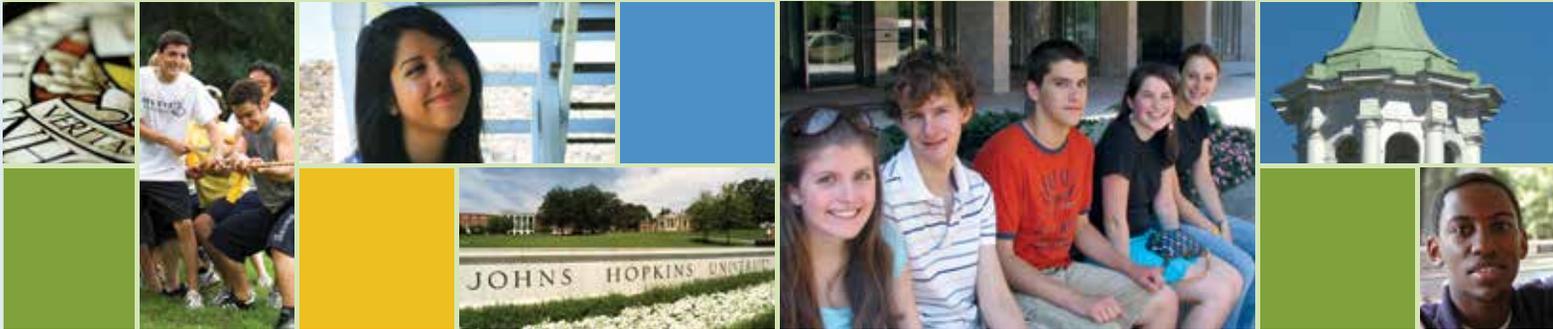
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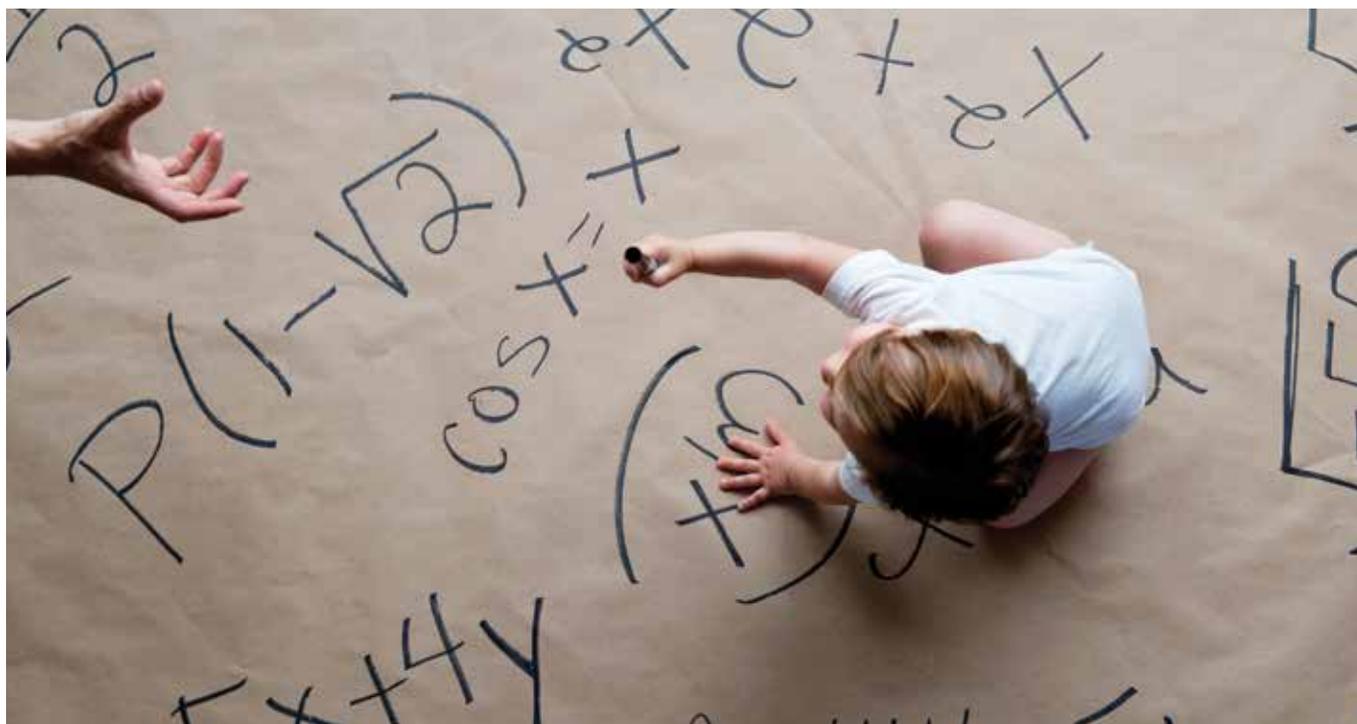
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Peabody composer Oscar Bettison fights the English disease with wrenches, tuning forks, and dangerous beauty.

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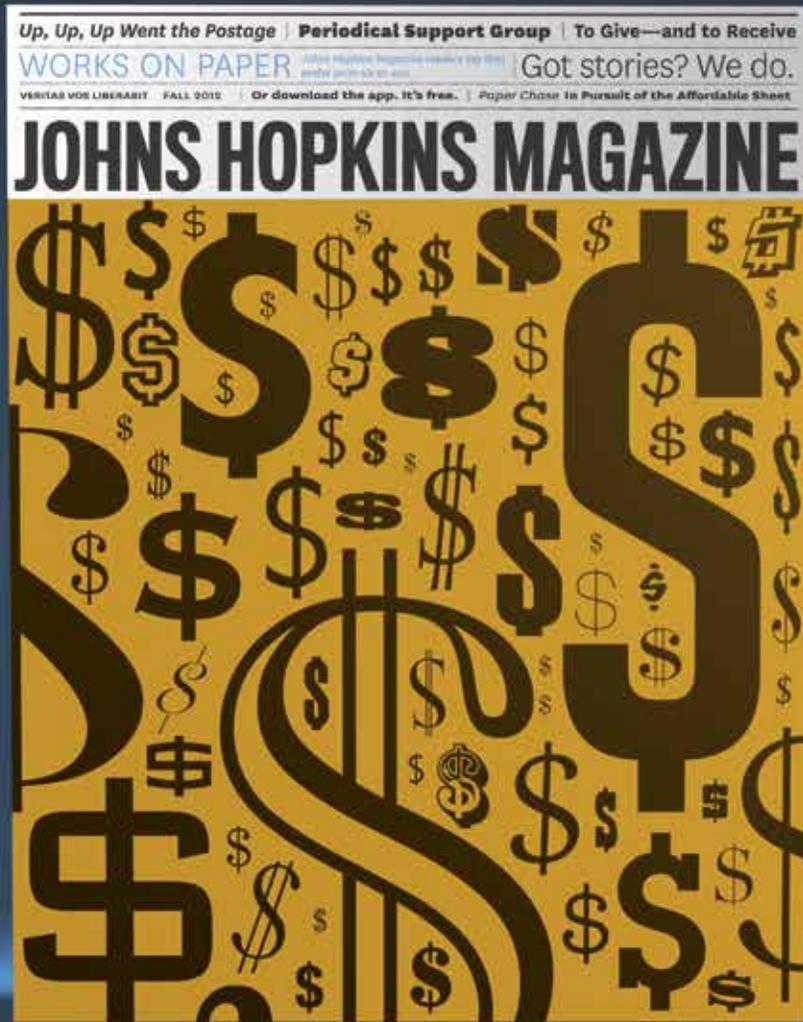
BRET MCCABE

For former Frugal Traveler Matt Gross, getting lost, running out of money, feeling alone in a strange place—that's all part of the adventure.

50 Right Fish, Wrong Pond

GABRIEL POPKIN

If Rachel Carson had been a better scientist at Johns Hopkins, she might never have become the science writer who sparked the environmental movement.



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JOHNS HOPKINS MAGAZINE

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Contributors

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Marianne Amoss (“Treating the Trauma of Intensive Care,” p. 23; “Welcome to the District,” p. 73; “Thrill of a Challenge,” p. 75; and “Space Communicator,” p. 77) is the former managing editor of *Urbanite* magazine. Her writing has also appeared in the *Baltimore Sun*, *Baltimore City Paper*, *Baltimore Fishbowl*, and *Style* magazine.

Walter Vasconcelos (“Bang On,” illustrations, p. 38) is an illustrator and designer whose work has appeared in newspapers and magazines in Brazil, the United States, and several other countries. He lives and works in Rio de Janeiro.

Annie Tritt (“A Guide for Getting Lost,” photography, p. 44) is a born-and-raised New Yorker who now splits her time between San Francisco and Los Angeles. Her photographs have appeared in publications such as the *New York Times*, *Wired*, *San Francisco Magazine*, and *Der Spiegel*, among others.

Geoffrey Himes (“Creating a Scene,” p. 70) has written about music for the *Washington Post* since 1977. His work has also appeared in *Rolling Stone*, the *New York Times*, *DownBeat*, *Paste*, *Nashville Scene*, *Baltimore City Paper*, *Baltimore* magazine, and many more. He hosts the monthly Roots Cafe Singer-Songwriter Series at Baltimore’s An Die Musik.

Lauren Simkin Berke (“Right Fish, Wrong Pond,” illustrations, p. 50) is a Brooklyn-based artist and illustrator whose clients include the *New York Times*, the *Los Angeles Times*, the *Boston Globe*, *New York Magazine*, the *Washington Post*, and others.

On the cover

Marshall Clarke, an independent photographer based in the Baltimore-Washington, D.C., area, photographed the babies that appear in our cover story on child development research. In this photo, the colorful pom-poms in the background are those used in the Laboratory for Child Development’s algebra study, which found that children as young as 1 year old are capable of doing algebra. Clarke’s work has appeared in exhibitions at the Fraser Gallery in Washington, D.C., and at the Baltimore Museum of Art, and his clients include magazines, universities, multinational corporations, and nonprofits.



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Daniel Coit Gilman
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PHOTO OF RACHEL CARSON WITH BOB HINES COURTESY OF U.S. FISH AND WILDLIFE SERVICE

VOL./
65**Rachel Carson spent a year sectioning snake and lizard heads before declaring her study a failure.**

That had to be frustrating. As you'll read in "Right Fish, Wrong Pond" (page 50), Carson, A&S '32 (MA), a graduate student in biology who hoped to become a scientist, experienced a lot of frustration before leaving Johns Hopkins with a master's degree. She ultimately succeeded, but as the author of *Silent Spring*, not as a biologist.

I think of Johns Hopkins people as so focused and goal-oriented, it's as if they all knew at age 11 what they wanted to be and how to get there.

But then there's Oscar Bettison, a Peabody composition faculty member who at age 11 was studying violin ("Bang On," page 38). If violinist-turned-composer isn't much of a stretch, what about Matt Gross, A&S '96, '98 (MA), former author of *The New York Times*' Frugal Traveler column ("A Guide to Getting Lost," page 44), who came to Johns Hopkins as a mathematics major and ended up with double degrees in the Writing Seminars? Over the years, the magazine has published a lot of these stories, and what all of these people have in common is an intense interest and the courage and imagination to pursue that interest wherever it leads.

Carson actually knew what she wanted to be when she was 11: a writer. At Johns Hopkins she acquired the scientific skills—including how to section a snake head—she needed to fashion an argument strong enough to launch an environmental revolution.



EDITOR Catherine Pierre

Unless an asteroid a kilometer in diameter has the density of something akin to feathers, the largest space vehicle would have about as little effect on its path as would a mosquito on a charging elephant.

'A colossal boondoggle'

I admire greatly the work of physicists and astronomers, and I appreciate investing in creative long-range, long-shot ventures. But the project described in "A Smashing Plan" [Idea, Spring] seems to me a colossal boondoggle.

Unless an asteroid a kilometer in diameter has the density of something akin to feathers, the largest space vehicle ever launched would have about as little effect on its path as would a mosquito on a charging elephant. Moreover, to have any beneficial effect, the intended impact would have to deflect the path of the asteroid in just the right direction; otherwise it would be useless—or even make the impending disaster worse.

I can see that if it occurs, the feared collision would "cause a global disaster." But isn't the probability of such an event in the next century,

millennium, or many millennia exceedingly low—virtually zero? Is there any evidence of even one such collision in the 10,000 (or 20,000, or 50,000) years of human history?

There are dozens of ongoing global disasters affecting billions of people daily. Directing \$150 million toward averting well-known current disasters would be less dramatic than the asteroid project but more humane.

Joe Morton, A&S '68 (PhD)
Towson, Maryland

Andy Cheng, chief scientist of the Applied Physics Laboratory's Space Department, responds:

The impact of a kilometer-sized asteroid would be a disaster on the scale of a global nuclear war and frightful to contemplate, but the average rate of such impacts is indeed quite low at a few per million years. However, we do not know when the next such impact will occur. And much smaller impacts occur much more frequently, while still being able to cause major damage, as witnessed by the impact of a ~20-meter body over Chelyabinsk, Russia, on February 15. The amount of deflection needed to avert a collision with Earth depends on the warning time—the longer in advance of a collision that a deflection is made, the smaller the amount of deflection needed.

The \$150 million cost we estimate for the first asteroid mitigation

experiment should be thought of like an insurance policy. The cost of this insurance at \$150 million would be about 48 cents per person in the United States, one time—not enough to buy a candy bar in a vending machine. The cost of our mission will be less than the cost of making the movie *Armageddon*, which was \$140 million in 1998 dollars or about \$199 million today. The amount of money we spent to watch the movie was quite a bit more, over \$500 million.

Keep swimming

Kudos on your feature story of JHU swimming ["Head First," Spring]! I am a 2009 biotechnology alum and, more importantly, a swimmer. I am so happy you focused on your swim team. They don't get enough attention. I love the line, "She moves a lot of water." This simple statement resonates with the very core of my being. I can't tell you how many times I've swum 1000s over stressful work times, personal times, or just to clear my head from the snow of Boston. What do you do when life gets you down? "Just keep swimming!"

Melissa Wojcik, A&S '09 (MS)
Boston, Massachusetts

Lost cause?

I enjoyed reading Bret McCabe's "From Farm to Plate to Policy" [Spring] on the agricultural challenge

Mercer Island, Washington: Seven readers per square mile. Sounds like our kind of island.

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of feeding a world population expected to grow 40 percent over the next 40 years. However, I wish that the instructors at Johns Hopkins who are “tackling current and future food crises from a variety of angles” would consider one angle left out of this article: the curbing of global population growth through educating women and distributing contraception in the developing world. Unless population growth is kept under control, any cause may well be a lost cause.

Adam Potkay, A&S '86 (MA)
Williamsburg, Virginia

I am tired of people coming to Maine in order to: find themselves, discover the meaning of life, reach nirvana, seek mental and emotional adventure, or cure depression.

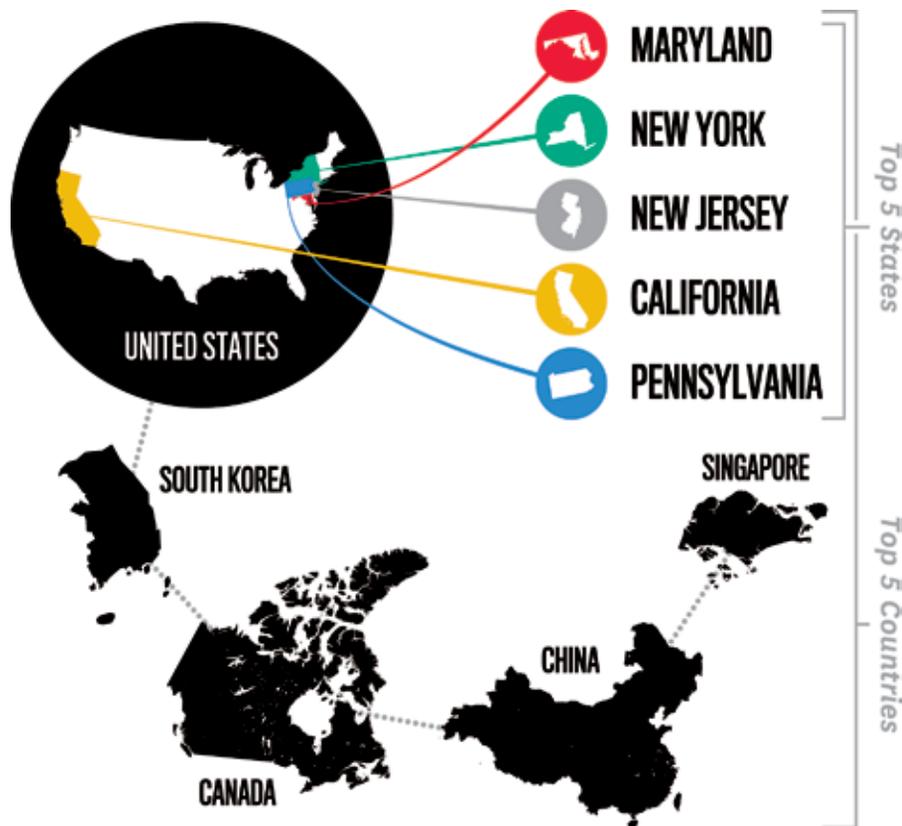
No place like home

I somewhat enjoyed the recent Spring edition of your publication. However, I spent the day thinking about a contradiction and an observation.

First, a contradiction. On page 11 [Dialogue], the effete weighed in on the negative impact that a horoscope section would have on your fine magazine with snobbish comments like, “An institution of higher learning shouldn’t participate in mystic tripe like horoscopes.” Yet on page 63 there is an ad for some Eastern gibberish from something called AndyO. I guess in today’s politically correct world horoscopes are “mystic tripe” and Oriental mysticism is acceptable. I fail to see any difference.

Now on to an observation. I am tired of people coming to Maine in

Our newest readers: The Class of 2013 came to Johns Hopkins from...



order to: find themselves, discover the meaning of life, reach nirvana, seek mental and emotional adventure, or cure depression. Susannah Hopkins Leisher’s “Out of the Woods” essay is a typical heartbreak when she discovers that Maine did not cure all her problems when she returned to New Jersey. Maine was never anyone’s idea of Walden and we would like to keep it that way. Come and enjoy the rugged beauty and people of Maine, but do not become disappointed when your troubles return when you return. Dorothy discovered that she had responsibility for her own happiness and that, clicking her ruby slippers, there is no place like home!

Thomas J. Wilkinson Jr.
Swan’s Island, Maine

Natural wonders

“Out of the Woods” [Spring] is a beautifully written commentary. Makes me thankful, once again, that I live in Maine. We are surrounded by the wonders of nature—spruce needles dappled with sun in the woodlands, crashing waves on the shore, brilliant red sunsets that fade to pink and gold, moonlight glimmering on the ocean, and bright stars in a black sky. Living close to nature makes us seem so small—and our troubles so insignificant. As Rachel Carson said, “Those who contemplate the beauty of the earth find reserves of strength that will endure as long as life lasts.”

Helen Meserve
Newagen, Maine
Comment from hub.jhu.edu/magazine



Sticker Shock

Dale Keiger

If you have ever been hospitalized, then you have had the experience of scanning an itemized bill that includes a list of tests that you or your insurance provider now must pay for. Leonard Feldman, an assistant professor of internal medicine and pediatrics at the School of Medicine, knew that some med schools try, without much success, to teach future physicians to consider costs when deciding whether to order blood cultures or urine toxicology screens or serum immunofixation. Might there be a better way?

Context

As program director of the Internal Medicine-Pediatrics Urban Health Residency Program at Johns Hopkins Hospital, Feldman observes residents in action, as do a number of his colleagues. “There seemed to be a lot of tests that we thought were being ordered unnecessarily,” he says. “We wondered if there was some easy and exportable way to teach, or at least remind, our residents that there is a cost to everything they do. We thought if they saw a connection between the tests they were ordering and cost, they might think twice about whether that test was actually needed.” So for a study recently published by *JAMA Internal Medicine*, he and his co-authors took 61 diagnostic laboratory tests and randomly assigned 30 to an active group and 31 to a control group. When a test from the active group appeared on the hospital’s computerized order entry system, the information on the screen included the cost, based on Medicare’s allowable fee. For the 31 tests in the control group, no cost appeared. Tests ranged in cost from \$3.46 for serum hemoglobin to \$238.62 for hepatitis C genotype.

Data

For six months, the researchers monitored orders for the 61 tests (displayed as usual without any cost information) to establish a baseline. Exactly one year later, for six more months they listed the costs of the 30 lab tests of the active group. Residents ordered 600,493 tests during the six-month experimental period. Feldman and his co-authors found that when residents could see the cost of a test, they ordered 8.59 percent fewer labs versus the preceding baseline period. For the tests in the control arm—no cost information provided—not only was there no decline, but orders rose 5.64 percent versus the baseline.

Upshot

Feldman says he had anticipated residents cutting down on the most expensive tests when they saw how much those tests cost. Instead, it was fewer orders for some of the most routine and cheapest labs that made the most difference, producing a net reduction in hospital charges of \$489,383 in only six months. But Feldman emphasizes that more than money was saved. Fewer tests mean fewer needlesticks for blood draws, he says, and fewer problems with false positives, which can be needlessly alarming and expensive for patients. "This is the sort of thoughtful ordering of labs that we want to see," he says. "Just get the information you need, not all the information you can just because you can."

Conclusion

Feldman says, "We keep seeing the cost of medicine go up year after year in the United States. A good bit of that has to do with the way we practice medicine." Such as ordering tests with no awareness of cost. "We need to take control of the situation and be held accountable for what's going on." He adds a note of caution: This was one test at one hospital. He cannot say if the effect observed in this one trial is generalizable to other health care centers. Nor can he say if the change in residents' behavior would have lasted over a longer period. Posting costs on the order-entry system was new to the residents, so it got their attention. After 18 months or two years, would they still be influenced by that information? Feldman hopes so. "We're never trained to think about a cost-conscious, high-value approach to medical care. Doctors just tend to order whatever they want without thinking about it. That's probably not the best way to practice medicine, but it's been part of the culture for decades and decades."

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APOCALYPSE NOW “I can’t go to *The Apocalypse* and feel good now,” says artist and author Bob Hieronimus, who painted the room-filling mural on the second floor of Homewood campus’s Levering Hall. Almost 45 years later, he is hoping to restore the painting, which, he says, does not depict the end

of the world as told in the Bible. “The mural is about how history is cyclical and how what determines the cycles is the key.” This detail depicts the separation of the sexes into male and female. For more details from the mural, visit hub.jhu.edu/magazine. **Bret McCabe, photo by Will Kirk**



At a Glance

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HEALTH CARE

Diagnosis: Irrational

Brennen Jensen

Douglas Hough came to Johns Hopkins a dozen years ago to teach economics in the Business of Medicine program. He was a prophet of Adam Smith and Smith's metaphorical "invisible hand" at the heart of mainstream economics. Classrooms full of seasoned health care providers soon taught him to be a Smith apostate. "The invisible hand wasn't working for them," Hough says of his early students. "They tolerated the theories but really weren't buying the conclusions." The problem? Standard economics posits that self-interest drives people to act rationally in the marketplace. But when that marketplace is a hospital or doctor's office? Students spoke of patients demanding useless tests, ignoring treatment regimens, acting *irrationally* amid their aches and pains.

In response, Hough began opening his curriculum to the barely 30-year-old field of behavioral economics. Behavioral economics draws on the perspectives, hypotheses, and studies of behavioral psychologists to explain marketplace behaviors. No, people are not always rational, behavioral economists say, but their irrationality at least happens in predictable ways. Hough's students stopped squirming in their seats—"They were going, 'Yeah, yeah, this makes more sense,'" Hough says—and the professor was well on his way to chucking out more than 200 years of economic theory.

However you look at it, the U.S. national health care system is sick—

a beast consuming 18 percent of gross domestic product while leaving millions without health insurance. "In health care, imperfect people are making imperfect decisions, and behavioral economics does a better job than mainstream economics in explaining and predicting this reality," Hough says. It's a case he sets out to make in his new book, *Irrationality in Health Care: What Behavioral Economics Reveals About What We Do and Why* (Stanford University Press, 2013), which is built around the economic behaviorist's take on 23 health care anomalies. Why do patients insist on getting a prescription or having a procedure performed when they visit a doctor? Why do tens of thousands of patients die each year from hospital-acquired infections when a simple five-step checklist used by physicians and nurses could reduce that number by two-thirds? Why would requiring everyone to buy health insurance make everyone—including those who don't want to buy health insurance—better off?

For answers, Hough eschews the rigid world of mathematics at the heart of standard economics for the multifaceted world of behavioral psychology. So, patients who demand pills or tests when symptoms send them to the doctor do so because of an "action bias," wherein people are predisposed to the idea that doing something is better than doing nothing, even though watchful waiting might be the most rational course. (This is how patients with virus-based common colds end up with prescriptions for antibiotics that do nothing against viruses.) And doctors' resistance to checklists has a tangle of psychological roots, chief among them the perception that checklists usurp their authority, and so they spurn them because of a psychological concept called "loss aversion."

Hough, who now holds joint appointments in the Bloomberg School of Public Health and Carey Business School, concedes there is much work yet to do testing behavioral economics' applicability to medicine. His book concludes with a proposed research agenda. "What's clear is that standard economics is not working in health care and maybe the solution is to stop beating on the old paradigm," says Hough. "What behavioral economics can do is demonstrate that the invisible hand has very stubby fingers."

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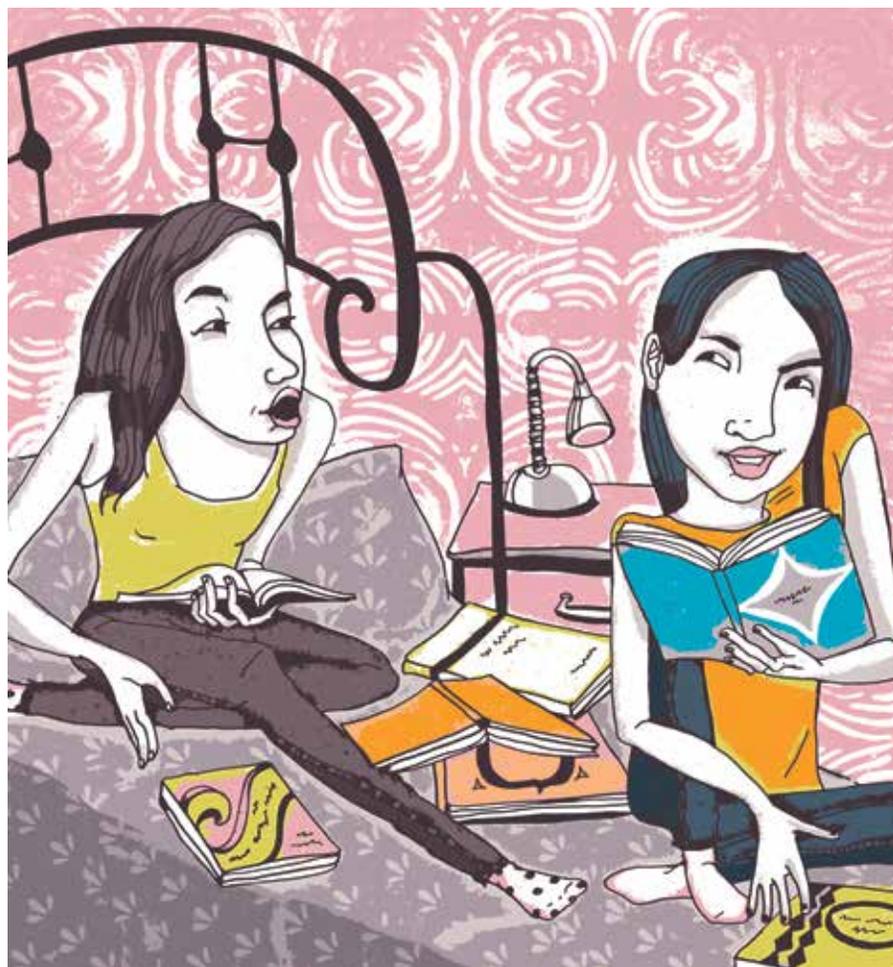
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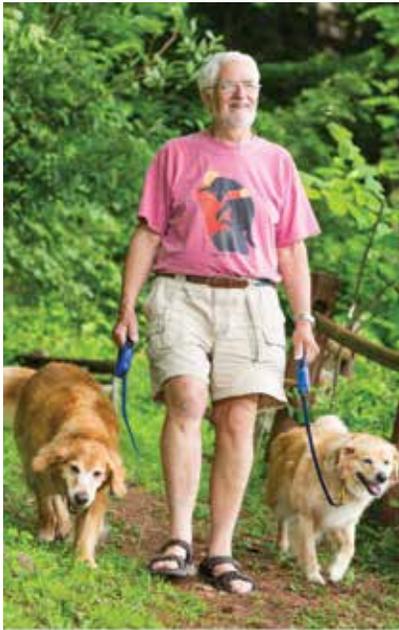
Lizzie Skurnick remembers not only the hometown store that started her book collection, but the specific shelves at Book Junction in Englewood, New Jersey, that she sought out when she was a kid in the 1970s and 1980s: the bottom two in a section of the store's back right corner. That's where she found the young adult novels that captivated her. "That's where I found M.E. Kerr," she says by phone from her current home in Jersey City. "That's where I got [Roald Dahl's] *The Wonderful Story of Henry Sugar and Six More*. I was an extraordinary reader when I was a child, as were most of my friends—and, I think, a whole generation of women. We were in a very weird position because there really wasn't anything called 'YA' then, and the fact that all of these novels existed was not anything our parents were paying attention to."

Kerr's 1977 novel *I'll Love You More When You're More Like Me* is one of



seven titles Skurnick will reissue in September through Lizzie Skurnick Books, a new imprint from Ig Publishing. Skurnick, A&S '99 (MA), is a freelance book critic, part-time English professor, former Sweet Valley High series contributing writer, and an author. She talks about this era of young adult books with the contagious enthusiasm of a blues disciple who makes life feel utterly incomplete until Texas nightingale Sippie Wallace has been heard in all her glory. And she's spent a good part of her adult writing career exploring the books for young people published from the late 1950s through the 1980s as an overlooked literary era.

In 2007, she started the Fine Lines column for the startup website Jezebel, which founding editor Anna Holmes created as an intelligent, playful, and politically engaged update of a women's magazine. Skurnick's column—about rereading books such as Paula Danziger's *The Cat Ate My Gymsuit*, Judy Blume's *Wifey*, Elizabeth George Speare's *The Witch of Blackbird Pond*, Scott O'Dell's *Island of the Blue Dolphins*, Lois Duncan's *Summer of Fear*, and Julian F. Thompson's *The Grounding of Group 6*—was initially going to be light and funny. But she quickly discovered that the books required a more serious discussion of their themes and subject matter.



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“We liked the writing because no one was yet talking about being a teenage girl,” Skurnick says, noting that the books “were about family and divorce. We were living through parents getting divorces—and no one talked about this stuff yet. Even if [the books] were works of fiction and fantasy, part of the reason they’re important is a lot of them were about women and power. A lot about domestic violence. A *lot* about sexism.”

Katherine Paterson’s *Jacob Have I Loved* is about twin sisters, one of whom is liked more than the other. It touches on one of the themes that Skurnick sees recurring in the novels. “So many of the books are about friendship,” she says. “We think about girls and friendship and we think crafts and sewing and going to the movie theater and eating popcorn. But the women in our lives, they are really the most important relationships we have probably until we have children. Men are important, too, but it’s not quite the same. It’s not as complex. And [in these books] you have something going on that was probably more at the level of humor and complexity as [Lena Dunham’s HBO] series *Girls*.”

Skurnick’s column took off, fueled in part by her zeal but also by her readers’ responses. They started scanning book covers and emailing them to Skurnick. She introduced a section called Plotfinder where readers described the plots and covers of books whose titles and authors they couldn’t remember and other readers figured out the identities. The columns were collected in Skurnick’s book *Shelf Discovery: The Teen Classics We Never Stopped Reading* (William Morrow, 2009). And after about 100 columns she took leave of it, though she continued to talk about the books and post covers on her blog (theoldhag.com), if only to maintain her relationship with readers.

In 2012 Ig Publishing Editor-in-Chief Robert Lasner contacted her with a dream-job prospect: Would she like to edit a line of reissues of these books? Um, does Marcy Lewis hate her father, being fat, and her school in *The Cat Ate My Gymsuit*? Yes. Skurnick had come to know a few of the authors she would want to reissue from putting together *Shelf Discovery*; the rest she looked up in the phone book and called. That almost every one of the 20 authors she contacted agreed to her project isn't too surprising. Writers want to be read, and many of these books have long been out of print. And the person on the other end of the line was incredibly passionate about their work.

"This is actually something I've been working on since I was about 7," Skurnick says with a laugh. Now she's hoping that the women of her generation want to reread the books that helped shape the women they are today—and maybe a new generation of young readers might discover what first captivated their elders.

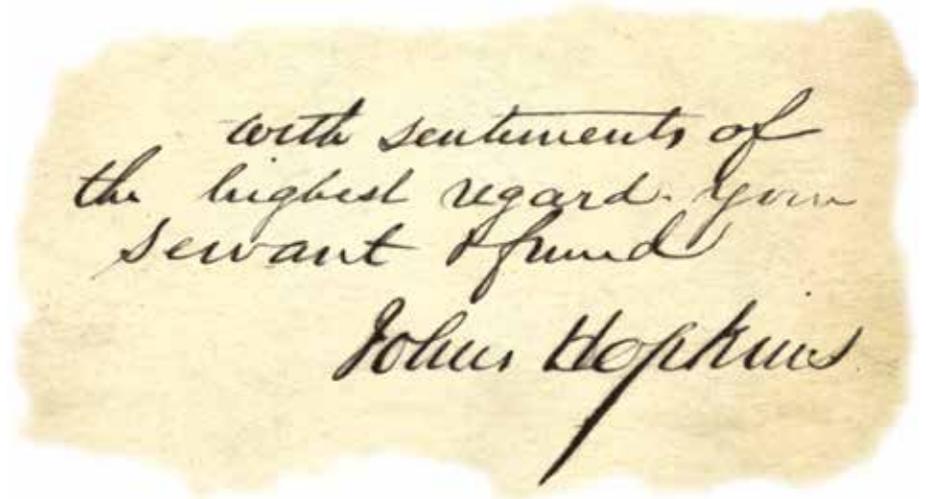
3

CORRESPONDENCE

Lincoln's 'Servant and Friend'

Neil A. Grauer

The only biography of Johns Hopkins is *Johns Hopkins: A Silhouette*, a 125-page profile written in 1929 by his grandniece Helen Hopkins Thom. No biography of more length and depth has ever been written because Hopkins destroyed most of his personal papers. Yet one fascinating clue to Hopkins' personality—and influence—can be found in the



Library of Congress' online collection of Abraham Lincoln's correspondence. It is a letter from Hopkins to Lincoln offering some advice in 1862.

Baltimore, home to many Southern sympathizers, had been the site of the Civil War's first bloodshed. On April 19, 1861, a week after South Carolinian forces had fired upon Charleston's Fort Sumter, starting the war but inflicting no casualties, a large brick-throwing and gun-toting Baltimore mob had attacked federal troops passing through town. Four soldiers and 12 civilians were killed and dozens wounded. Lincoln put Baltimore under military control and in June 1862, Maj. Gen. John E. Wool became commander of the Department of Maryland, and thus de facto commander of Baltimore.

Wool was a tough customer. A veteran of the War of 1812, he was 78 years old—the oldest commander in active service on either side of the Civil War. In October 1862, he learned of a petition by supposed pro-Unionists who charged that he was incompetent and possibly senile. The petition urged Lincoln to replace him. On October 27, 1862, Wool ordered the arrest of everyone who had signed it.

Hopkins believed that Wool merited support. On October 30, 1862, he took a piece of plain, lined note paper and wrote to Lincoln:

Sir, When I had last the pleasure of seeing you, I press'd on you the importance of retaining Genl Wool in his present position here, looking to the preservation of the peace of the city, and the cause of the Union.

Present events which have renewed the efforts of certain parties to remove him, only confirm me in my former convictions; and my object in now addressing you is to throw what weight I can into the scale in favour of his being retained—I am of the opinion that no one whom you could put in his place, could better serve the purposes of the government, in a city whose peace and tranquility at this time are in great measure owing to his judgement and discretion.

*With sentiments of the highest regard—your Servant & friend
Johns Hopkins*

The letter provides tantalizing hints about Hopkins' relationship to Lincoln. Clearly they had met previously—Hopkins wrote, "when I had last the pleasure of seeing you" (emphasis added). It also shows that

Hopkins was not only a firm supporter of the Union but an admirer of Lincoln, signing the letter “your Servant & friend.”

Hopkins, indeed, was staunchly pro-Union in a city that had a large pro-Confederate population. He and his good friend John Work Garrett, president of the B&O Railroad, overcame the opposition of pro-Southern members of the railroad’s board to ensure that B&O trains and tracks served the Union cause.

Lincoln followed Hopkins’ advice on Wool—briefly. In December 1862, he replaced Wool but did not fire him. Instead, he transferred the old warrior to the command of New York City. In July 1863, the septuagenarian Wool commanded federal forces that responded to the racially charged, three-day anti-draft riots there. At least 120 were killed. Within weeks of that riot, Wool retired from the Army—apparently not voluntarily. He did not have the equivalent of Johns Hopkins in New York to urge Lincoln to keep him on.

4

GENOMICS

A Lot of Loblolly

Dale Keiger

The phrase “sequencing a genome” misleads. It makes the process sound so straightforward: A simple sequence of events leads to a sequenced genome. First, take the DNA that makes up the genome. Spool out the now familiar double helix of the DNA molecule, the orderly spiral ladder of adenine and guanine, cytosine and thymine. Separate the strands, then use a machine to start at one end and

record each base—AAGCTAGCTAGC and on and on and on—until you reach the end. Done. No more complicated than reading the digits of pi, except unlike pi the genome is finite, which should make reading it even more straightforward.

Actual sequencing bears little resemblance to that orderly process. The human genome consists of about 3 billion DNA base pairs. Current sequencing technology requires starting with a solution that contains millions of copies of the genome broken into tiny random fragments of roughly 150 base pairs each, the maximum size that the

technology can accurately read. This produces hundreds of millions of read bits with no instructions for how to reassemble them into the blueprint for a single molecule.

There are not many people in the world who know how to sift those hundreds of millions of fragmentary DNA reads and assemble a single, accurately sequenced genome. Steven Salzberg, a professor in the McKusick-Nathans Institute of Genetic Medicine at Johns Hopkins, is one of them. He is not a biologist or geneticist but a computer scientist. He and his team create algorithms that sort the



PHOTOGRAPH ISTOCKPHOTO.COM

innumerable fragments of sequenced DNA and place them in the proper sequence. He got into this line of work while a graduate student in computer science at Harvard (he completed his doctorate in 1989). At the time, the Human Genome Project was just getting under way. "I heard about it and thought, *That is going to be the biggest thing in science. I have to see if I can get involved in that,*" he says. He expanded his studies to include genetics and genomic technology, and identified some problems in DNA sequence analysis to which he thought he could apply his computer expertise. Now he is one of the world's experts in the computational process of genome assembly.

That means he gets calls for interesting projects. After the 2001 anthrax attacks that killed five people in the United States, he was part of a team at the Institute for Genomic Research in Rockville, Maryland, that sequenced the strains of anthrax used in the attacks. He has worked on the mitochondrial DNA of a Columbian mammoth that lived in North America about 11,000 years ago. He is collaborating with Cynthia Sears, an infectious disease specialist at the School of Medicine, to sequence a bacterium associated with colon cancer.

He is also working on the most complicated sequencing yet attempted: the genome of the loblolly pine tree. The loblolly's genome runs to about 22 billion base pairs, roughly seven times longer than the human counterpart. Biologists and agricultural scientists have ample reason for wanting to know what all is in there because the loblolly pine is the most commonly farmed tree in the United States and the second most common species after the red maple. Understand the genome and you have the potential ability to manipulate it to

respond to new diseases and environmental changes, and to engineer the crop to be more productive.

Salzberg's team completed the basic assembly in March and is now refining it. They had to piece together about 16 billion separate DNA reads, each one in its proper place. Salzberg characterizes the challenge like this: "Imagine that we have today's newspaper, and suppose we took 100,000 copies and shredded them in such a way that you could read only 100 to 150 letters in a row. You have all these fragments, and now I tell you I want just one reassembled copy of the newspaper." Plus the data obtained from the sequencer is not free of noise. The many copies of DNA used in the process can contain slight variations, and the sequencing process introduces errors at a rate of 0.5 percent. In the course of 16 billion reads, those errors add up.

To further complicate matters, genomes are filled with repetitive sequences. For example, the human genome has sequences 300 bases long that occur, repeated almost exactly, more than a million times. That means if you take any one fragment, there may be a million places where it could go. "It's like the blue sky section of a jigsaw puzzle," Salzberg says. "If all the pieces are the same color, you don't know where they go. It's actually much worse than that. Imagine if all the pieces were the same shape, too."

Nobody knows why the loblolly genome is so immense. "Pine trees are not very smart, yet their genomes are seven times bigger than ours. They don't even have a brain! How come they have a genome that is seven times bigger?" Salzberg asks. Even the amoeba has a larger genome than humans. Why? "It's good cocktail party conversation," Salzberg says. "We don't really know the answer."

5

MEDICINE

Essential Drugs, Short Supplies

Greg Rienzi

Alix Dabb spends part of each day as soothsayer. The pharmacy specialist in pediatric oncology at Johns Hopkins Hospital forecasts the availability of lifesaving drugs, such as chemotherapy agents used to fight cancers in both children and adults. She maintains a nationwide network of specialists that she regularly checks with for updates on availability. If a shortage looms, she and others sound the alarm. "Dealing with shortages can be a full-time job," says Dabb, a member of the hospital's drug shortage task force that was formed in 2010. "It can get exhausting, but we have to be proactive. Lives are at stake."

Johns Hopkins and other medical centers across the nation face frequent shortages, with those of intravenously delivered chemotherapy drugs particularly acute. The problem is not new. Nor is it going away anytime soon, experts say. There is culpability to go around, but many claim profit is the principal factor. The chemotherapy drug business has become less lucrative. Many cancer-fighting pharmaceuticals can now be produced generically, some for as little as \$5 a dose, and the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 effectively restricts the amount chemotherapy drugs can be marked up by the manufacturer. Pharmaceutical companies also face heavier regulation by the Food and Drug Administration and have had to

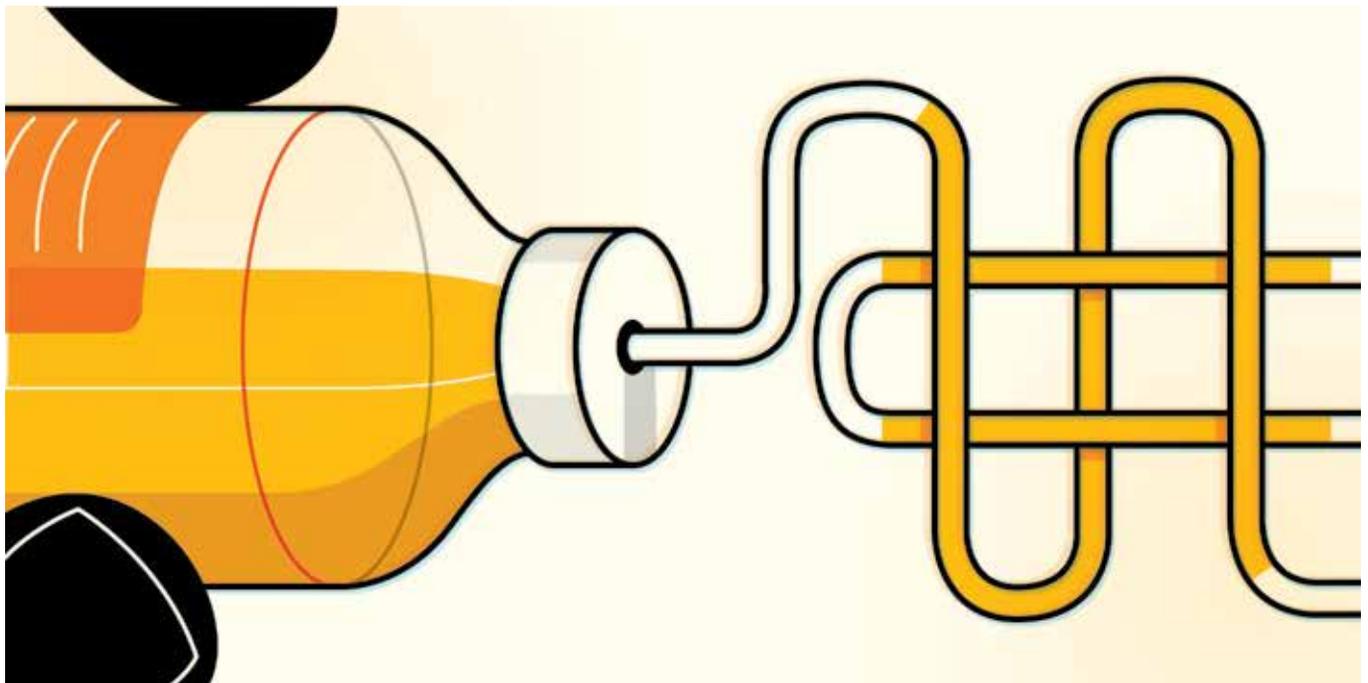


ILLUSTRATION BY HARRY CAMPBELL

upgrade facilities to meet new quality-control standards. In response, some manufacturers decided not to invest in new infrastructure and either ceased production of certain products or temporarily suspended production to address manufacturing issues. Industry consolidation further reduced the number of companies producing drugs.

A small number of the shortages can be attributed to lack of raw materials such as active ingredients, fillers, and diluents. Some shortages are exacerbated by gray-market companies that accumulate large quantities of a drug so they can create an artificial shortage and mark up the cost some 500 percent. Johns Hopkins and others refuse to buy from these companies, but the damage has been done.

In the past five years, the number of hard-to-find drugs has ballooned. The Johns Hopkins Hospital pharmacy monitors approximately 160 drugs in short supply. Forty have an

operational charge in place, such as a different dosage or clinical restriction that limits use to certain indications. For example, phosphate injections currently have a clinical restriction that allows use only for patients with serum phosphate below a set level.

Dealing with these shortages has involved a massive, coordinated effort. At Johns Hopkins, a task force of clinicians, pharmacists, drug purchasers, and other stakeholders meet monthly to discuss drug availability and how best to proceed based on current and predicted volumes of patients. Emergency shortage meetings are not uncommon, and clinicians can be summoned at a moment's notice to a conference room if a drug previously expected now won't arrive in the foreseeable future.

Kenneth Cohen, an associate professor of oncology and pediatrics at the School of Medicine and clinical director of pediatric oncology at the hospital, says that shortages have

forced medical centers to develop fluid action plans and confront hard questions. "The issues have been long-standing, but, if anything, over the last four to five years things have gotten worse," Cohen says. "When there is a shortage, we look at a variety of issues to make a determination as to how best to prioritize a limited supply of a drug. Those issues include the importance of that drug in the treatment of each disease in which it is utilized; is it felt to be a key component of curative intention therapy; the availability of other agents in the same class that might be substituted during a shortage; the potential to swap a course of therapy if the impact is felt to be minimal, and so on."

The shortages have affected how hospitals schedule chemotherapy treatments. Some patient groups have to be prioritized. More frequently, cohorts of patients are scheduled to maximize use and minimize waste of a drug because once a vial has been

opened, the drug must be used. Brian Pinto, assistant director of medication policy and clinical informatics at the hospital, says the overriding goal is to minimize impact on patients and stay one step ahead of shortages. “The ability of JHH to weather the shortage difficulties over the past several years with minimal clinical impact is due in large part to many pharmacists and technicians working countless hours behind the scenes to ensure we have adequate drug supplies to meet our patients’ needs, avoid disruption in clinical workflow, and ensure business continuity,” Pinto says.

In January, the Berman Institute of Bioethics hosted a workshop that invited leading clinicians, pharmacists, ethicists, and others from across the United States and Canada to discuss the ethical implications of shortages in pediatric oncology and guide clinicians and institutions in coordinating their efforts and prioritizing treatment. One of the attendees, Yoram Unguru, a physician in pediatric hematology and oncology at the Herman & Walter Samuelson Children’s Hospital at Sinai, says that the problem isn’t going away. Medical centers need to address how best to move forward. “We’re dealing with a finite resource. How do you determine the order of who gets what first? Is it based on prognosis, cost, survival rate?” says Unguru, who is also an assistant professor of pediatric oncology at the School of Medicine with a joint appointment at the Berman Institute. “And is it ethical for one institution to stockpile, knowing full well that means less drugs available for others? It’s a complex problem with no easy answers or solutions.”

The U.S. Government Accountability Office, the independent investigative arm of Congress, will soon put out a report on the economic factors that

lead to drug shortages. Johns Hopkins officials hope the paper will help guide legislative action and changes at the FDA level. With support from the university’s Office of Government and Community Affairs, Johns Hopkins was able to add an amendment to the reauthorization of the Prescription Drug User Fee Act last year that allowed institutions like Hopkins to repackage drug supplies into smaller vials in order to share within a family of hospitals. The new measure won’t solve everything, but it could alleviate some of the problem. Until then, Dabb and others keep watch.

6

PSYCHIATRY

Treating the Trauma of Intensive Care

Marianne Amoss

For the once active and healthy 39-year-old former patient, life was different after his stay in the hospital’s intensive care unit. He found the fast pace of his grocery store job overwhelming. He could not concentrate on simple tasks like completing his child’s application for school. He remembered hallucinations—“kids with animal heads”—that he’d experienced in the ICU. He was terrified that he might get sick again, and he wondered, “Am I ever gonna be back normal the way I was before?”

This man’s symptoms—avoidance, intrusive memories, anxiety—match those of post-traumatic stress disorder. He’s not alone. A recent study by Johns Hopkins researchers of ICU survivors with acute lung injury who had required use of a mechanical ventilator

found that about one-third experienced PTSD symptoms for up to two years. Although the study was limited to acute lung injury survivors, the researchers believe their findings will apply to survivors of other critical illnesses.

The ICU can be frightening—time spent there can include painful procedures, difficult breathing, and limited ability to communicate. “Just like victims of sexual assault and soldiers coming back from Afghanistan or the Middle East, ICU survivors have experienced a life-threatening stress,” says Dale Needham, a critical care specialist at the School of Medicine and senior author of the study, which was published online by *Psychological Medicine*. Critical illness survivors afflicted with PTSD can experience a frustratingly slow recovery and trouble resuming their pre-ICU lives. The researchers, including first author O. Joseph Bienvenu, an associate professor of psychiatry and behavioral sciences at Johns Hopkins, found that the onset of PTSD symptoms was most common within three months of patients leaving the ICU. At the two-year mark, 62 percent still had symptoms, 40 percent had sought psychological treatment, and 50 percent had taken psychiatric medicines. (Among study participants without PTSD symptoms, those figures are 17 percent and 25 percent, respectively.)

According to the study, risk factors for PTSD include a longer stay in the ICU; a longer duration of sepsis, a serious and common ailment among ICU patients; administration of high doses of opiates in the ICU; and a history of depression. Protective factors include longer durations of corticosteroid and opiate administration in the ICU. The research team had hypothesized that there was a connection

between PTSD and the delirium some patients experience in the ICU—hallucinations like the one described by the aforementioned patient, who was featured in a video Needham posted online for educational purposes. However, they did not find that link.

The study is part of Needham and Bienvenu’s research on long-term health of critical illness survivors. It involved 186 patients who survived stays in 13 ICUs at four Baltimore hospitals; they were recruited for the study between October 2004 and October 2007. Although other research on PTSD in post-critical care patients exists, Needham says this study is unique in that it is relatively large for the field and that it is longitudinal: Patients were interviewed at three, six, 12, and 24 months, and a separate study in the program will allow them to be followed for up to five years. Because ICU survivors are often wary of returning to the hospital, the researchers conducted interviews in other locations or occasionally by phone to reduce the dropout rate. “We would go to the patient’s home or their health care facility to conduct the research if they were unable or too scared to come back into the hospital,” Needham says.

Mitigating what has been dubbed post-intensive care syndrome starts with awareness, Needham and Bienvenu say. “It’s really just to get people thinking about the fact that ICU survivors have a few different kinds of problems,” Bienvenu says—physical, yes, but also mental and cognitive. Being in the ICU is not yet a widely recognized risk factor for PTSD, but with communication of this research to other critical care physicians, primary care doctors, psychiatrists—anyone who might be involved in the patient’s recovery—that could change. One technique that

has shown promise is an ICU diary, in which a nurse or family member records what happened to a patient on a daily basis. This can help the patient make sense of the experience and interpret frightening memories. It can also help the patient’s family members, who can experience PTSD symptoms as well.

7

MEDIA

Detectives in the Theater of Images

Bret McCabe

In the Baltimore Museum of Art’s Black Box gallery a silent animation is projected onto a wall. Its three and a half minutes play in a continuous loop, and at first it looks merely like an old photograph with parts tinted purplish blue. In the photo, six men sit at drafting tables frozen in work, writing implements held over blank pages. Soon, however, the eyes detect a number of subtle movements. The ceiling fan turns at irregular intervals and speeds, like a pair of clock hands haphazardly marking time. A book’s pages rustle as if a gust of wind had sneaked in through the open windows that run along one side of the room. And just outside those windows a man passes by like somebody accidentally walking through a movie set.

Wall text reveals that the original image is a 1911 photo by James Waterhouse that features surveyors making maps in colonial Calcutta, India, which lends a dry humor to these animated tweaks. Titled *An Afternoon Unregistered on the Richter Scale*, this single-channel video

installation quietly becomes a witty commentary on the act of nation building: Here colonized workers create the geopolitical lines that would define a country and its conflicts for the next century, but this act of institutional power looks as innocuous as a family snapshot.

Afternoon was created by the Raqs Media Collective in 2011, and on a weeknight in March, Shuddhabrata Sengupta, one of Raqs’ members, projected a still from the animation onto a screen in the Mattin Center’s Digital Media Center for a small group of undergraduates. He wanted the students to think about an archival image as a crime scene, to get them to consider the stories behind everything captured in the frame. “Photos leave clues,” Sengupta says. “Even the best criminal leaves clues for the detective to follow.”

Those clues point in two directions—back, to whatever led, say, a person or an item of clothing to the moment captured in the photograph, and forward, to wherever that person or item of clothing may wander after that. The artist can imagine those stories through the artwork itself—a process that makes time as pliable as clay. Raqs—Sengupta, Jeebesh Bagchi, and Monica Narula—have been exploring how the past haunts the present since they formed Raqs in 1992 in New Delhi, India. At the Digital Media Center, Sengupta cheekily switched between the Waterhouse photo appropriated in *Afternoon* and a photo of Indian cartographers taken in the 2000s. Save for a few changes in clothing and new technology, the work stations, room, and workers look remarkably unchanged.

Raqs started as a documentary filmmaking team but has evolved into an impressive hybrid. One part is a research unit that writes papers,



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PHOTOGRAPH COURTESY OF RAQS MEDIA COLLECTIVE AND FRITH STREET GALLERY

A still image of Indian surveyors, from the Raqs Media Collective video installation *An Afternoon Unregistered on the Richter Scale*.

curates art exhibitions, and co-launched a social science and humanities research center at the Centre for the Study of Developing Societies in Delhi. The other part is a creative hub that orchestrates site-specific multimedia installations and performances that have been included at a number of international biennials and commissioned by museums. Raqs was the inaugural artist-in-residence at the Johns Hopkins Center for Advanced Media Studies, and during their monthlong residency on the Homewood campus, its members attended classes, met with faculty, installed two video pieces at the BMA and gave an artist's talk, and conducted this workshop at the Mattin Center, offering students a crash course in

creatively exploring and exploiting archival images.

After talking about *Afternoon* Sengupta and Bagchi invited the students to play detectives themselves. The students turned to computers in the DMC and searched online archives for photos. When they found one that caught their eye, Raqs asked what they would do with it if they were the artists. What does the photo say about how people live now? Is the image the beginning of a story or the end? "That has been our major obsession, how to play with time, how to break away from a progressive idea of time," Bagchi says. "Everything is open to a great investigation in time."

This playful approach to visual literacy made Raqs an ideal choice for

CAMS' first residency. Housed in the Department of German and Romance Languages and Literatures and collaborating with faculty in anthropology, political science, and film and media studies, CAMS was formed in 2010 to encourage the university's humanities research efforts in an emerging field that wallpapers everyday life.

Moving images aren't the exclusive realm of television, movies, and museum installations anymore; they're the dominant form of communication, from video games to branded content to animated GIFs and Vine, the mobile app that allows users to post six-second moving images. They travel across geopolitical borders and language barriers more easily than verbal communication. And the

media-consuming, mobile phone-owning, meme-creating, social media-connected population living right now has one of the most sophisticated visual vocabularies in history.

The questions Sengupta asked the students to consider as artists, he said, they already consider as mass consumers of images. Every day we come across images that spark a laugh, push a political button, tug at heartstrings, remind us of where we've been, who we love, what we want. Shouldn't we consider how these images are interacting to influence how we remember who we are, individually and collectively?

"Working with [images in] archives is a very emotionally loaded field because an image is a piece of theater," Sengupta says. "And in theater, *everything* is an actor."

8

DISEASE SURVEILLANCE

Fever Forecast

Kelly Brooks

More than 2.5 billion people—over 40 percent of the world's population—are at risk of infection by the mosquito-borne dengue virus. Most dengue fever victims experience flu-like symptoms of fever, headache, muscle pains, vomiting, and a measles-like skin rash. But an unlucky few—mostly children, the elderly, and those who have had the disease in the past—develop an accumulation of fluid in the chest or abdomen that leads to life-threatening hemorrhage. Worldwide, the virus infects 50 to 100 million people each year; 500,000 will contract severe dengue. In poor, tropical countries, around

5 percent of those with severe dengue will die.

So public health professionals in those nations have a substantial interest in knowing where the disease might next break out. Anna L. Buczak, a researcher with the Applied Physics Laboratory, has been attacking that problem with advanced mathematics. She has developed a statistical model that can predict outbreaks weeks before they occur. Dubbed PRISM—PRedicting Infectious Disease Scalable Method—her method sifts statistical variables such as current dengue incidence rate, temperature, rainfall, population, and percentage of private dwellings with running water. Because these data are publicly available or already among the figures compiled by governments, PRISM is inexpensive—important for low-resource settings.

Take Peru. "Dengue is a big problem in Peru," Buczak says, which made the country a natural fit for a study that began in 2011. (For example, in 2012 the country recorded 21,000 cases of dengue fever and at least 32 fatalities.) Plus APL had previously worked with a U.S. Naval Medical Research Unit in Lima, Peru, to implement a surveillance system for infectious diseases, including dengue. As Buczak developed the PRISM model, she could use this surveillance data to see how accurate her forecasts were. A team of 18 people, including medical doctors, statisticians, epidemiological specialists, and technology experts, worked on the study and found that when PRISM predicted a dengue fever outbreak to happen within four weeks, it occurred 81 percent of the time. "We could even predict six to eight weeks ahead with good accuracy," says Buczak.

After its success in Peru, Buczak's team traveled to the Philippines in

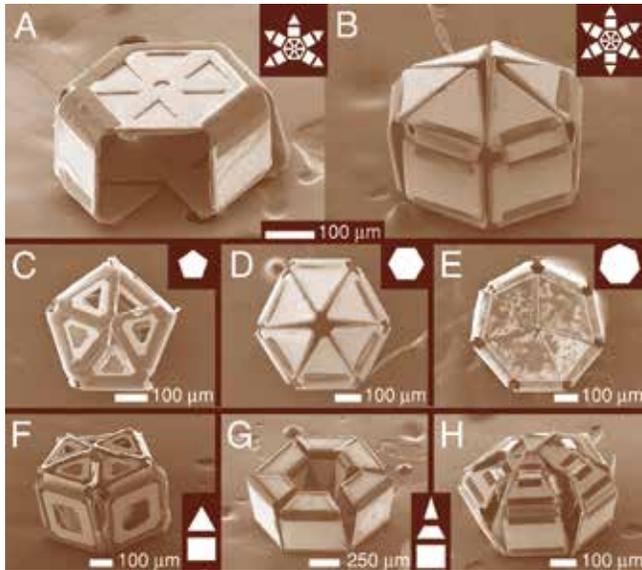
2012 to forecast dengue fever there. "Every country is different in terms of geography, disease, and rainfall, so the model needs to be developed differently for individual countries and areas, explains Buczak. "We develop a new model but use the same procedures, the same software as before. For the Philippines, the team tweaked PRISM, added a variable to account for typhoon weather trends, and succeeded again.

It was a natural leap to turn its attention to other mosquito-borne infections, so next the team tackled malaria in South Korea. The preliminary data suggest predictions there were even better—a positive predictive value of 92 percent—than those from Peru and the Philippines, says Buczak.

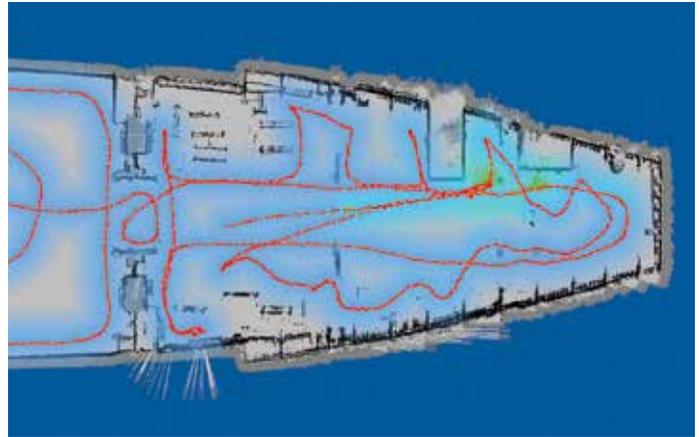
Now that the method has been developed for multiple sites and multiple diseases, "we have to create a way for [governments and public health officials] to use PRISM. We're in that process now," says Buczak. With a four-week head start, officials who use PRISM can launch public health interventions to reduce the severity of disease outbreaks by targeted insecticide spraying, mosquito net distribution, and health education campaigns reminding people to wear long sleeves and not leave standing water outside as mosquito breeding grounds.

"Many countries still don't have robust surveillance capabilities, so it's hard to know what the potential impact is," says Sheri Lewis, APL's global disease surveillance program manager. "That's what we're hoping we'll change. APL can arm them not only with the predictive tools they need to have an effective public health response, but with the surveillance tools they need to know whether they're making a difference."

Mu-grippers, which can gather cells for biopsy.



Inspection route through a ship as recorded by EMAPS technology.



RIGHT: JOHNS HOPKINS APPLIED PHYSICS LABORATORY
LEFT: PNAS.ORG

By Dale Keiger

For more information on these Johns Hopkins research findings, go to hub.jhu.edu/magazine.

IT'S THE LITTLE THINGS

Biomedical engineers have developed microscopic machines, smaller than a speck of dust and powered by body heat, that could harvest cells in the body for biopsy. Called mu-grippers, the machines successfully grabbed clusters of colon and esophageal cells after they were placed in test animals by endoscopy. Mu-grippers have the potential to gather far more cells for biopsy from many more locations in the body than can be obtained by conventional tools such as forceps.

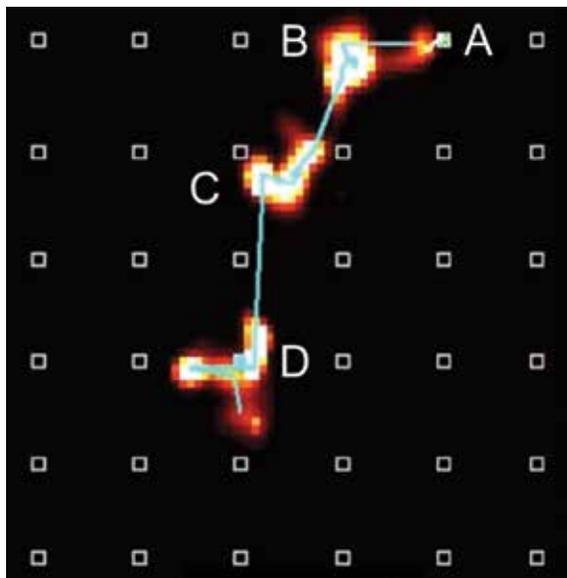
Hay fever sufferers, remember this protein: *Ambrosia artemisiifolia*, major allergen 1. It's the primary ingredient in a once-a-day pill that researchers say effectively blocks many of the effects of ragweed allergy. A clinical trial found that volunteers who used the pill for a one-year period reported a 27 percent reduction in both overall symptoms and the need for other medications.

TOO MUCH

Researchers described the overdiagnosis and overtreatment of clinical depression in the United States as “staggering.” A recent public health study used structured interviews to assess 5,639 adults who had been diagnosed with depression by medical professionals during a 12-month period. Despite the diagnoses, the study revealed that only 38.4 percent of the subjects met the criteria for having experienced major depressive episodes.

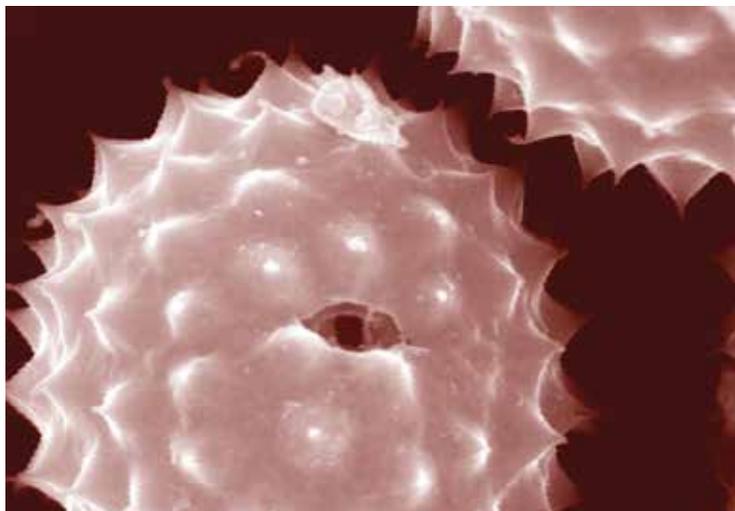
Healthy people who take vitamin D supplements should note new research that shows blood levels of the vitamin in excess of what is currently recommended provide no discernible benefit. Vitamin D has become a popular supplement because people believe it helps prevent a number of illnesses—including hypertension, atherosclerosis, and diabetes—and that they no longer get enough from sunlight because of concerns about sun exposure and skin cancer.

Representation of a rat's brain planning a route from memory.



RIGHT: MARIE MAJOURA
LEFT: DAVID FOSTER, COURTESY OF NATURE

Hay fever sufferers—this is the nasty stuff that makes you sneeze.



MRI images revealed that the brains of people who suffer from restless leg syndrome have abnormally high levels of glutamate, a neurotransmitter. Too much glutamate also interferes with sleep, which could explain why so many people with twitchy legs also report disrupted sleep, even after treatment alleviates the nocturnal muscle activity that gives RLS its name. The condition afflicts an estimated 5 percent of the U.S. population.

NOT ENOUGH

A study of 39 primary care physicians and 208 patients found that the doctors were much less likely to establish important emotional rapport with patients who were overweight or obese. The physicians were significantly more likely to express empathy, concern, or understanding when working with patients of normal weight. Bonding and empathy play important roles in persuading patients to improve their health by losing excess pounds.

MAPPING THE WAY

Engineers developed portable technology that can be used to make annotated maps of locations that cannot be surveyed by GPS systems, such as underground chambers or the inside of ships or buildings. Operators walk about carrying the 4-pound Enhanced Mapping and Positioning System in a backpack. EMAPS uses a laser scanner plus light, detection, and range sensors to create “floor plan” maps and detect potential threats such as radiation or hazardous chemicals.

Neuroscientists discovered that the hippocampus in rats’ brains uses stored spatial information to imagine pathways that the rats might use to navigate familiar territory. The scientists likened their discovery to an internal GPS system and said it is the first evidence that rats plan routes in their minds before going to a remembered place.

IN ERROR

The standard formula for estimating low-density lipoprotein cholesterol—and gauging whether high-risk patients have LDL readings in the safe range—frequently produces inaccurate results. Called the Friedewald equation, the formula estimates LDL levels by subtracting HDL cholesterol and triglycerides from total cholesterol and dividing by five. When researchers compared figures produced by the equation to direct measurement of LDL in 1.3 million American adults, they found the Friedewald estimate was off nearly 25 percent of the time.

Assertions that catastrophic malpractice lawsuit payouts play a major role in escalating U.S. health care costs are wrong, according to a new review of malpractice settlements and judgments from 2004 to 2010. Researchers found that payouts of \$1 million or more represent less than 1 percent of U.S. national medical expenditures.



Researchers explore the minds of infants and children.

Hey Kid, What Do You Know?

a

little girl in a pink dress sits at a table at the Johns Hopkins Laboratory for Child Development. She is just shy of 3 years old. “Can you count these?” a researcher across from her asks, indicating a picture of six apples. “One, two, three, four, five, six,” the girl says in a high-pitched voice, pointing confidently at each apple in turn. Then the researcher asks, “So how many apples is that?” The child waves her hands in the air with delight. “Eight!” she cries.

This odd scenario plays out with nearly all 2- and 3-year-olds. It turns out that while kids learn quite early to “count,” they are at first simply performing a routine, matching words to objects. It takes longer, until around age 4, for a child to develop a true understanding of cardinal numbers, of *quantity*.

The phenomenon came to light in the early 1990s, when it occurred to psychologist Karen Wynn, then at the University of Arizona, to ask that apparently obvious follow-up question, “How many?” Her study is a striking example of something Johns Hopkins Laboratory for Child

Andrea Appleton | PHOTOGRAPHY Marshall Clarke

How one asks the question is key, even when the subject lacks teeth and bowel control, let alone the ability to respond in words.

Development co-directors Lisa Feigenson and Justin Halberda take as a guiding principle: We know less about children than we think we do, and expanding our knowledge is often a matter of how one asks the question.

“[People] often have the gut impulse that studying child development and [studying] how children think about the world are sort of self-evident,” Feigenson says. “Well, isn’t it obvious? Don’t you just look and see what they are doing?” No, it’s not at all obvious. There are many, many cases where if you look deeper, what we think on the surface—our first guess—is totally wrong.”

“It’s reassuring to me as a scientist when the answer is the opposite of what I expected,” Halberda adds. “It says, ‘Hey! Doing science is important. You can’t just, like, make it up.’”

Both associate professors in the Krieger School of Arts and Sciences’ Department of Psychological and Brain Sciences, the pair have separate spheres of research. Feigenson works primarily with babies, studying memory development and infant learning. Halberda studies older children and adults, focusing on language acquisition and how we construct mental representations of the world. But they also conduct research as a team on numerical abilities. About a thousand children a year pass through the lab, and many come back for other studies throughout their childhood.

While sometimes we attribute more knowledge to children than they actually have—as in the case of the counting toddler—just as often we underestimate them, Feigenson says. The lab has made some astounding discoveries about children’s capabilities. For example, a new study now in peer review has found that children just over a year old can not only add and subtract approximate quantities, as previous research had shown, but also solve for x . That is, do algebra.

Results like these tend to provoke skepticism, even from fellow child development researchers. But Feigenson and Halberda are confident that the lab’s conclusions about infant knowledge are as valid as results involving older children, or adults for that matter. It comes down, once more, to that guiding principle: How one asks the question is key, even when the subject lacks teeth and bowel control, let alone the ability to respond in words.

for thousands of years, the mind of the child—particularly the infant—was considered fundamentally unknowable. That, of course, didn’t prevent philosophers from speculating. Plato believed that babies were born with innate knowledge, while Aristotle thought their minds were essentially blank slates. Charles Darwin kept one of the first observational journals of infancy, an account of his own son’s development. (“April 16th, [1839]. Was exceedingly amused by his pinafore being put over his face & then withdrawn.” Science discovers peekaboo.) Swiss psychologist Jean Piaget also based much of his work on observations of his own children, beginning in the 1920s. One of the first thinkers to take an empirical approach to studying development, Piaget believed that human beings construct knowledge by encountering new information and squaring it with their existing understanding of the world, which at birth, according to Piaget, consists of next to nothing.

Child development became a subject of serious study in the 20th century, but it was not until the 1960s that psychologists devised a systematic method to study infants. While babies cannot perform tasks and have limited control of their limbs, researchers noticed that they had control of their eyes at birth. With this in mind, developmental psychologist Robert Fantz discovered that infants tended to look longer at patterned images than solid ones, indicating that they distinguished between them and preferred one over the other. Over time, his observations evolved into the “preferential looking” paradigm, based on the premise that babies will pay attention to anything new and interesting. Researchers could “habituate” a baby to a given stimulus and then introduce something new to test the baby’s ability to differentiate. Initially, researchers used the method to learn about infants’ perceptual capacities: Could they see color? (Yes, but poorly until around 3 months.) At what age did they recognize their mother’s face? (At birth.)

In the 1980s, cognitive psychologist Elizabeth Spelke—Feigenson’s undergraduate adviser at Cornell—was one of the first to extend the use of preferential looking beyond perceptual questions to cognitive ones. She helped develop the “violation of expectation” experimental method:

Babies were presented with physically impossible events—in essence, magic shows—to ask questions about whether they had innate expectations about the world. She found that, as young as 2 and a half months, infants tended to look longer at impossible events, like a ball rolling through a solid wall. From such results, Spelke and others concluded that babies did indeed have a core body of knowledge. The looking-time measure revolutionized the field of infant cognition. Thousands of studies—on topics ranging from whether babies understand gravity to their knowledge of rules of social interaction—have since relied on it, including many conducted at the Laboratory for Child Development.

But the fundamental disagreement that Plato and Aristotle had about the mind of the infant has endured. Those in Spelke's camp, like Feigenson and Halberda, see the discovery of looking time as a watershed moment in the history of psychology. "People have been debating the fundamental issues about what it is to be human for thousands of years," Feigenson says. "What do we come into the world with? How much of our mind is acquired through experience and effort? Insights that allow us to test babies and find out what's in the mind of a baby before much experience has accumulated—we've only been able to do that for 50 years. It's incredibly inspiring." Feigenson and Halberda—along with many of their colleagues—believe that Piaget was wrong: Babies are not born devoid of knowledge. In fact, their studies have shown that babies come pre-equipped with a rather sophisticated body of knowledge in some cases, like the ability to do basic math.

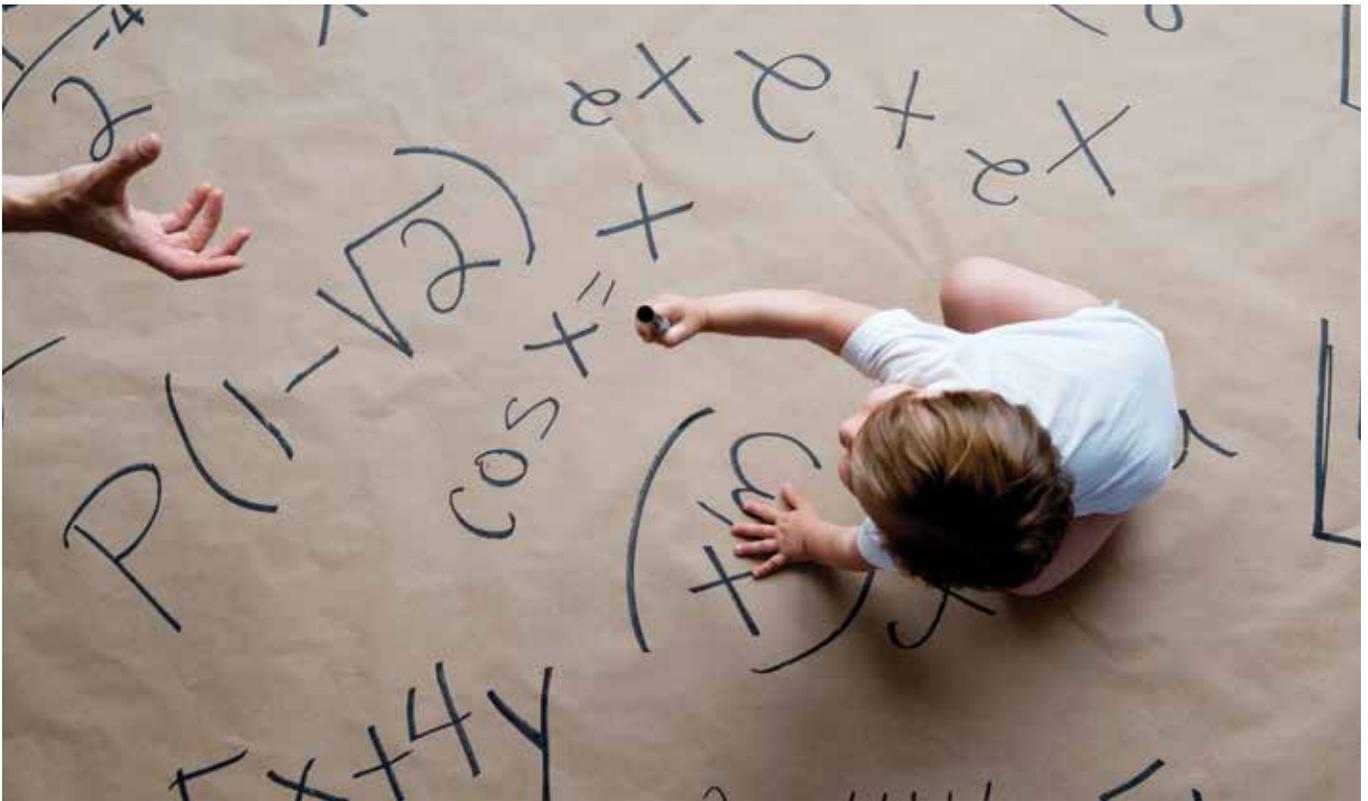
Many developmental psychologists, however, are skeptical of such "super baby" studies, as critics have dubbed them. Marshall Haith, a psychologist at the University of Denver, has written that researchers who rely on looking time to draw conclusions about infant cognition are committing "psychological felonies" and contributing to a "theoretical muddle" in the field of child development. In basic terms, Haith and other skeptics contend that there are other explanations for why an infant might look longer in a given study, perceptual reasons that have nothing to do with cognition. For example, an infant who looks longer at a ball rolling through a solid

wall might simply be reacting to the novelty of the ball being on the other side of the wall, rather than to the physical impossibility of the action.

But Halberda says such a reductionist approach begs the question: If the mind of a baby is initially more or less blank, how is knowledge acquired? As he puts it: "You could never learn how object A supports object B"—for instance, a table supporting a cup—"unless you first understand that object A is *separate* from object B. If you don't have some fundamental abilities at the get-go, you're not going to be able to learn." Looking-time outcomes have paralleled one another in numerous domains of knowledge, he and Feigenson say, and studies in adults and newborns are further evidence of the method's power. In studies with adults, looking-time measures mirror verbal ones, and babies just 3 days old look longer at an image of their mother's face than that of a female stranger.

"Looking is just a way of orienting your attention," Halberda says. "From the moment they're out of the womb, the baby will orient toward stimuli that are attention grabbing to the infant. In a way, that's all we want to know from the looking time: *Did you notice this?*" And, Feigenson and Halberda say, other methods of measuring infant reactions to stimuli—changes in heart rate, blood flow, and electrical activity within the brain, for instance—have provided converging evidence that looking time, simple as it is, is revealing hidden complexities within the infant mind.

emil, my 9-month-old son, bangs vigorously on a xylophone, oblivious to the contribution he will soon make to science. The waiting room of the Laboratory for Child Development is full of toys; even the interior design is friendly. Rainbows of marbles stud the sconces, and the large windows separating the office from the waiting room are shaped like a triangle, a circle, and a square. Graduate student Aimee Stahl guides us into a small room dominated by a puppet stage. The baby is to take part in a study on whether infants learn more after experiencing surprise. We place him in a high-chair facing the stage, and I sit behind him in a corner. A camera embedded in the stage will record his reactions, while another, behind me,



records what he is seeing. The curtain rises and a hand—Stahl’s—appears.

“Look!” Stahl says with exaggerated animation, wiggling a flat piece of black foam core. Emil kicks his chair and whines. “Watch this!” she says, and a blue foam block with googly eyes and a pink nose descends onto the stage. Emil writhes, craning his neck to see me. Stahl decides he might be more comfortable on my lap and we rearrange. The curtain rises once more, Emil quietly sucks on his fingers, and the puppet show begins in earnest. It’s not long on plot. There are two characters, the blue block and a bright green ball with red spots. At one point, the blue block character disappears behind the piece of foam core and reappears behind another, on the other side of the stage, as if by magic. (This is the surprise element of the trial.) Not long after, Stahl attempts to “teach” Emil that the blue block—as opposed to the green ball—makes a rattling sound. He is then shown both of the characters once more, accompanied by the rattling sound. If he has learned his lesson, he ought to look toward the blue block when he hears the rattle.

The whole show takes just six minutes. Despite an in-depth discussion about the study prior to the show, I have no idea how one could draw any conclusions based on Emil’s behavior. A few days later, I return to the lab, babyless, to find out.

The coding area looks a bit like the control room of a low-budget television station. Banks of monitors are ranged along one wall, interspersed with piles of VHS tapes and labeled plastic tubs: “Cartoon Logic,” “Ball Search,” “Box Volume.” A panel for controlling video feeds from the testing rooms—there are four—is labeled “Do not touch EQ settings on pain of fiery death.” Stahl sits down at one of the monitors to demonstrate how looking time is coded, pulling up a video of subject EL154. A still image of Emil sitting in my lap appears, and Stahl plays the video in slow motion. (Someone who did not witness the puppet show will do the actual coding, to avoid any unconscious bias.) For each tenth-of-a-second frame, she clicks on an option: Left, Distracted, Center, or Right. These correspond to where the baby is looking during that slice of time. She clicks at lightning speed, without hesitation. “I’ve coded literally thousands of babies at this point,” she

says. “It’s very clear.” And in this case at least, it does seem remarkably easy; though the baby’s other movements—the fingers in his mouth, his kicking legs—are erratic, the movement of his eyes is easy to track and clearly related to what is happening on the stage. (After analyzing the data, Stahl tells me that Emil did indeed learn that the blue block was associated with the rattling sound.)

The surprise study has not yet been published. Yet it is clear, Feigenson says, that at least under the conditions they’ve tested thus far, babies and children are better at learning right after their expectations have been violated. That, she suggests, may be why they look longer at surprising events: They are using the event as an opportunity to learn. “One of the outstanding questions is how we can harness that to think about children’s learning in other settings,” she says. “How broadly does this apply?”

The questions raised by this study are already leading to many new avenues of research, as most of their work does. But the co-directors of the Laboratory for Child Development also derive inspiration from a source closer to home: their children.

feigenson and Halberda met at New York University, where both received their doctorates in cognitive psychology. They went on to Harvard and, as newlyweds, worked together at a lab in Paris before coming to Johns Hopkins to form the Laboratory for Child Development in 2004. Their two daughters, now 6 and 4, have taken part in nearly all the lab’s studies. “They love it,” Feigenson says. “They say, ‘When can we come to work with you again?’”

The demands of parenting have sometimes provided fodder for research. “We wanted to finish dinner and our 2-year-old needed entertainment,” Halberda says of one such occasion. To occupy their restless toddler so they could eat in peace, the couple hid M&Ms throughout the living room. While they ate, their daughter periodically returned to ask for clues to find them. The game led to an ongoing study about the precision of spatial memory in children. Four- and 5-year-olds are tested on how many hiding places in a grid with 36 cubbyholes they can remember at once, and in what configuration. (Preliminary results indicate that children of this age have a good memory for the locations of up to five hid-

den objects, particularly if they are hidden in a geometrical configuration.) Feigenson keeps a notebook for ideas like these. “Trial and error, but some of them do end up being gems,” she says.

Once the question has taken shape, the design stage—how that question is asked—kicks in. One important consideration in designing a study is that the trials be fun. “You have to have a sort of sixth sense for what kids enjoy and what kids can and can’t do,” Feigenson says. “They’re not going to do it because it advances science or because they get \$10 afterwards.” With very young infants, the studies often involve brightly colored images on a computer monitor, like yellow smiley faces, accompanied by silly noises. Older infants watch puppet shows, and studies with children 3 and older tend to take the form of games: stuffed animal races, finding a hidden prize, matching the image of a face with a voice.

But until recently, the scientists struggled with children between the ages of 1 and 2, who do not care to sit passively in a highchair and watch puppets but also cannot understand complicated verbal instructions. “You’re kind of at an impasse,” Feigenson says. “So we wanted to try and develop some way of assessing those kids’ knowledge in a very natural way. What do kids like doing at that age? One that a lot of parents will recognize is that they’re interested in putting things in and taking things out of containers.” In collaboration with a former adviser, she and Halberda devised a task in which children search within a box for hidden objects using their hands. Here, that sixth sense about how children see the world allowed Feigenson and Halberda to develop a new way of assessing knowledge, one that has since been used in dozens of studies.

Over time, the lab has developed rules of thumb, some of them unexpected. Babies, it turns out, “fuss out” of a study more often if the researcher is wearing black. Beards can also be a problem. And researchers must avoid jewelry and manicures so as not to draw undue attention to their hands rather than the puppets. Well-meaning parents who nudge a baby to pay attention or encourage a child to choose a particular object are another potential obstacle. Even when all such factors are controlled for, children sometimes cry, refuse to participate, throw up. Feigenson laughs. “Our enterprise involves some

The 2011 study found that there is a link early in life—by age 3—between a child’s approximate number system and how well he or she performs in formal mathematics.

complications that are just different from what other scientists encounter,” she says.

But designing a specific study is not just a matter of making sure parents are coached and children are having a good time. The study, like any in science, must also answer a given question without introducing unplanned variables that could bias the results. The process thus calls for a blend of creativity and rigor. “It’s like being a horse whisperer or something,” Halberda says. “You don’t know that you have an aptitude for it until you get your hands dirty a bit and try.”

Given that even a baby’s most basic desires can be difficult to read, it might seem absurd to imagine asking something like whether they can do algebra. But postdoc Melissa Kibbe, in collaboration with Feigenson, has developed a “puppet show” to do just that. In brief: An opaque pitcher always pours the same number of pom-poms—say, six—into a transparent receptacle that already contains some pom-poms. (This quantity varies each time.) The idea is that the infant, by watching how the number of pom-poms in the receptacle changes after the pitcher pours, gradually learns there are six pom-poms in the pitcher, without ever directly seeing them. After a number of trials, the infant grows bored—her looking time decreases—at which point Kibbe suddenly pours a different number of pom-poms into the receptacle. Infants tend to look longer at this event, suggesting they recognize that something is amiss. They have, without saying a word or putting a pencil to paper, solved for x .

the discovery that babies can do algebra may prove too conceptual to make waves outside of academia. But one body of research from the lab has recently made a big splash. MSNBC, *The New York Times*, and *Time*, among others, covered a 2011 study led by postdoc Melissa Libertus and co-authored by Feigenson and Halberda. The study concerned the approximate number system—that gut ability that helps us estimate numbers, as when we choose the fastest line at the grocery store by eyeing what’s in the carts. Chimpanzees, rats, even guppies have an approximate number system, as do newborn babies. In 2008, Feigenson, Halberda, and another collaborator found that, in teenagers, individual differences in

the approximate number system correlated with differences in formal math abilities. And in a 2010 study, Libertus found that infants vary widely in their precision: As young as 6 months, some have a more precise number sense than others. The 2011 study found that there is a link early in life—by age 3—between a child’s approximate number system and how well he or she performs in formal mathematics.

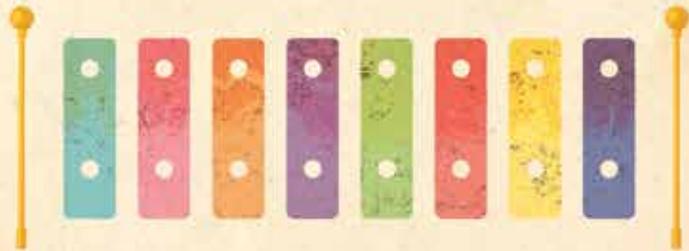
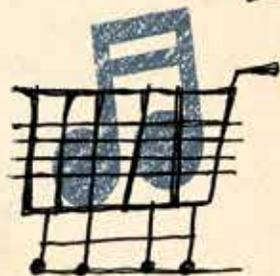
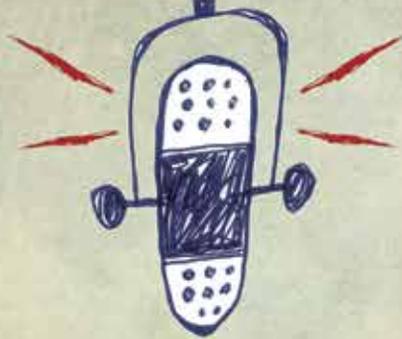
“That this primitive thing we all have would be linked to this very rarified, fancy, symbolic human ability is surprising,” Feigenson says. But she and Halberda say the popular press and even some in the scientific community have misinterpreted their results. (*The Toronto Sun* ran one of the more thunderous headlines: “Math ability pre-destined.”) “We never said that your math ability is written in your genes,” Halberda says. “And actually we don’t believe that.” A related, still unpublished, study with both identical and fraternal adult twins indicates that individual differences in precision are very likely not genetic, though they clearly arise quite early. An Internet-based study Halberda co-authored recently found that one’s approximate number system appears to gradually improve throughout life, peaking late, at about the age of 30. And yet another (unpublished) study out of the lab, involving a simple computer game, indicates that the approximate number system can be improved through training, at least temporarily.

Feigenson and Halberda’s approximate number system research, like much of their work, may eventually have practical applications, perhaps influencing the way math is taught. But it is primarily the thrill of discovery that drives them. That, and their obvious affection for children. “I love babies and I love kids,” Halberda admits. But Feigenson says that even when we find children cute, it is, in part, because they are mysterious to us.

“Why is it that some people love babies?” she asks. “You see the baby doing something so simple—reaching for a bottle, watching something fall to the floor—and then do it again and again, 20 times in a row. What is driving those behaviors? Unpacking those mundane daily mysteries tells us something fundamental about the human mind.”

Andrea Appleton is a freelance writer based in Baltimore.





Composer Oscar Bettison fights the English disease with wrenches, tuning forks, and dangerous beauty.

BANG ON



Oscar Bettison was 8 years old, as he remembers it, when he first tried to create music from the sounds in his head. He wrote down what he thought were the right musical notes, but “it didn’t sound like I thought it would. I think that’s what got me hooked. I’m still trying to get closer and closer to the thing that’s in my head, trying to make notes on paper sound like this nebulous thing.” Transforming a nebulous thing into music has been Bettison’s life since his midadolescence in London. He doesn’t start with anything that could be called a tune. He starts with a “weird, hazy, tenuous aural image” and then spends months learning what happens when he applies to it the grammar, syntax, and logic of music.

Dale Keiger | ILLUSTRATIONS Walter Vasconcelos

“There’s something about cutting through refinement a little bit. It’s not that refinement is a bad thing. But there are times when it can get in the way.”

Oscar Bettison

When Bettison, who teaches at the Peabody Conservatory, talks about this process, words like “danger” and “vulnerable” and “uncomfortable” show up with unexpected frequency. He talks about “dangerous beauty.” He does not dispute the beauty of the love theme from Tchaikovsky’s *Romeo and Juliet*. Of course it is beautiful, he says, beautiful like a classic English flower garden is beautiful. “But if you go out into a desert, there’s a beauty there, too, a very cruel beauty. To me that’s more beautiful than any sort of nice botanical garden because there’s a danger to it. You’re aware that this landscape can kill you. It heightens the beauty.”

An integral element of his composition practice is putting himself in a musical place where he has never been before—uncomfortable—without much idea of what to do next—vulnerable—and relying on his fertile imagination and the fundamental logic of music to find a path to something beautiful. Along the way, he might apply 16th-century rules of counterpoint to one section of a piece and in the next instruct a percussionist to bang on a xylophone fashioned from wrenches, or a violinist to use a foot pump to simultaneously play a melodica with a few taped-down keys that make it sound like a broken accordion. Parts for wrenches and altered melodica—Bettison calls these inventions “Cinderella instruments”—appear in his composition *Livre des Sauvages*. He scored a later work, *Apart*, for tuning forks set in vibration by the musicians and then touched to contact microphones. He wrote *Junk* for orchestra, soprano saxophone, and percussion instruments fashioned from scrap he had scavenged from junkyards.

His most ambitious work to date, the 65-minute *O Death*, was a collaboration with the Dutch sextet Ensemble Klang. He stipulated that each member of Klang had to play his or her primary instrument, plus at least one other. So not only could he expand his sonic palette beyond the six instruments of the group’s standard setup, he achieved a vulnerable quality by forcing the players to work outside their reassuring mastery. “There’s something uncomfortable there that I really like,” he says. “A difficulty. A tension. There’s something about cutting through refinement a little bit. It’s not that refinement is a bad thing. But there are times when it can get in the way.”

Bettison was born 37 years ago in Jersey, Channel Islands, which are closer to the Normandy coast of France but part of the United Kingdom. (He now lives in New Jersey and has learned that when he says he is from “Jersey,” people take him to mean somewhere at odds with his English accent.) He demonstrated enough talent and interest in childhood violin and piano lessons for his parents to enroll him in the Purcell School, a music school in London, when he was 10 years old. “It was one hell of an education,” he recalls. He remembers days that began with 50 minutes of Kodály Method ear training exercises, singing Hungarian folk songs in close intervals until he attained near-perfect pitch. When he was around 15, there were twice-weekly lessons in the 16th-century counterpoint that still informs his composing.

After a few years at Purcell, he began to think of himself less as a violinist and more as a composer. Two things contributed to this change of heart. One, he could hear that he was not outstanding as a player. “When you realize that you’re OK on an instrument at a school where there are people who are completely exceptional at that instrument, you kind of go, ‘Well, yeah...’” Two, he was not sufficiently fond of practice to gain ground on the exceptional kids. When he arrived at Purcell, he liked to play the violin, but that was not the same thing as applying himself to mastering it. By the advent of his teenage years, about the only thing he enjoyed that might be called practice was banging around on percussion, and not orchestral percussion but a drum set better suited to accompanying the Iron Maiden records that he liked. “You’re in this high-pressure environment, and if you don’t want to practice you aren’t going to get very far. Even now if you ask me to practice something on the piano I’ll just be like, *ughhhhhh*. But I can sit down and work on paper composing for hours and be happy. Whatever weird brain wiring I have is totally set up for that kind of thing.”

Once he got serious about composing, he played the records in the school library’s small collection of 20th-century composers so often he knew them by heart—Steve Reich, George Crumb, pre-serial Anton Webern, early Igor Stravinsky. To supplement the library, he would



record radio broadcasts of contemporary works by composers such as György Ligeti. One Ligeti concert broadcast included an interview with the composer, which he studied as well. “I played that tape so much I pretty much destroyed it. That’s the thing that would occupy my time, just sitting there and trying to figure out new music.”

He had figured out enough by age 18 to win the BBC Young Composer of the Year prize in 1993. From Purcell he moved on to study at the Royal College of Music in London, then to the Guildhall School of Music & Drama for a master’s degree, then to The Hague to work with composers Louis Andriessen and Martijn Padding at the Koninklijk Conservatorium. At his first composition lesson with Padding, Bettison played some of his music. “He looked at me and said, ‘You have very good technique.’ And I said, ‘Thank you.’ And he said, ‘Ah, I don’t mean that as a compliment. You have the “English disease.” You’re too polite. You don’t say anything like you really mean it. You’re scared of your ideas and you’re scared to say things.’

“I don’t know how many composition lessons I’ve had in my life,” Bettison continues, “but if there was one lesson that totally changed everything for me, it was that one. My mind was literally spinning. He was right and I knew he was right. I just didn’t know how it was going to manifest itself.”

Padding was not done messing with his head. Bettison remembers describing a new piece that he wanted to write. “Martijn said, ‘No, you shouldn’t do that, because that’s the piece you *can* write. You should always write the piece that you can’t write. Never do the thing that you know you can do.’ Which is the greatest piece of advice I’ve ever been given. Now I always try to make myself uncomfortable. I deliberately create problems and challenges for myself. The difficulty is kind of the attraction. It’s addictive, you know? Now, if stuff comes easy to me, I’m really, really suspicious of it. I don’t accept my own ideas. They’ve got to really prove themselves.”

Writing the piece he can’t write forces Bettison to work slowly, which suits him. He used to precede composing music with more pre-composition planning. “The piece [I had in mind] would have an approximate duration, and I’d divide it up. If I’ve got 10 minutes and I’ve got to have five sections, I could do two minutes a section, but that would be pretty boring, so I’d try to define if some sections should have more weight. It becomes this proportional thing, you know?” Now he prefers to start with some tiny element and spend a long time playing around with it, ever so slowly finding his way to something whole. “I sit down and figure out some chords that I like,

His continuous pursuit of the new teaches him, note by note and chord by chord, what can be done with the very old.

not so many, you know, four, five, six. Then I literally just play around with them for weeks. Inevitably what ends up happening is that at a certain point something comes out of that. I think it was a math professor who told his students, 'If 90 percent of the ideas that you're generating are not terrible, you're not generating enough ideas.' I kind of think that about my writing process."

What if he takes a chord that has stuck in his mind and inverts it? What if he tries a melodic line backward? "I'm just trying to find something," he says. "I can literally spend a month doing that. If I come back to those first five chords and decide to just leave them the way they are, at least I've learned that that is really what I want. I go on these weird journeys of discovering what I want and things just start popping out to me." What if he were to apply a rule of counterpoint on this section? And another on top of that? "Music is a very controlled environment, but with three or four simple rules, things can go completely haywire very quickly. Writing music for me is a lot of 'what if' or 'what if I try this?' Some things stick, and 95 percent of things don't."

Because most of his compositions result from commissions, Bettison usually knows the instrumental makeup of the ensemble that he's composing for and has a general idea of duration. When he wrote *O Death*, "I said I wanted to write something at least an hour long. I wanted to see if I could, to be honest. I'll admit to a bit of compositional jockishness, but also I felt I had some ideas that could really stretch into something big." He had a vague notion of writing a sort of requiem, prompted by a folk song, also titled "O Death," in which the singer pleads with Death not to take him away so soon. Ensemble Klang's instrumental lineup includes guitar, trombone, piano, saxophones, and percussion. Before he was done writing, Bettison had added parts for banjo, harmonica, recorder, Jew's harp, melodica, flower pots, and wrenches.

The seven movements of the finished piece did not come in order. He recalls finishing the seventh movement first, followed by two, six, one and five (at about the same time), then four, with the third movement coming last. (He's never been satisfied with the fourth section and says one movement of *Livre des Sauvages* is his way of trying to work out what still bothers him,

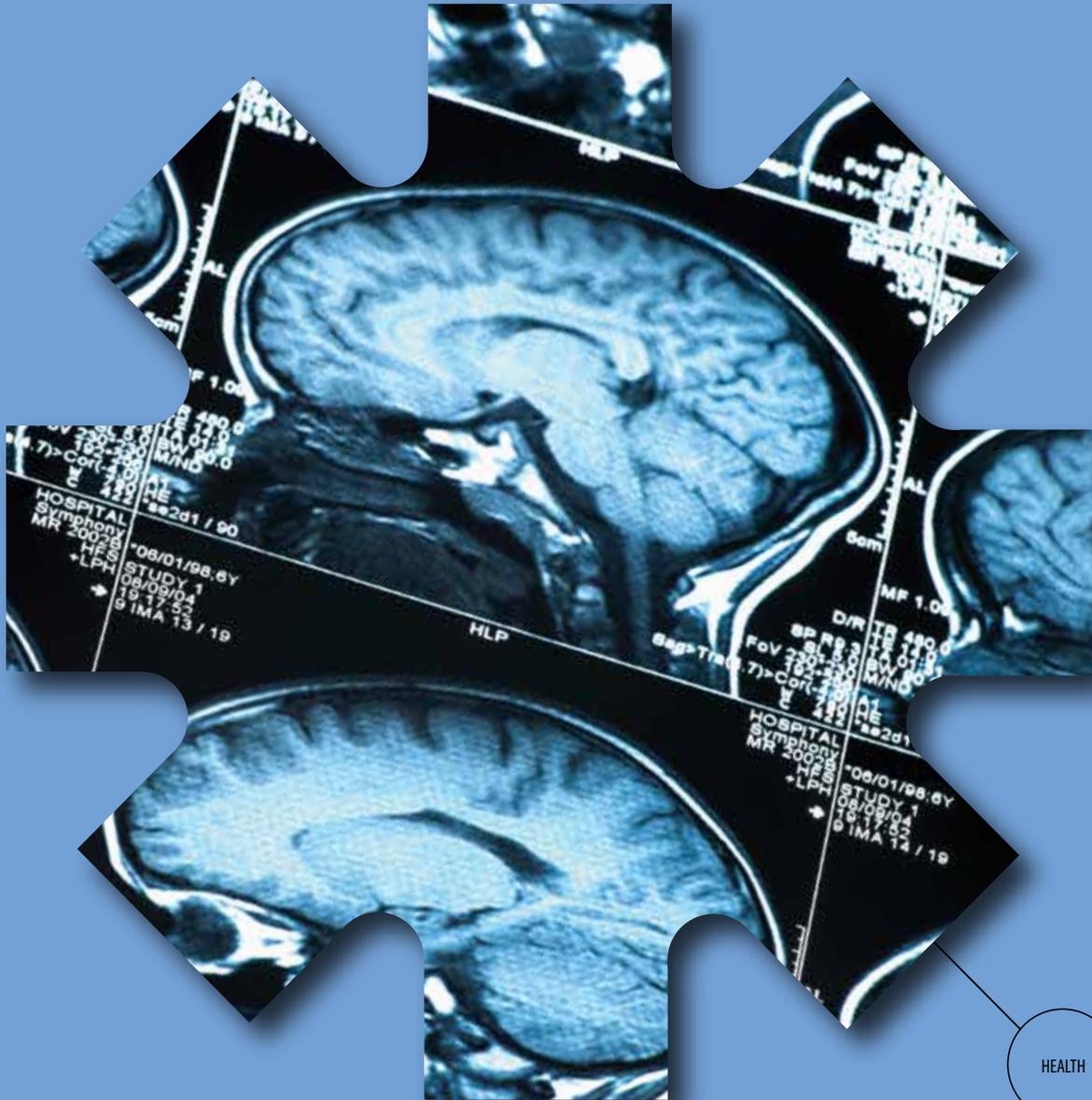
"a bit of therapy for me.") Then he had to go back and shape everything into a single organic piece. "At a certain point it will be obvious that if I have an ending and there's a particular harmony or pitch center there, and I have all this stuff in the middle and an opening, I have to go back and push things around and change things so there's a sense to it, so it feels coherent," he says. "I really like twists and turns and surprises, but I like them to feel inevitable. You can only do that by making sure there's a sort of internal logic to things. It's great when things suddenly take a totally different direction, but there needs to be some kind of narrative thread that means whilst at the time there was a surprise, there's some kind of payoff, some kind of denouement."

The narrative thread of Bettison's creative life is an oscillation between surrendering control and reasserting it, between venturing outside convention and applying conventional rules to shape the inchoate into music, between deliberately getting lost and finding his way. "You have to have a lot of faith that you're going to get there in the end," he says. "The composers who I admire are the ones who are always changing and always challenging themselves to do something new. All the time, you know?"

His continuous pursuit of the new teaches him, note by note and chord by chord, what can be done with the very old. You could argue that humans did not invent music, they discovered what had been there all along, that the grammar and syntax and logic of music, like mathematics, have been around forever, waiting to be found and studied and understood and wielded to organize randomness into meaning. Figuring out what awaits inside a key modulation or tonal relationship or Cinderella instrument animates Bettison as much as the desire to write something beautiful. He says, "You know how they say that you can tell a religion from a cult because a religion will tell you its beliefs up front, while in a cult you just get little, piecemeal things, and that's how they keep you hooked? Composition is a bit like that. When you're a kid, you think, 'Now I've got this thing figured out.' Of course, you haven't! It takes a lifetime and still you've never solved it, never figured it out. I just got hooked into this thing."

Dale Keiger, A&S '11 (MLA), is the magazine's associate editor.

To hear examples of Bettison's Cinderella instruments, visit hub.jhu.edu/magazine



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A vertical photograph of a city street. In the foreground, there's a crosswalk with white stripes on a dark asphalt road. A blue car is driving towards the camera. In the background, there are other cars, buildings, and a clear sky. The photo is partially obscured by the large text on the right.

A GUIDE FOR GETTING LOST

For former Frugal Traveler Matt Gross, the best laid plans are the ones that don't work out. Getting lost, getting sick, running out of money, feeling alone in a strange place—that's all part of the adventure.

Bret McCabe

PHOTOGRAPHY Annie Tritt

“I’ve been to roughly 60 countries, but I haven’t spent more than a couple of weeks in any of them. And that’s a very difficult travel experience.”

Matt Gross

Avowed foodie Matt Gross doesn’t remember what the scrambled duck fetus tasted like. Raw octopus tentacles still writhing on his plate in Seoul, South Korea; curried goat brains in Yangon, Myanmar; chili-drowned rabbit’s head in China—those were delicious. But the taste of *hôt vit lôn*, the half-hatched duck egg he was served in Vietnam, escapes him. Its “suicide-by-skyscraper” appearance simply made a bigger impression than its flavor.

Unusual meals are going to happen when working as a professional travel writer, and eating adventures are merely one kind of tale that Gross, A&S ’96, ’98 (MA), has amassed in his career. The scrambled duck fetus? He ate it. Walk across Europe? Sure. He’s had the flu during a New Year’s Eve holiday in Cambodia; required IV fluids following dehydration and sunstroke at a beach at Nha Trang, Vietnam; and was stricken with the intestinal parasite giardia in the Himalayas—and in a railroad toilet in New Delhi, and in Kenya’s Rift Valley, and somewhere along the roughly 300-mile drive from Mexico City to Oaxaca. He’s hopped around Europe for a week on low-cost airlines. Travel stories? He’s got them. He just wasn’t sure how they might fit into a book.

“I have a very difficult kind of travel experience for making a book,” Gross says, sitting in a side room of a sedately seasoned bar in Brooklyn’s Boerum Hill near his home. An avid runner, he has a lean face that makes his striking blue eyes appear alert and inquisitive. “Most travel books are the account of one journey [or] one place or set of places that are thematically connected. *Eat Pray Love*—there’s your theme right there.

“Me? I’ve been to roughly 60 countries, but I haven’t spent more than a couple of weeks in any of them,” he continues. “And that’s a very difficult travel experience.”

From 2006 to 2010 he wrote the Frugal Traveler column and blog for *The New York Times*. For three to six months out of each of those years he bounced around the globe on the cheap, his only editorial diktats to provide a sense of place and frugal tips. He spent the summer of 2006 going around the world in 90 days, a trek that took him to Portugal, Turkey, Georgia, and Kyrgyzstan before a 48-hour train ride from Ürümqi in northwestern China to Beijing for his flight home. In 2010 he chronicled

his 180-mile walk from Budapest, Hungary, to Vienna, partly retracing the route Patrick Leigh Fermor took in 1933 when the English travel writer started his roughly one-year stroll from the Hook of Holland to Istanbul. In between, Gross slurped noodles in Tokyo and traced his family’s roots in Vilnius, Lithuania. He won Webby Awards in 2008 and 2009 and started the *Times*’ Getting Lost series, traveling with no preplanned agenda. During his *Times* stint his byline became synonymous with the Frugal Traveler column, as he supplemented his reporting with video and photos and interacted with his readers online.

But he wasn’t sure what held his travels together when he started to think about writing a book. A series of anecdotes about unusual items consumed and tales of intestinal woe do not a book make. Nothing united his travels save himself, the guy who passed through place after place after place not spending much time in any one of them.

How to deal with the velocity of travel is exactly what he explores in his first book, *The Turk Who Loved Apples: And Other Tales of Losing My Way Around the World*, which Da Capo Press issued in April. He realized that his travel experience was less about the places he’s been and more about the unpredictability that comes with traveling itself. All those mundane difficulties he experienced—being alone, scared, naive, underfunded, unmoored—had an enriching flip side. Yes, he often felt lonely when in a new place for the first time, but he ended up making new friends along the way. Yes, sometimes he got sick, but he ate authentic versions of everything he ever dreamed of. Yes, things aren’t going to go as planned, but perhaps the plan wasn’t well laid to begin with.

“Once I hit on the idea that I’m good at dealing with bad things—or mostly good at dealing with bad things—it was just a matter of ordering them” into a somewhat instructional framework, Gross says of writing *Turk*. Turns out he did have something to offer readers: a philosophy. “I wanted to get at something deeper than how to do it and what happened and what lesson I learned. I wanted to represent some kind of philosophy of travel—maybe an abstract, totally obscure, opaque, confused philosophy of travel, but after having read a lot of other traveling writing and done a lot of it myself, the part that I felt was left out was what does it all mean? To me or to anyone?”

JIGGETY-JOG

by Matt Gross

Instead of being at home at home, I was at home everywhere else. The process of arriving, setting up camp, and exploring took on a rhythm that my New York life never had. In late 2009, I followed video directions on my iPhone to a spacious apartment I'd rented in Shibuya, one of Tokyo's churning epicenters of fashion, nightlife, and foot traffic. Then I drank a coffee, had a shower and a bath in the voluminous tub, and stepped outside to look for the first of what would amount to nearly 30 bowls of ramen that week. Around me rose a forest of towers, and I could communicate with almost no one, and I could read but a handful of Japanese kanji, and even then I knew only their Chinese equivalents. I'd spent a little time here before—Japan had been my first stop after the 2007 road trip—but this was still a foreign place, unfamiliar and new.

But it didn't feel foreign. As I walked down the street toward Shibuya Station, I was as relaxed as I would have been on St. Marks Place. I was exploring, and I'd always been exploring. Back when I'd lived in Manhattan's Lower East Side, I used to take the opportunity, one weekend night every month or two, to walk almost every block and just see what was going on. New hotel? Synagogue collapsed? There was no project involved—I wanted only to see and to know, and that was what I was doing now in Tokyo. And ah! Here was a ramen shop—not on my list, but I had to start somewhere. I walked in, sat at the counter, pointed to something tasty-looking on the laminated menu, and prepared myself to slurp. Wait, "prepared"? I was born ready to slurp.

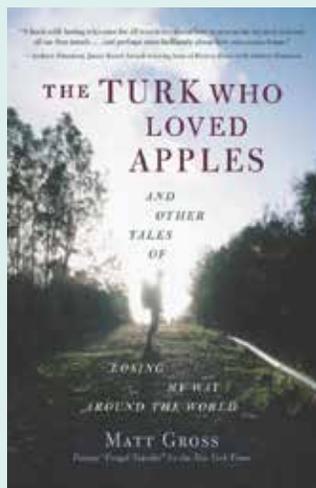
And in a similar way, my Lower East Side strolls were not preparation for my trips abroad, home-based experiences I could translate into new contexts in *Playas del Coco* or *Ouezzane*. Rather, the overseas explorations came first, and the exploratory walks in New York merely recalled that foreign behavior, allowing me to exist at home (such as it was) exactly as I had abroad: with a clearly defined purpose.

That, I think, explains how comfortable I felt in countries and cities and situations seemingly designed to discomfit a traveler: I had something to do—a cultural phenomenon to understand, a money-saving strategy to test, a difficult journey to undertake, the lay of the land to mentally map. In Osaka, a city obsessed with *takoyaki*—battered balls of octopus slathered in mayonnaise and other sauces—I had to find the best.

And in Sa Dec, in Vietnam's Mekong Delta, I was tracking down traces of Marguerite Duras, who'd lived (and loved) there 80 years before.

In New York, where I had permanent lodging and access to all my possessions, I had the freedom to do whatever I chose, but that freedom bred confusion and laziness. I could do anything, but what? And why? And couldn't I do that later? I'd be back here eventually, right? Naturally, there were some constraints. I had to write my articles and pitch new ones and go shopping and cook dinner and wash clothes. But those were flabby errands, infinitely delayable, inconsequential when compared with the trip in which I walked from Vienna to Budapest, a 160-mile trek that left my feet shredded with blisters, my back and knees buckling, my psyche in tatters. Every step was torture, and yet I couldn't give in—this was the route taken by one of my idols, the war hero, polymath, and travel writer Sir Patrick Leigh Fermor, who'd trekked from Rotterdam to Istanbul in the 1930s. Now that was a life with purpose! And I had to measure up to his example, blisters or no blisters, in cozy pensions or under starry open skies. Every morning I'd awake knowing exactly what I had to do, whether I wanted it or not: put one foot in front of the other, again and again, until I just couldn't walk any more. What might happen along the way was yet to be determined, but the structure was there, and it told me one thing only: Onward!

From *The Turk Who Loved Apples: And Other Tales of Losing My Way Around the World* by Matt Gross. Reprinted courtesy of Da Capo Press, a member of the Perseus Books Group.



For Gross traveling is as much a mental experience as a physical one, as potential travelers/readers aren't going to know what they want from travel until they start doing it. It's learned through experience, not by rote.

Gross isn't going to answer that question any more than a philosopher is going to pin down the meaning of life. Instead, *Turk* offers his thoughts on travel thus far, roaming through his misadventures to suggest a perspective that fellow travelers can remember while on their own excursions. Doesn't matter where you're traveling, things will go wrong. Maps will be inaccurate. Food will cause illness. Communication will be difficult. These things are all going to happen, and viewed through Gross' auspicious pragmatism, crashing into the unexpected doesn't ruin the adventure. Just because the world is unpredictable doesn't mean it can't be sublime at the same time.

That's not an attitude he divined from thin air; he had to travel, make mistakes, and write his way there. Born in Concord, Massachusetts, and raised in Williamsburg, Virginia, Gross came to Johns Hopkins as a math major, switched to Writing Seminars, and returned after spending a year in Vietnam to earn a master's in writing. He moved to New York in 1998 and eventually worked as a news editor at foxnews.com and an assistant editor at *New York* magazine before heading to Cambodia in 2004 to do research for a historical novel.

Travel writing wasn't something he thought much about at the time. "I'm glad that wasn't my ambition back then because I wouldn't have known what I was doing," he says. "I was more interested in reading novels and getting inspired by that than going through Paul Theroux, Bruce Chatwin, or Bill Bryson—or travel magazines. I just didn't read them."

Through a friend he emailed *The New York Times* when he returned to Southeast Asia, and when he came back to New York he forged a relationship with the newspaper's travel editors, writing a few freelance pieces that led to the invitation to take over the revamped Frugal Traveler column, which was started by Susan Spano in the 1990s and continued by Daisann McLane in the late 1990s. He learned how to write about travel on the job—in *Turk* Gross amusingly recounts receiving a "get your shit together" email from his editor early in the around-the-world trip after filing an underwhelming column. Toward the end of the assignment he expe-

rienced the pride of finding his writing stride when his editor sent an internal email to the *Times* staff suggesting they read his latest piece.

That's not the only time Gross casually introduces his life into *Turk*. Part of his travel philosophy is that the personal shapes what you want to get out of traveling. His wife, Jean Liu, A&S '96, comes up often, as simple disclosure (he writes that her steady fashion design career is what permitted him to have a travel writer's dream job) and as occasional travel partner. She accompanied him on a few Frugal trips, and they went to Taiwan together to visit her family.

An adventurous eater and cook—Gross is currently an editor at BonAppetit.com—in *Turk* he recounts flying to Taipei, Taiwan, solo in October 2008, a few months before his daughter's birth, to learn from the family cook, A-Mui, how to prepare the meals his wife grew up eating. They'd wake at 6 a.m. to hit the market, a "damp concrete underworld where blowtorch-wielding men singed the hairs off pigs' feet," return home by 7:30 a.m., and around 11 a.m. the lesson began in a compact kitchen. Gross writes: "As she assembled dish after dish—deep-fried pork chops marinated in fermented rice paste, sesame oil chicken, braised pigs' feet with peanuts—I'd take notes, amazed at her practiced efficiency. Five dishes at lunchtime came out in around 20 minutes."

This snippet captures what makes Gross' writing entertainingly informative. He's got a sharp eye for details, a refreshing appreciation for anecdotal brevity, and he candidly introduces the personal. He just happened to be writing about travel during a fortuitous time of the personality traveler. In 2005 Anthony Bourdain's *No Reservations* debuted on the Travel Channel, and 2006 saw the release of *Vice* magazine's *The Vice Guide to Travel* DVD, which included stops in a Pakistani gun market and Chernobyl, and Daniel Kalder's book *Lost Cosmonaut: Observations of an Anti-Tourist*, in which the Scottish writer visits practically unknown ethnic Russian republics, such as Kalmykia on the Caspian Sea and Udmurtia, located some 600 miles east of Moscow. All three are obnoxiously entertaining because they take a louche approach, treating being in a far-flung place and/or eating something odd and exotic as existential bungee jumping.

Gross comes across, in person and in print, as too generous of mind to explore a city or country from a predisposed position. He responds to a place rather than expecting it to accommodate him. Throughout *Turk* he recounts bits and pieces of his travels like somebody remembering birthday gifts he's received, good and bad: writing a column on his PDA while sitting in the back of a Turkish bus; lunching in Calais, France, with refugees waiting to cross the channel to enter England illegally; a tense trip with his brother to eat their way around Montreal; a man coming up to him in Tunisia mistaking him for somebody else. They form a collage of people, places, and scenes through which Gross suggests how to meet people when traveling or how to handle gastrointestinal distress using himself as the example, creating a thoughtful, episodic memoir as practical guidebook.

"When I was writing the book I kept looking through my library and racking my memory and trying to figure out other writers [and] other books that had tackled some of the same problems that I had," Gross says. "I couldn't think of anything, which is not to say that I'm doing something totally unique and new. But it made me think of something: *This is a weird travel book*. And weird can be good."

Weird only in the sense that *Turk* is an old-fashioned approach to a very new thing: a primer on navigating global travel in the information-overloaded 21st century. It isn't a ruminative, George Santayanaesque effort to experience someplace else in order to see home through new eyes, nor is it a simple handbook on how best to evolve from the consumer tourist (read: bad) into the curious traveler (read: good). For Gross traveling is as much a mental experience as a physical one, as potential travelers/readers aren't going to know what they want from travel until they start doing it. It's learned through experience, not by rote.

"Part of the general philosophy of traveling is expect everything to go wrong, so when it doesn't that's just gravy," he adds. "If I go off expecting to get sick and talking about how unprepared I am, when things go OK or even great it feels amazing. I don't know if you'd call it optimistic pessimism or pessimistic optimism. But there's a way that those two things can coexist in expecting and being prepared to deal with calamity and at the same time being open to ecstasy."

That's an outlook that grants anyplace the potential to be fascinating, a function of the *who* as much as it is the *where*. As Gross points out, most travel books are accounts of one journey, one place, or a thematically connected set of places: Bill Bryson's *A Walk in the Woods*, V.S. Naipaul's *An Area of Darkness*, Paul Theroux's *Dark Star Safari*, Bruce Chatwin's *In Patagonia*. By focusing on breadth instead of depth, Gross calibrates the brain for how many of us already travel. Few of us have the time or money to spend a month, much less a year, somewhere, but we might be able to get there for about a week. And while lonelyplanet.com might offer hints on where to sleep, eat, drink, and the cultural sites to see, *Turk* advocates unfettering yourself from the pressure of cramming everything into one trip and being disappointed.

"One of the points that I try to make about travel in the book is that you have to think long term," Gross says. "It might be your first trip to Paris or Moscow but it doesn't have to be your only one. It's the first trip abroad of many trips abroad, and with each one you will learn more and more about what you like and how to use your time."

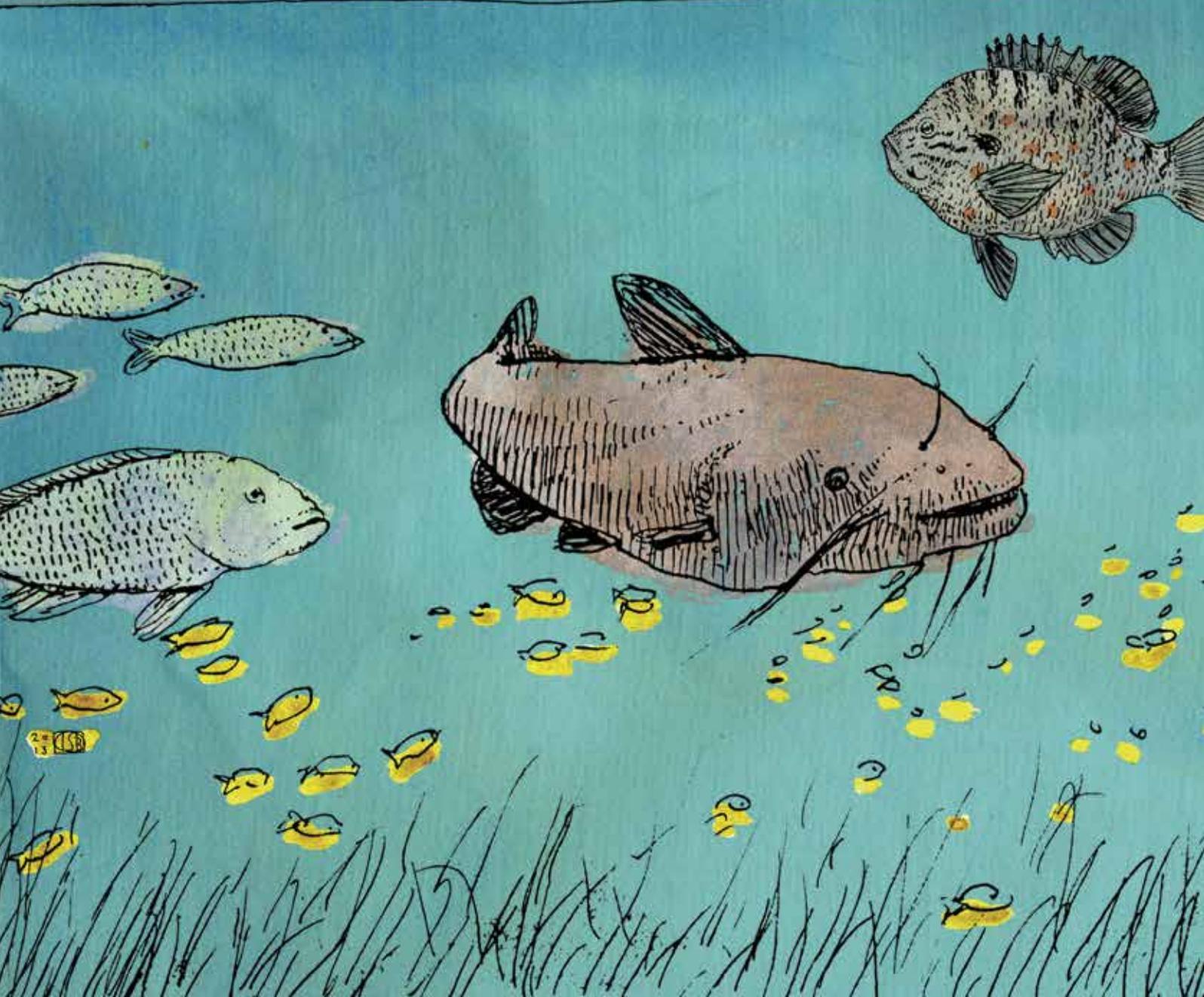
It's a long-view approach that Gross' writing career reinforced. Early in *Turk*, Gross recalls getting lost on his first ever overseas trip, noting how the vertigo of feeling untethered often recurred during his column-writing adventures. In fact, in 2007 he used the anecdote to open the piece about bouncing around Europe on low-cost airlines.

"The idea was every day for a week I'd fly a different low-cost carrier," Gross says. "The route was Geneva, Prague, Copenhagen, London, Fez, Paris, Budapest, Geneva. I started the story in Denmark with the tale of having been lost in Copenhagen when I was almost 8 years old, where I got separated from my father and there was a fireworks scene and it was my first trip overseas."

He filed to his editor Stuart Emmrich, who liked the piece but told Gross to change the beginning. "And I thought, 'This is an important thing that happened to me,'" Gross says. "It feels relevant, it feels connected to being sort of lost in Europe on these cheap airlines."

Gross laughs when remembering Emmrich's wise words. "My editor said, 'Save it for the book.' So I did."

Bret McCabe, A&S '94, is the magazine's senior writer.



I'm getting sort of used to the idea that the lab is my world and is going to be my chief existence until I get my degree," Rachel Carson wrote to a close friend in November 1929, having just started a graduate program in marine biology at Johns Hopkins. "Just so one doesn't become that pitiable spectacle—'a typical biologist' (or typical student of any sort) in the process, it's all right."

Carson never became that typical biologist. Instead, after four years of academic and financial struggle, she left Johns Hopkins with a master's degree and turned from doing science to writing about it. Working in government and freelancing on the side, Carson eventually published her way to fame with her 1951 best-seller, *The Sea Around Us*, which combined advanced marine science with clear, elegant prose. Carson's next book, *Silent Spring*, a withering indictment of pesticides, turned her into an international celebrity. She appeared on national television and testified before Congress; her book even prompted President John F. Kennedy to appoint a commission to investigate whether her findings were true. (They were.)

It seems safe to say that none of Carson's professors anticipated she would become one of

Right Fish, Wrong Pond

If Rachel Carson had been a better scientist while at Johns Hopkins, she might never have become the science writer who sparked the environmental movement.

Gabriel Popkin

ILLUSTRATIONS Lauren Simkin-Berke

While at Johns Hopkins, Rachel Carson made an important journey from inexperienced biology student to jaded researcher to skillful narrator of nature.

Johns Hopkins' most famous and influential alumni. In a lukewarm but typical recommendation, Herbert S. Jennings, the head of Carson's department while she was there, wrote, "Miss Carson is a thorough, hard working person, not brilliant, but very capable, and with a good knowledge of biology. . . . She is thoroughly dependable and will continue to be a satisfactory teacher." Carson later acknowledged that she, too, did not foresee parlaying her disappointing academic career into a successful literary one. "It never occurred to me," she told an audience of female journalists in 1954, speaking of her education, "that I was merely getting something to write about."

But in Carson's letters, as well as the writings of her friends and mentors, we can see her getting that something to write about. Her course and lab work put her in contact with some of the top biologists of the time and gave her a background in subjects like organic chemistry, genetics, and physiology—all of which would be crucial to her later critique of pesticides and toxins. Her master's thesis, while not groundbreaking science, shows her learning to observe and describe living beings in precise detail. Those who knew her tell of her attention to detail and her enthusiasm for studying the natural world, and for sharing what she learned.

While at Johns Hopkins, Rachel Carson made an important journey from inexperienced biology student to jaded researcher to skillful narrator of nature. Her education didn't quite give her what she needed to become a successful researcher. But it gave her something that might have been more important—the foundation to become the most famous science writer of her age and the voice that launched the environmental movement.

I can remember no time, even in earliest childhood, when I didn't assume I was going to be a writer," Carson told her 1954 audience in a speech later published in *Lost Woods: The Discovered Writing of Rachel Carson*. Indeed, she had her first story published in *St. Nicholas*, a children's magazine, at the age of 11. She later earned a scholarship to study English at the prestigious Pennsylvania College for Women (now Chatham University) in

Pittsburgh. But Carson also excelled in science and was steered toward biology by an influential professor named Mary Skinker, who became her mentor. By the time Carson graduated from PCW in the spring of 1929, she had in hand a \$200 scholarship to continue her studies at Johns Hopkins.

Carson was preparing to enter graduate school at a precarious time for women in science. Although around a quarter of the students in her program were women, the faculty teaching them—and thus their academic role models—were all men. And women scientists had far worse employment prospects in academia than their male colleagues—their best opportunities typically involved teaching posts at schools like PCW, or work in government agencies.

Carson spent part of the summer of 1929 at the Marine Biological Laboratory in Woods Hole, Massachusetts, where she met her Johns Hopkins research adviser, the marine biologist Rheinart P. Cowles. To increase the chances that she would earn her master's in two years, Cowles advised Carson to begin narrowing her thesis topic right away. The summer of 1929 was also the first time Carson saw the ocean, which would become her enduring passion and literary muse. That September, after a pleasant but brief sojourn at the Marine Biological Laboratory, she headed for Baltimore. She had found an apartment on Homewood Terrace, a quiet street two blocks north of University Avenue. (The university's only dormitory did not accept female students.) From her apartment it was a short commute to Gilman Hall, which housed the zoology lab.

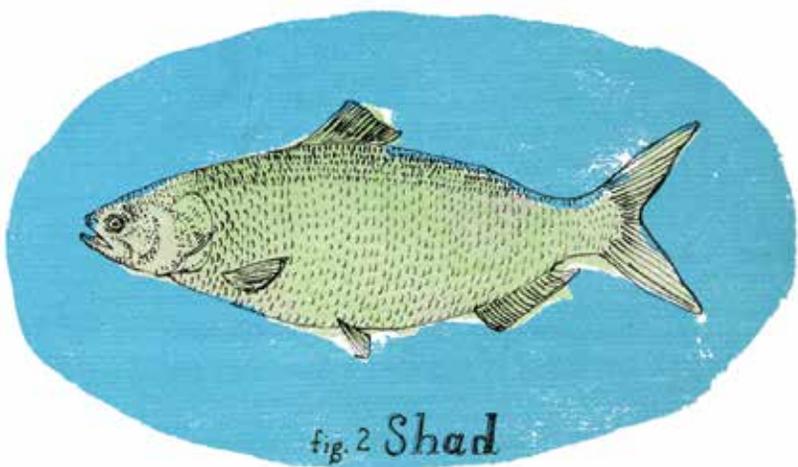
Johns Hopkins, though a far cry from the cozy PCW, impressed Carson, at least at first. "I do like it tremendously," she wrote to a friend in one of several letters now archived at the Rachel Carson Council, a nonprofit organization dedicated to Carson's legacy. "The professors are splendid to work with and the students are a dandy crowd." But her challenges quickly mounted, beginning with her four science classes. "Chemistry is of course my chief agony, but really it isn't as bad as I thought it would be," she wrote. "I'm getting used to tearing through the experiments as fast as the men do." At a

moment of low inspiration, she also revealed a slyly subversive attitude toward her studies: “I just tell myself that in ten years it won’t make any difference, except that I can say ‘oh yes, I had Organic at Johns Hopkins.’” By the following spring, though, Carson had triumphed, both in chemistry and in confidence: “I got an 85 in the course, and I never was so proud of an 85 in my life! It’s fun to take a course with about seventy men and one other girl, but stiff!”

But ominously for her future as a scientist, Carson had trouble making headway in her research. She began with a study comparing the brains and cranial nerves of various reptiles, but after more than a year sectioning snake and lizard heads she had little to show for it. (Her friend Dorothy Thompson Seif speculates in a memoir that the investigation Carson hoped to do might have been beyond the scope of technology of the time.) Declaring the reptile study a bust, Carson turned briefly to a project involving squirrel embryos. But here, too, she ran into trouble. “The squirrels would not breed, and there was just nothing to do about it,” she wrote in a letter, adding that her Texas dealer also lost his animals to a fire. “I have made so many false starts along lines which yielded no results, but that, as I am learning, is the fate of most people.”

Despite the course work and lab work, Carson’s life wasn’t all drudgery. She took intense interest in her friends’ lives and enjoyed occasional visits with them. When she managed to get outside, she found her mid-Atlantic surroundings a pleasant change from cloudy and polluted Pittsburgh. “I do like the Baltimore climate very much on the whole,” she wrote. “Most days are beautifully clear and sunny. Many roses are to be seen in bloom in the gardens, and chrysanthemums every where. Last night I got a beautiful bunch of them in the market for .35. When it rains it surely rains hard, because of the oceanic climate, I suppose.”

But Carson’s academic challenges were soon compounded by financial ones. “The old bug bear of impecuniousness,” is how she put it in a letter to Seif. Her family had never been well-off, and when the Depression hit, her father’s already struggling business career struggled even more. So in the spring of 1930, Carson persuaded the whole crew—her parents, brother, sister, and two



nieces—to join her in Baltimore. They moved to a house in Stemmers Run, a suburb east of the city. Carson now had an 11-mile commute by trolley, but she lived surrounded by woods and only two miles from the Chesapeake Bay. She supported her family financially during this difficult time. Her brother, Robert, an electrician, also provided some income, but in the Depression, this could be unreliable: Carson biographer Linda Lear writes that in exchange for a television repair he once received a litter of cats—which Carson welcomed.

Her financial woes increased as graduate school wore on. After her first year the university raised tuition by half, to \$300, and she was forced to become a part-time student. She found a position working with the rat and fruit fly colonies in the lab of Raymond Pearl, a pioneering Johns Hopkins biologist who studied the effects of heredity and environment on longevity. Although genetics was not why she came to Johns Hopkins, Carson valued the opportunity to be part of the Pearl lab’s dynamic environment. “His laboratories are certainly the real thing, and it’s a decidedly worth while experience to work in them,” she wrote. But she also recognized the toll it was taking on her own research, complaining, “I just don’t have time even to think any more, —it’s worse this year than ever before. I feel sometimes as though I’m not getting any where as far as the degree is concerned.”

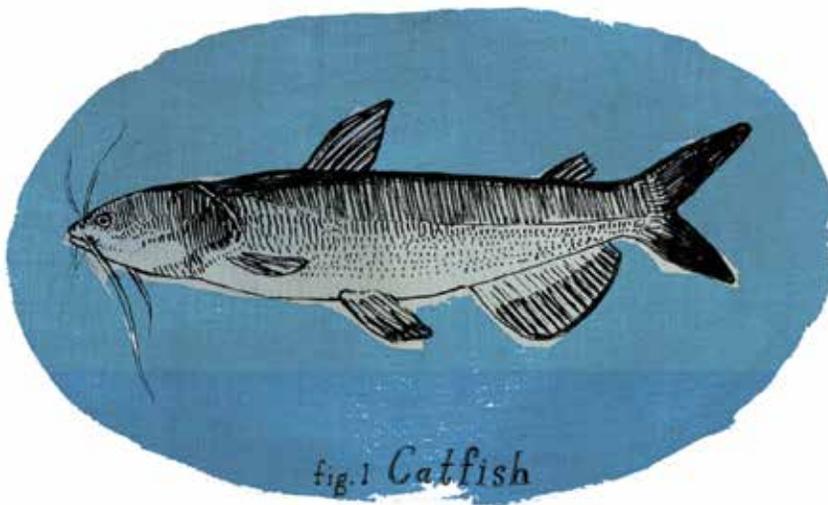
Carson also earned money teaching summer classes at Johns Hopkins and in the University of Maryland's Dental and Pharmacy School. But like her family obligations, teaching pulled her away from what she had come to Hopkins for: research. After her two false starts, she asked Cowles for a project she could finish quickly. He suggested she describe the development of the pronephros, a kidneylike organ that appears and then disappears in the urinary system of developing fish. The work was painstaking—Carson had to section catfish embryos at each day of their development, stain the sections, and draw them in detail while peering into a camera lucida, a device that superimposes the image onto the drawing surface. But finally she was making progress, albeit toward a more modest goal than she had originally set out to achieve. Nevertheless, she wrote to a friend in August 1931, "It will be nip and tuck to get the thing done and the thesis written in acceptable form by next May."

Carson earned her master's degree in 1932, a year behind schedule, with a 108-page thesis titled "The Development of the Pronephros During the Embryonic and Early Larval Life of the Catfish." The writing, while scientifically authoritative, is dense and abstruse. With awkward

phrases like, "An extensive and accurate investigation of the whole subject therefore remains a desideratum," it yields little hint of the graceful style Carson would soon develop in her professional writing. But the research, while not blazingly original, was certainly solid. Carson's adviser Cowles described the study as "a good one [that] constitutes a worthy contribution to our knowledge of the urinary system of fishes," and wrote that "the investigation has been done with care and the description of the results shows that it was undertaken from an exceptionally critical point of view."

Cowles alone of the Johns Hopkins faculty seemed to see a future for Carson in research, describing her in a recommendation as "clear-headed and accurate" and "capable as an investigator." Most of the other faculty members seemed to tend toward Jennings' perspective—they commended Carson's teaching, perhaps sincerely, but perhaps also suggesting by omission that they didn't expect much from her as a researcher. Carson's slow progress may have played a part in this skepticism, but it is hard not to wonder how her gender influenced her professors' evaluations. At any rate, they certainly didn't make for a strong foundation on which to build a research career.

Her research struggles notwithstanding, Carson from all indications intended to go on for her doctorate. She spent another summer at Woods Hole, though Lear writes that what she did there is lost. Carson also continued teaching at the dental school and began a new line of research on how different levels of water salinity affect eels. In fact, the eels seemed to animate her more than any of her previous projects. Her friend Seif described in an unpublished manuscript a visit to Carson's lab in fall 1932: "[Carson] continued to talk while she was assembling her testing equipment. 'Eels are fascinating creatures. How they can adapt as larvae to living in fresh water and then to sea water is not well-known. Did you know that as almost elvers [baby eels] they migrate hundreds of miles from the seas, where they are born, into the freshwater streams and ponds of our forests.'" Carson went on like this for a while, then caught herself: "That was quite a spiel. I do get carried away." But perhaps,



rather than getting carried away, Carson was simply doing what came naturally to her: storytelling about nature.

Despite finding a subject that apparently sparked her interest, Carson did not complete a doctorate. There seems to be little documentation on this period of her life, but what exists confirms her extremely difficult financial situation. Her university personnel file lists five “partially dependent” family members: mother and father, sister, and two nieces (the cats apparently didn’t count). On top of being dependent, her father and sister were in poor health; both would die in the next few years. Whether due to financial strain, research difficulties, lack of faculty support, or all three, Carson left Johns Hopkins around the beginning of 1934, with no plan for what she would do next.

Even with an academic career out of reach, Carson was not leaving empty-handed. She was now an expert in marine biology, having studied with some of the top people in the field. She also had her undergraduate background in English, which gave her a broader humanistic perspective on science that many “typical biologists” lacked. And she had a particular knack for seeing and describing precisely. The trick was harnessing these strengths to earn herself and her dependents a living during the worst of the Great Depression.

Carson’s first break came through her former undergraduate mentor, Mary Skinker. Skinker connected Carson with Elmer Higgins, a division chief at the U.S. Bureau of Fisheries who needed someone to write a series of radio scripts about marine life. The bureau’s scientists and a professional writer had all failed at this task, and Higgins was desperate enough to take a chance on an unproven writer. His gamble paid off: Carson had the essential combination of deep expertise in the subject and a rare ability to translate her knowledge into compelling and accessible stories. She took the material and made it shine.

Carson then repackaged some of the research she had done for the scripts and sold it to *The Baltimore Sun*, demonstrating the entrepreneurial pluck that would propel her throughout her career. Her article came out as a 4,000-word feature titled “It’ll Be Shad-Time Soon,” which told

readers about the decline of an important Chesapeake Bay fish. The piece earned her \$20, and it began a productive relationship that led to a series of feature articles in *The Sun* and its affiliated newspapers. It also gave Carson an opportunity to hone her narrative voice outside the strictures of government writing.

In these early writings, Carson’s ecological perspective began to emerge. In “Shad-Time,” for example, she described a “delicate balance” between the fecund shad and its various predators—a set of relationships that she noted had been “rudely disturbed” by human activity. And she made her first calls for humans to change how they interact with fellow species: “If this favorite of the Chesapeake Bay region is to hold its own against the forces of destruction, regulations must be imposed which consider the welfare of the fish as well as that of the fisherman.” In another article she surveyed the decline of wildlife in America and warned that by draining wetlands, plowing prairies, and unleashing the Dust Bowl, humans had done something more profound: They had altered the “balance of nature.” Decades later, she would make the same arguments about pesticides.

Carson was also honing her distinct literary voice. Her description of shad embryology, for example, could not have been more distant in tone from her dispassionate master’s thesis: “Bit by bit, the delicate tissues take form. Unblinking eyes peer through the confining walls. Slender threads of blood vessels lead to a pulsating, crimson sac, the heart. V-shaped ridges along the back hint of developing muscles. Within about a week the occupant of the frail prison has become sufficiently active to effect his own release.” She peppered her prose with allusions that reached beyond science—to Aldous Huxley, to Shakespeare, and to Greek and Roman mythology.

Rachel Carson had discovered that her métier was not to conduct scientific research but to illuminate it, contextualize it, and share it with the public. Like the baby shad, she had been released.

Gabriel Popkin, A&S '13 (MA), is a science writer based in the Washington, D.C., area and a new graduate of the university’s science writing program.

Carson had the essential combination of deep expertise in the subject and a rare ability to translate her knowledge into compelling and accessible stories.



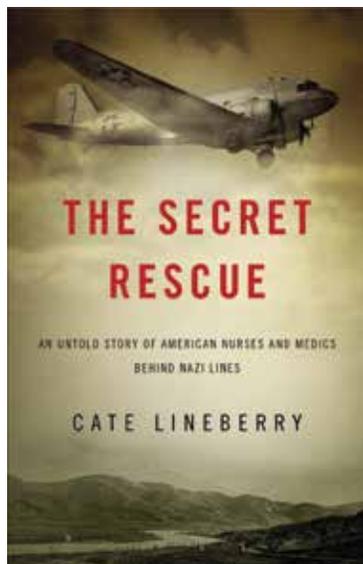
The Secret Rescue

Cate Lineberry



The Melancholy Assemblage

Drew Daniel



HISTORY

Action Heroes

On the morning of November 8, 1943, 25 nurses and medics from the U.S. Army's 807th Medical Air Evacuation Transport Squadron boarded a transport plane on Sicily's east coast. They were heading about two hours east to Bari, where the British 8th army was stationed. The MAETS, a recently formed squadron of male medics and female nurses trained to evacuate the sick and wounded from field hospitals, supported that Allied base.

They never reached Bari. A storm forced the plane across the Adriatic Sea to Nazi-occupied Albania. The plane crash-landed, and for the next few weeks—and, in a few cases, months—the U.S. forces were fed, housed, and hidden by Albanian villagers as British and U.S. intelligence officers plotted their rescue. This little-known feat of human

resilience receives the serious-history treatment from journalist Cate Lineberry in *The Secret Rescue: An Untold Story of American Nurses and Medics Behind Nazi Lines* (Little, Brown and Company, 2013).

Building on interviews and discussions with Harold Hayes, the sole surviving member of the flight, who was a 21-year-old medic in 1943, Lineberry, A&S '09 (MA), painstakingly recreates the 807th's ordeal. In addition to traveling to Albanian villages and speaking with men who were young boys at the time of her story, she combed through newspapers, documents in armed forces registries and historical archives, memoirs and notes from other medics and nurses in the 807th, and corroborating interviews, meticulously annotating the entire book.

Such tireless legwork results in an impressive feat of history, though all that detail—the taste and texture of what they ate, the severity of lice infestation, the fact that Mount Nemërçkë's highest peak rises more than 8,100 feet above sea level—can make this a sometimes slow read. Though, to be fair, that impression might come from the fact that, while reading, the mind is busy casting, storyboarding, and scoring the gripping action-film adaptation this story all but demands. Hollywood is always looking for new unsung heroes and, as Lineberry notes, over the course of the war, the MAETS would transport more than 1 million troops, losing only 46 patients in flight. Producers wanting a ready-made story where the historical research has already been done, look no further.

Bret McCabe



CRITICAL THEORY

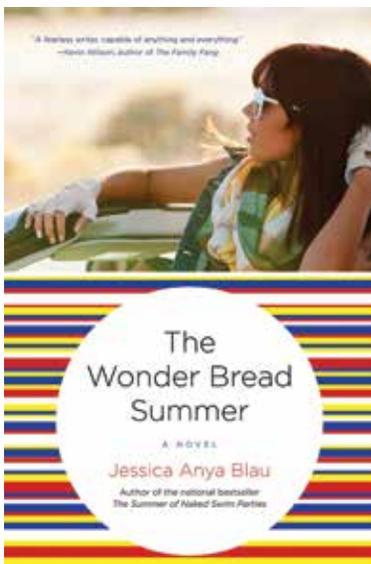
On Melancholy

Department of English Assistant Professor Drew Daniel's *The Melancholy Assemblage: Affect and Epistemology in the English Renaissance* (Fordham University Press, 2013) is that rare critical theory book that's fun to read. Consider it a more complexly realized update of Robert Burton's 1621 book *The Anatomy of Melancholy*, a multidisciplinary rumination on an emotional state believed to be rooted in corporeal imbalances. Daniel treats melancholy as a Deleuzian system of interrelated ideas and, while focusing on the English Renaissance of, say, John Milton's *Samson Agonistes*, stretches from Galen's humoral medicine to Harry Harlow's isolation experiments with rhesus monkeys to death metal. Yes, it's academic, but Daniel refreshingly spices his arguments with artful prose and candid humor. **BM**



The Wonder Bread Summer

Jessica Anya Blau



FICTION

Fun Dysfunction

Normally a UC Berkeley undergrad might reconsider her life choices should she find herself feeding enchiladas to a paraplegic porn producer in early 1980s Los Angeles. But more pressing matters trouble the biracial Allie. Her father's burger joint is closed. Her mother plays tambourine in a rock band. Her ex-boyfriend unwisely invested her scholarship money. And a thug named Vice Versa is looking for her because she stole a mound of uncut cocaine, which is now stashed in a plastic Wonder Bread bag in her best friend's Honda Prelude. In her first two books Jessica Anya Blau, A&S '95 (MA), comically savaged family dysfunction. In *The Wonder Bread Summer* (Harper Perennial, 2013) she turns that nimble touch and harsh humor into a stoner adventure comedy with a female lead. Guiltless fun. **BM**

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...Federico Bandi

Hollis Interviews

Federico Bandi
Professor of economics and finance



.....
Hollis Robbins, A&S '83, is chair of the Humanities Department at the Peabody Institute; she teaches courses in literature, drama, film, and aesthetics. She has a joint appointment in the Center for Africana Studies at Homewood, where she teaches African-American poetry and civil rights.

Latest reading: *Death with Interruptions*, by José Saramago
Favorite food: Fish tacos
Favorite place to buy (Italian) shoes: Tangs in Singapore
Trivia: Best bachata dancer in the world

Let me ask about a recent magazine story that lauded your work applying high-level mathematical models to financial markets. Apparently you can explain the flash crash!

[laughs] I have not worked directly on it, but I have my opinions. As one would expect, very large sell orders can determine substantial downward price impacts. In times of high-frequency trading, these initial downward swings can be easily exacerbated by additional orders on the same side of the market. The buy side can work similarly.

You and some colleagues have devised a new market indicator called EXIT, measuring idle time in financial pricing. Could you say more about it?

EXIT is an acronym for EXcess Idle Time. In a nutshell, it is a market friction indicator capturing the extent of staleness (or idle time) in observed high-frequency market prices. One could imagine markets as being populated by informed agents (who have some awareness of the fundamental value of an individual asset) and uninformed agents. Uninformed trading decisions amount to little more than tossing a coin to determine trades. Informed decisions are more complex, but they are still intuitive provided we simplify them a bit: Informed agents will buy at the prevailing ask price when the funda-

mental value is higher than the ask value, they will sell at the bid price when the fundamental value is lower than the bid price, and they will sit idle if the fundamental value is within the quoted bid/ask spread. EXIT is designed to quantify staleness in prices as determined by slow trading or lack of it.

I imagine that EXIT would be particularly interesting in this era of high-frequency trading.

Yes. We've seen renewed awareness that liquidity is an elusive concept with many facets. Its classic definition ("the ability to trade large amounts in a short period of time without considerable price impacts") has three dimensions—volume, price, and time. There is an important interaction between liquidity and asymmetric information, another pervasive market friction. EXIT is formulated to capture this interaction. It is simple to implement empirically, which is a nice feature. It turned out to be a bit less obvious to study formally in terms of its mathematical properties. This study has led to some interesting technical findings, which we believe to be broadly applicable in other areas of high-frequency asset pricing.

You came to the Carey Business School in 2009 to be the chair of the Finance and Economics Committee. What does this involve and what do you see as the Carey School's future?

I was brought on to build the finance and economics side of the business school. Our goal as a school is to be a critical player in business research



and training MBAs. In both the part-time MBA and the Global MBA programs, we emphasize areas that other schools do not and that play to the key strengths of Johns Hopkins: health care, real estate and infrastructure, enterprise risk and national security, and financial businesses.

How is social responsibility part of your curriculum?

We stress the necessity of having a conversation about social responsibility in several areas of business training and thinking. We would like this conversation to be technical, rather than ideological. My guess is that social responsibility will be, going forward, a pervasive element of the entire curriculum, not simply of individual courses.

When you're not doing higher math, what do you do for fun? Or to bring yourself down to earth?

Latin dancing! I started about 10 years ago. It's hard to find the time these days and I don't compete, but I'm a serious club dancer. It's easier when I travel, actually. I could find a hidden salsa club in Jakarta in 15 minutes. I've done it! It is a responsibility to be the best bachata dancer in the world, but it is one that I gladly take upon myself. [smiles]

Do you see any link between dancing and mathematics?

They both keep me on my toes.

.....
Federico Bandi, a professor of economics and finance at the Carey Business School, is an expert in financial econometrics, continuous-time asset pricing, and empirical market microstructure.

Rising to the Challenge

Johns Hopkins aims to advance human knowledge, solve global problems, and enhance the student experience with \$4.5 billion to be raised in a new campaign, announced in May.

Encompassing both the university and the health system, this joint fundraising effort—the institutions' largest ever—is called Rising to the Challenge: The Campaign for Johns Hopkins. It seeks to create as many as 300 endowed professorships and generate \$753 million for financial aid and fellowships. It also will support interdisciplinary research teams seeking answers to vexing worldwide problems in areas such as health, education, water resources, and revitalization of cities.

The campaign has raised \$1.94 billion, or 43 percent of the goal, since its “quiet phase” began in January 2010. Now that it has been publicly announced, the aim is to complete the effort in 2017.

“Humanity today confronts both age-old questions and burning new ones unlike any we have faced before,” says university President Ronald J. Daniels. “Our job at Johns Hopkins is to rise to the challenge, to develop the tools and the talent, and to help humanity resolve those questions—on our campuses, in our communities, and around the world.”

The campaign will be built on three pillars. The first is “Advancing Discovery and Creativity.” Since its founding in 1876 as America’s first research university, Johns Hopkins has in many ways defined modern higher education, linking teaching and research in all disciplines, from the humanities and arts, to public health and medicine, to science and



ILLUSTRATION BY MIKE AUSTIN

technology. Funds will be strategically invested in programs and activities that advance the university’s core academic mission and allow it to embrace tomorrow’s opportunities and meet its problems.

The second pillar is “Enriching the Student Experience.” Rising to the Challenge will strengthen financial aid in the form of scholarships and stipends, invest in inspirational spaces for collaborative learning and social interaction, and build new programs that enrich the academic experience, ensure diversity, and strengthen connections between Johns Hopkins and its surrounding communities.

The third is “Solving Global Problems as One University.” Complex social, political, economic, and environmental issues threaten the

progress of nations and communities around the world. As a leader in creating the cross-disciplinary solutions such problems demand, Johns Hopkins will draw on its tradition of innovation to launch new “signature initiatives” in individualized health; the science of learning; the potential of our urban centers; the sustainability of water resources; and global health.

A major milestone in the quiet phase of the campaign was the commitment in January of \$350 million—the largest single gift in Johns Hopkins history—by philanthropist and New York City Mayor Michael R. Bloomberg, Engr ’64. That gift is divided between student aid and endowment for 50 Bloomberg Distinguished Professors promoting collaboration across traditional academic disciplines.

“Mike Bloomberg’s generosity and dedication to the Johns Hopkins mission are inspiring,” says Jeffrey H. Aronson, A&S ’80, who, having led the campaign’s quiet phase, will pass public phase leadership to new co-chairs Heather Murren, A&S ’88, and Charles Clarvit, A&S ’78, and become the next chair of the university’s board of trustees. “I know that there are many thousands of alumni, parents, patients, and other supporters who find our mission as compelling as Mike does,” says Aronson, who is a parent of two current students. “They will, just as he did, rise to the challenge.”

The campaign’s overall goal includes \$2.4 billion for Johns Hopkins Medicine (the Johns Hopkins Health System and its six hospitals plus the university’s School of Medicine). The rest of the university is seeking the remaining \$2.1 billion.

“At Johns Hopkins, we are driven to discover,” says Paul B. Rothman, the Frances Watt Baker, M.D., and Lenox D. Baker Jr., M.D., Dean of the Medical Faculty, vice president for medicine, and CEO of Johns Hopkins Medicine. “The formula for success is deceptively simple: Find the best faculty members, bring them together, surround them with the best students and staff, and give them the resources they need to unleash their imaginations and dare to discover. This campaign will enable us to do all that, and to do more for our patients and for the world than we ever have before.”

Looked at another way, half the total campaign goal—\$2.25 billion—is for research and program support. Another \$968.5 million is for faculty support, including about 150 endowed professorships in the School of Medicine and 150 more throughout the rest of the university.

Another \$753 million, 17 percent of the goal, is for undergraduate student

aid, graduate student fellowships, and continuing education.

About 9 percent is for buildings and other capital needs, contrasting with 18 percent of the total that was raised in Knowledge for the World, the \$3.741 billion Johns Hopkins campaign that ended in 2008. At the time, it was the second-largest completed campaign in U.S. university history.

“Rising to the Challenge is focused squarely on Johns Hopkins people,” Daniels says. “We have done an amazing job over the past decade or so at building some of the best facilities in the world. This time, we are emphasizing support for the scholars, the mentors, and the learners who do some of the best work in the world.”

There are, however, some critical facilities projects in the campaign plan, including new buildings for the Bloomberg School of Public Health and the School of Nursing, and renovations at the Paul H. Nitze School of Advanced International Studies.

Also included in the Rising to the Challenge goal is a total of \$700 million for five signature initiatives, universitywide efforts identified by university deans and directors and President Daniels as ripe for interdisciplinary collaborations.

“Increasingly, the most significant discoveries come not from a single lab,” Daniels says, “but from experts across a wide range of fields, bringing their own perspectives and skills to a combined effort that is far more than the sum of its parts. That’s the approach we are taking with these initiatives.”

Additional signature initiatives may be added during the campaign as new opportunities for interdisciplinary efforts arise.

For more about the Rising to the Challenge campaign, go to rising.jhu.edu. **Dennis O’Shea**

Rising to the Challenge Signature Initiatives

The Johns Hopkins Institute for the American City (\$100 million)

Faculty from across the university—together with urban scholars and leaders from the private sector, foundations, and governments—will develop and test solutions for fostering economic growth, improving schools, reducing violence, and revitalizing Baltimore and other U.S. cities.

The Johns Hopkins Global Health Initiative (\$100 million)

Experts from the fields of public health, medicine, nursing, engineering, economics, and public policy will build a “pipeline of discovery” to advance international efforts in the areas of noncommunicable diseases, injuries, infectious diseases, nutrition, and the health of women and children.

The Johns Hopkins Science of Learning Institute (\$100 million)

Neuroscientists, cognitive scientists, geneticists, computer scientists, and education experts will join forces to explore how genetics, environment, brain chemistry, and other factors foster or inhibit learning; develop technologies and programs to optimize and personalize learning; and help transform the American education system.

The Johns Hopkins Individualized Health Initiative (\$300 million)

Physicians, scientists, engineers, and information experts will help doctors customize patient treatment by connecting and analyzing huge databases of clinical information, plus new data sources such as DNA sequences, methylation analyses, RNA expression levels, and high-tech images.

The Johns Hopkins Institute for Water (\$100 million)

Experts in public health, medicine, nursing, bioethics, engineering, economic development, and public policy will collaborate to protect our most precious natural resource by modernizing infrastructure, exploring water’s complex role in the environment, improving the health of waterways, and sharpening responses to natural disasters.



Now They're Alums

If you think they're happy, you should see their parents



Now They're Alums

In the weeks leading up to graduation, members of the Class of 2013 offered some advice to underclassmen in the form of a bucket list—things you shouldn't miss before graduating from Johns Hopkins: "See an astronomical event from the telescope at Bloomberg," "Enjoy the view from Gilman tower (legally)," "Make a real connection with someone in the Baltimore community," "For Pete's sake. Go to the Museum of Art."

In May, those graduates officially joined the ranks of Johns Hopkins alumni. At press time, there was a total of 7,185 degrees, certificates, and diplomas to be awarded at the universitywide commencement ceremony, traditionally held outdoors on Homewood Field.

Renowned Johns Hopkins neurosurgeon and neuroscientist Alfredo Quiñones-Hinojosa was the featured speaker at the May 23 event, addressing graduates from all divisions and campuses of the university. Born in Mexico, Quiñones-Hinojosa came to the United States at the age of 19,

working as a farm laborer, painter, and railroad welder to pay for his education. After receiving his bachelor's from the University of California, Berkeley, he went on to graduate with honors from Harvard Medical School, joining the faculty at Johns Hopkins in 2005. As a professor of neurosurgery and oncology, Quiñones-Hinojosa is known for his cutting-edge cancer research as well as his easygoing, comforting manner with patients.

Other speakers at the week's various commencement events included American folk singer and songwriter Pete Seeger at the Peabody Conservatory's ceremony; Christiane Amanpour, CNN's chief international correspondent, at the Paul H. Nitze School of Advanced International Studies' event in Washington, D.C.; best-selling author Wes Moore, A&S '01, an Army combat veteran and youth advocate, at the School of Education's graduation event; and Wesley G. Bush, CEO and president of Northrop Grumman, at the Carey Business School's ceremony. **Kristen Intlekofer**



New Provost

Robert C. Lieberman



RIGHT: PHOTOGRAPH COURTESY OF COLUMBIA UNIVERSITY
LEFT: PHOTOGRAPH BY WILL KIRK / HOMEWOODPHOTO.JHU.EDU

New Provost

Robert C. Lieberman has been named Johns Hopkins' provost and senior vice president for academic affairs.

Currently interim dean of Columbia University's School of International and Public Affairs and a professor of political science and public affairs, Lieberman is a scholar of race and politics in America, social welfare policy, and the welfare state. He is also an experienced administrator, having overseen a strategic planning process and a major curriculum review, and he has been involved in faculty hiring, review, promotion, and tenure.

"Provost-designate Lieberman is adept at working productively across academic boundaries," university President Ron Daniels said in an April announcement. "At SIPA, he brings together scholars and students in 11 disciplines . . . to form a cohesive, globally focused public policy school."

Lieberman, who holds degrees from Yale and Columbia universities, will join Johns Hopkins on July 1.

Catherine Pierre



Moving Up

School of Education now rated second in nation



Hall of Famer

Phyllis Sharps

PHOTOGRAPHS BY WILL KIRK/HOMEWOODPHOTO.JHU.EDU



Moving Up

The School of Education now ranks No. 2 in the nation, according to *U.S. News & World Report's* 2014 list of the Best Graduate Schools of Education. The school moved up from a No. 6 spot last year and a No. 18 ranking prior to that.

Such recognition “confirms our school’s place as a national leader in education reform through research and teaching,” said David Andrews, dean of the School of Education, adding that the ranking “reflects our vision to challenge the accepted and transcend conventional boundaries to improve learning outcomes worldwide.”

Johns Hopkins is in good company; other universities currently ranked in the top five for their graduate education programs are Vanderbilt University, Harvard University, the University of Texas at Austin, and Stanford University. The School of Education is among seven Johns Hopkins graduate programs ranked in the top 25 this year by *U.S. News*. ❧

Hall of Famer

Phyllis Sharps, associate dean for community and global programs and the director of the Center for Global Nursing at the School of Nursing, will become the ninth SoN faculty member to enter the International Nurse Researcher Hall of Fame when she’s inducted in July. Created in 2010 by Sigma Theta Tau International, the Honor Society of Nursing, the Hall of Fame recognizes nurse researchers whose work has garnered international recognition for the impact it has on the profession and the people it cares for. Since the mid-1990s, one of Sharps’ primary research interests has been investigating the impact of domestic violence on the physical and emotional health of pregnant women, infants, and young children.

Sharps has also focused her investigative mind on the future of the profession. In January, Sharps and the School of Nursing were awarded a \$20,000 “Enhancing the Diversity of the Nursing Profession: Assessing the Mentoring Needs of African American Nursing Students” grant from the

National Black Nurses Association to conduct a national survey to determine the motivations and barriers facing African-American nurses and nursing students. According to the 2008 National Sample Survey of Registered Nurses, while African-American nurses tend to earn more advanced nursing degrees than their white peers, at the same time they account for only 5.5 percent of the entire workforce. According to 2011 Census data, currently about 13.1 percent of the entire U.S. population identifies as African-American.

“That this recognition comes from researchers worldwide makes it that much more of an honor,” Sharps said in a statement. “It reinforces the importance of the work we’re doing in Baltimore and across the globe to protect women and children from violence. It’s great news for me, of course, but even greater news for any who will not be victimized tomorrow because of the work we’re doing today.” **Bret McCabe**

Sports' Busy Spring

Johns Hopkins men's lacrosse made news, as it does every year around here, but not for the usual reasons. First, the Blue Jays did not qualify for the NCAA national championship tourney for the first time in 42 years. The Jays' 9-5 season included a 7-4 win against Maryland, which was ranked No. 1 in the country at the time. But a failure to defeat any other top team on the schedule—tough one-goal losses to North Carolina and Albany came back to haunt them—cost Hopkins a postseason berth. Another factor was the ever-higher level of competitiveness in Division I. For several years now, lacrosse has been the fastest growing varsity sport among American high schools, which has meant more talent dispersed among more collegiate squads. Johns Hopkins was not

alone among perennial lacrosse powers that failed to make the 2013 NCAA tournament. Neither did Princeton or Virginia, while Maryland and defending champion Loyola lost in the tournament's first round.

Then, on May 17, Johns Hopkins announced it would seek a Division I conference affiliation for men's lacrosse for the first time in the program's 130-year history. The report of the committee appointed to study the issue said, "We believe joining a conference at this time will ensure that the Johns Hopkins men's lacrosse program will remain at the forefront of the sport for years if not decades to come. This move will help to preserve Johns Hopkins' legacy in college lacrosse and to maintain the tradition of excellence that distinguishes the men's lacrosse program and the Johns Hopkins

University." At press time, no timetable had been announced. Nor was there much hint as to which conference it might seek to join.

When the committee began its study in March, longtime supporters of Johns Hopkins lacrosse expressed concern that a conference affiliation could mean the end of annual games against some of the Jays' biggest rivals. The committee's final report took note of this: "... the Athletics Department has confirmed to the Committee it has every desire to maintain traditional rivalries with institutions such as Maryland, Syracuse, Virginia, Navy, North Carolina, and Loyola. These are not only meaningful rivalries, they are excellent lacrosse programs. Continuing to play against them is not only important to JHU lacrosse fans, it would help Johns Hopkins maximize its own strength of schedule."



PHOTOGRAPH BY DALE KEIGER

While all of that was happening, women's tennis had the best spring of any Johns Hopkins varsity sport. The Jays finished No. 7 in the national rankings and advanced to the quarterfinals of the NCAA championship tournament. Seven-time national champion Williams College ended Hopkins' title hopes with a 5-1 defeat. But en route, the Jays won their seventh straight Centennial Conference title and finished with a sterling 20-3 record, the first 20-win season in school history. Olivia Kasten, Sydney Lehman, and Stephanie Rettig were a combined 40-3 for the season. Women's head coach Dave Woodring was named Wilson/ITA Atlantic South Coach of the Year, as was his counterpart, men's head coach and director of tennis Chuck Willenborg. Willenborg's men's team also won a seventh straight Centennial title, reached the Sweet 16 of the national championship, and qualified three players for NCAA individual championship play: Andy Hersh, Tanner Brown, and Erik Lim, who among them had won 53 matches leading up to nationals.

Johns Hopkins baseball finished its year with a 37-10 record and played in the NCAA regional tournament. During one torrid stretch in March and early April, Blue Jays baseball rang up 20 straight victories and reached No. 3 in the national rankings. Among starting players, Jeff Lynch led hitters with a .377 average. Colin McCarthy batted .364, and Chris Wilhelm led power hitters with eight home runs (Lynch had seven). Right-handed pitcher Tyler Goldstein compiled an 8-2 record with a 1.99 earned run average.

Women's track and field won its fourth straight Centennial Conference title, and at press time Frances Loeb, Annie Monagle, Hannah Oneda, Maggie Shelton, and Emily Swenson had qualified for the NCAA national championship meet. Going into

nationals, Oneda, who was instrumental in Johns Hopkins winning the national women's cross-country championship last fall, had run the second-fastest 5,000 meters in Division III track this season; her time of 16:35.56 was just one second off the nation's best time, set by Taylor Berg of the University of St. Thomas in Minnesota. The future for women's track looks good: This season seven school records were set by freshmen. On the men's side, 10,000-meter runner Max Robinson also qualified for nationals. The men's team finished second in the Centennial Conference.

At press time, the various NCAA spring sports championships were still being decided, and the Hopkins athletic department was watching intently to see where the school ended up in the 2012-13 Directors' Cup standings. For the last 17 years, the National Association of Collegiate Directors of Athletics has ranked more than 300 Division III programs according to the cumulative results in all sports. Johns Hopkins' best finish to date was 2010-11, when it reached No. 8. Going into the spring season, Hopkins was ranked No. 4 and hopeful of a best-ever finish. **Dale Keiger**

GOLOMB'S GAMBITS™

Some Irregular Verbs Solomon Golomb, A&S '51

English, like most Germanic languages, has many regular ("weak") verbs, like *work*, *worked*, *worked* (in standard dictionary format, listing present, past, and past participle), and a bewildering collection of irregular ("strong") verbs, which follow many different patterns, or no pattern but their own. This column will focus on two related patterns.

Pattern A

The verb *drink*, *drank*, *drunk* has a short *i* in the present, replaced by *a* in the past, and by *u* in the past participle. At least nine common English verbs follow this pattern (not counting variants obtained from these by prepending such prefixes as *re-*, *un-*, etc.). How many of these common verbs can you list?

Pattern B

The verb *swing*, *swung*, *swung* replaces the *i* of the present with *u* in both the past and the past participle. At least 10 common English verbs follow this pattern. (Many of these, in their earlier history, followed pattern A, but there is an evolutionary trend, still ongoing, for less frequently used verbs to leave pattern A for pattern B.) How many of these pattern B verbs can you find?

Variants

1. A common verb with *i* in the present replaces this with *o* (but pronounced like *u*) in the past and past participle. Can you identify this "almost pattern B" verb?
2. Another common verb with *i* in the present replaces this with *a* in both the past and past participle. What is it?
3. A very common verb with *a* in the past and *u* in the past participle has *u* in the present. Can you think of it?
4. Another *i,u,u* verb has a long *i* in the present (lengthened by a silent final *e*, which disappears in the other tenses). Can you identify it?

Humor

Incorrect conjugation of English verbs has been the despair of English teachers and an unending source of humor when used either deliberately or inadvertently. (A former baseball announcer was famous for such coinages as "The runner slud into third base.")

There are two common verbs that, properly used, follow neither pattern A nor pattern B, but are often treated as if they do, for comic effect. Can you identify these verbs, with an example for each of how they are misused?

Solutions on page 78

Abbreviated

Edited by Catherine Pierre

Jef Boeke, a professor in the **School of Medicine's** Institute for Basic Biomedical Sciences, was elected to the National Academy of Sciences. School of Medicine researchers **Stephen Desiderio**, **Hal Dietz**, **Drew Pardoll**, **Jeremy Sugarman**, and **David Valle** were elected to the Association of American Physicians.

Geraldine Seydoux, a professor of molecular biology and genetics at the **School of Medicine**; **Timothy Heckman** and **Marc Kamionkowski**, both professors in the **Krieger School's** Department of Physics and Astronomy; and **Stephen Nichols**, a Krieger School professor of French and humanities, were among the 198 new members elected to the American Academy of Arts and Sciences. Other members of the 2013 class include Nobel Prize winners Bruce A. Beutler and David J. Wineland, actors Robert De Niro and Sally Field, soprano Renée Fleming, and astronaut and former senator John Glenn.

American folk singer and activist **Pete Seeger** (who is also one of this year's AAAS inductees) received the 2013 George Peabody Medal for Outstanding Contributions to Music in America. The award was presented at the **Peabody Conservatory's** graduation ceremony in May, where the 94-year-old Seeger was also commencement speaker.

Jeffrey Sharkey, director of the **Peabody Institute**, announced in May that he would not seek another term in the position. Sharkey, a pianist, composer, and veteran music educator, has been at Peabody since September



Tia Price

2006. **Nicholas P. Jones**, dean of the **Whiting School of Engineering** since 2004, is also stepping down to become executive vice president and provost of Penn State.

Tia Price, a Master of Music candidate studying voice at **Peabody**, won the Presser Award. The \$10,000 grant will enable Price to commission a song cycle from **Natalie Draper**, a Doctor of Musical Arts candidate in composition. The song cycle, called "This Is My Voice," will be based on texts by students in Peabody's Tuned-In program (which offers scholarships to Baltimore City youth), and Price will perform it in churches and other venues throughout Baltimore.

School of Education senior research scientist **Robert Balfanz**, a national expert whose work focuses on America's dropout crisis, was among 10 education leaders named White House "Champions of Change" for their commitment to furthering education among African-Americans. Dean **David**

Andrews received the Education Industry Association's 2013 "Friend of the Education Industry" Award, which is given annually to an individual who demonstrates vision and entrepreneurship in advancing education reform. **Norma Day-Vines**, a professor in Counseling and Human Development, received the Exemplary Diversity Leadership Award from the Association for Multicultural Counseling and Development.

Time magazine named **Deborah Persaud**, a **School of Medicine** associate professor of pediatrics and infectious disease, as one of its "100 Most Influential People in the World." Persaud was recognized along with University of Mississippi pediatrician Hannah Gay and University of Massachusetts immunologist Katherine Luzuriaga for functionally curing a newborn of HIV.

SoM Professor **Bert Vogelstein**, co-director of the Ludwig Center at Johns Hopkins and a Howard Hughes Medical Institute investigator, received the Breakthrough Prize in Life Sciences for his work in cancer genomics and tumor suppressor genes. Vogelstein is among 11 inaugural winners who will receive \$3 million each for their



Deborah Persaud

groundbreaking research in the life sciences. The Breakthrough Prize was established by technology entrepreneur Yuri Milner, Google founder Sergey Brin, 23andMe co-founder Anne Wojcicki, Facebook founder and CEO Mark Zuckerberg, and his wife, Priscilla Chan. A foundation created to administer the prize will be chaired by Art Levinson, chairman of the board of Apple and chairman and former CEO of Genentech.



Peter Pronovost

SoM Professor **Peter Pronovost**, a world-renowned patient safety researcher, ranked fifth on this year's list of the "50 Most Influential Physician Executives in Healthcare," a recognition program co-sponsored by *Modern Physician* and *Modern Healthcare*.

The **Bloomberg School of Public Health's Center for American Indian Health** is partnering with Barclays Bank to design an evidence-based program to inspire American-Indian youth to stay in school and create business and social entrepreneurship

opportunities. Barclays will provide \$1.2 million in program funding over three years, and employees will serve as mentors to program participants.

In April, the **Paul. H. Nitze School of Advanced International Studies** hosted *A New Economic Landscape: Promoting Women in Emerging Markets*, the inaugural **Global Women in Leadership Conference**, organized by SAIS graduate students to address new economic challenges and opportunities facing women. The new issue of **SAISPHERE** is out. This year's issue is called "Cities Lead the Way for Global Change" and features articles and essays by members of the SAIS faculty, scholar, student, and alumni community. In May, U Thein Sein, president of Myanmar, spoke at SAIS' Kenney Auditorium on the topic of "Myanmar in Transition: U.S.-Myanmar Bilateral Relations," during his visit to the United States.

Carey Business School Dean **Bernard T. Ferrari** received the Thomas E. Weiss, M.D., Outstanding Alumnus Award from the Ochsner Alumni Association in April. Ferrari, who began his career as a surgeon, was the Ochsner Clinic's chief operating officer and assistant medical director in the 1980s.

Carey School student **Bahar Zarrabi** had a winning idea about how medical residency programs could benefit by incorporating business education into their curricula. Zarrabi is a senior administrative coordinator in the **School of Medicine's Department of Plastic and Reconstructive Surgery**. When she shared a paper she wrote for her Business Communication class, the department's leaders decided to add her idea to a proposal they were submitting for the medical school's

Institute for Excellence in Education Residency Redesign Challenge Grant. In March, the team was awarded the grant—\$45,000 for the first year with an option to apply in the second year for funding worth \$50,000.

A team from the **Center for Global Health** took first place and \$6,000 in the 2013 Emory Global Health Case Competition in March. The team, which was charged with developing a plan to address worldwide sanitation issues, included **Krieger School** undergraduate **Kevin Wang**; **Whiting School** undergrad **Aaron Chang**; Bloomberg School graduate students **Collin Weinberger**, **Nidhi Khurana**, and **Stephanie Van Dyke**; and **Nursing/Public Health** graduate student **Matthew Lindsley**.

The **Applied Physics Laboratory** held its first-ever **Technical Achievement Awards** ceremony in May, recognizing APL's top inventions, researchers, and publications. The Invention of the Year award went to a novel technique that creates a compressed DNA-type fingerprint of parts of computer code to reveal malware. The Government Purpose Innovation Award went to a system that can detect and locate the source of false signals generated by radar jamming devices. A new Innovation Award, which recognizes the most creative Ignition Grant project for 2012, went to an inexpensive prototype to prevent hearing damage from sudden blasts. Ignition Grants are a Lab-wide initiative to encourage staff to explore and pursue innovative ideas outside APL's traditional processes. Also in May, more than 100 Maryland middle school students got an inside look at lunar exploration during **"Space Academy: Mission Moon,"** which focused on NASA's recent robotic missions to the moon.

Welcome

It's about finding new ways of doing things. In this issue, Peabody alum Michael Straus talks with Professor Gary Louie about innovating not only in the music they create but in how they get their music to audiences (p. 70). We also profile transplant surgeon Dorry Segev (p. 75), whose collaborations with his mathematician spouse have helped connect thousands of patients with badly needed organ donations. And in *Afterwords* (p. 80), Sarah Hemminger writes about the nonprofit Incentive Mentoring Program and its unconventional approach to supporting struggling high school students in inner-city Baltimore.

TINY PATIENTS, BIG DECISIONS

Written by | BRENNEN JENSEN

The high-tech world of modern medicine can be daunting. Perhaps nowhere more so than in the neonatal intensive care unit, where some of the most fragile patients—premature infants born as early as 23 weeks and weighing no more than a can of soda—are cared for around the clock amid banks of blinking machinery.

Sara Rosenthal, Nurs '04, '08 (MSN), '12 (PhD), will never forget her first visit to the Johns Hopkins Hospital NICU. She was a first-year nursing student seeking a position as a part-time clinical nurse intern, a hands-on opportunity to hone patient care skills. "I didn't even know what was going on, it was such a different, noisy environment with all this equipment," Rosenthal recalls. "You just don't expect to see newborns surrounded by all this technology."

Suddenly, an alarm sounded. One of the monitors detected that a baby's breathing or heart rate was abnormal and the room's activity accelerated as staff scrambled to resuscitate one of their tiny charges. "It was a lot to take in," Rosenthal says. "But there was something about the people who were working there. I really felt like I connected with them."

She had hoped the internship would augment her nurse's training. What it did was transform it. After getting her bachelor's and RN she went to work in the Johns Hopkins NICU full time for a stretch before switching to part time once she began pursuing her master's. Before long, she felt she had the drive and desire to seek a doctorate in nursing, a goal that became a reality thanks to a doctoral fellowship.

Although the NICU can be a challenging and stressful environment for health care professionals, Rosenthal developed a fervent interest in the experiences of parents whose small and vulnerable sons and daughters were connected to all those monitors. For many parents, bonding with their newborn is a given. But in the NICU, because of premature birth or other serious health issues, technology can interfere with this basic human instinct. "It's a big challenge to help the parents realize their role in this totally foreign environment," Rosenthal says. "A lot of parents are very timid to even touch their baby because they see all this equipment. They're afraid. We start out just having them put their hands on their baby. The skin contact is helpful."

Not only do parents have to deal with the emotional strain of separation from their infants, they are also frequently called on by NICU staff to make crucial, sometimes life-or-death, decisions regarding their care. As she witnessed this stressful decision making again and again, Rosenthal's dissertation subject came fully into focus. "I felt like we were asking parents to make these really difficult decisions about treatment for their babies, and a lot of times they were really struggling with it," Rosenthal says. "So I wanted to find out more about what the parents' decision-making process was like."

In particular she wanted to know how much involvement parents wanted to have in that process. Further, she wanted to know how



Parents of newborns in intensive care not only have to deal with being separated from their infants—they are often called on to make life-or-death decisions regarding their babies' care. Through her research, School of Nursing alum Sara Rosenthal wants to help make the decision-making process easier.

much trust the parents had in the health care professionals taking care of their babies and in health care institutions in general. Did their amount of trust or distrust impact decision making? Toward answers, she had 70 NICU parents—51 mothers and 19 fathers—complete surveys exploring these topics, following up with eight of them in extensive personal interviews.

The collected data and analysis showed that parents' race, education, or income level were not related to their level of trust, and did not affect the way they preferred to make medical decisions—findings that ran counter to what some earlier studies

had shown. "I did find most of the parents were pretty trusting of the health care providers," Rosenthal says. "And the majority of parents wanted some type of shared decision making, a cooperative process between them and the health care providers, so I think this is an important finding."

It's a finding that might not have been possible without philanthropy. As an undergraduate, Rosenthal received the Dorothy P. and C. Emerich Mears Scholarship, established by Baltimorean Dorothy Mears Ward and awarded to nursing majors. Pursuing a doctoral degree seemed a financially difficult proposition until her academic adviser told her about the Ellen

Levi Zamoiski Fellowship. "Graduating with a daunting amount of student loans would have been very discouraging," Rosenthal says. "I was also able to keep some hours working in the NICU, which was helpful in developing my research questions."

Though last fall she became an assistant professor of nursing at Notre Dame of Maryland University, she still puts in an occasional shift at the Johns Hopkins NICU. "I would definitely like to continue this research," Rosenthal says. "I think the next step should be to try and develop some interventions to help providers discuss with parents what their preferences are for decision making."

CREATING A SCENE

Interview by | GEOFFREY HIMES



Michael Straus is a San Francisco-based saxophonist, improviser, composer, writer, and arts organizer. A former Fulbright fellow to Amsterdam, this fall he will be relocating to the Midwest as the newly appointed assistant dean of technology and facilities at the Oberlin College Conservatory of Music. Earlier this year, he was selected to receive Johns Hopkins' Outstanding Recent Graduate Award.

Unlike, say, violinists, classical saxophonists have never been able to count on seats in orchestras, slots in recital series, chairs in chamber groups, or even centuries of repertoire to explore. In the art-music world, these reed players have had to manufacture their own opportunities by transcribing old works from other instruments, commissioning new works, pulling together chamber groups with saxophone chairs, and organizing new series and festivals.

This historical necessity and the inventions it mothered have served saxophonists well. In an era when traditional performance opportunities are shrinking, reed players are ahead of the curve when it comes to finding alternative ways of getting their music to audiences. When Michael Straus, Peab '07 (MM, Saxophone), '07 (MM, Computer Music), came to the Peabody Institute in 2005 as a graduate student in classical saxophone, he was already thinking that way, and he found a mentor in Gary Louie, who not only taught the saxophone but also introduced the Conservatory's pioneering course titled *The Business of Music*, which he co-taught with Bill Nerenberg from 2002 onward.

Today Straus and Louie are still inventing new ways to put their instruments in front of music lovers. Straus, the director of operations at San Francisco's *Other Minds*, a nonprofit new-music organization, has formed unusual chamber groups, not only with other wind instruments but also with robots. Louie continues to commission new works for the alto saxophone and performs those works all over the world. Recently they got together to share some ideas.

Michael What I'm about is creating a scene that didn't exist before. At *Other Minds*, I'm in charge of the record label, fundraising, running the film festivals, and producing a large annual new-music festival. And it's a different kind of festival, because we've seen what happens at other festivals, where people fly in and fly out without really interacting. When a composer signs on for ours, they sign on for eight days, and the first five are spent at this camp out in the redwoods, in cabins on a cliff looking over the ocean, where you can trade ideas without any critics around looking over your shoulder. All the skills I learned at Peabody apply to what I'm doing now.

Gary Those of us at music schools are doing a good job with our primary mission of teaching students how to play their instruments. But we're not doing such a good job at our secondary mission, which is helping young musicians find valid roles as artists in our society. We need to empower our students, so they can "own" their music, so they're not just employees but entrepreneurs. I was adamant in raising my voice, and we finally got a full-time career person at Peabody who does nothing but prepare students for life after graduation: Gerald Klickstein, the director of the Music Entrepreneurship and Career Center, who's brilliant.

M For my generation, the teaching jobs are drying up and are harder to get. By the mid-2000s, when I finished my undergraduate degree, a lot of these conservatories prepared students to play a great solo for their

auditions, but they didn't teach them how to survive in the real world. At Peabody, they did, thanks in large part to you. I learned how to handle contracts and copyrights; I learned how to raise money, how to design a Web page, how to organize an event.

G If you're a string player and all you've ever done is prepare for an orchestral seat, what do you do when there are fewer of those available? I say to my students, "What are you going to do for the 10–15 years till you get that seat?" Maybe because saxophonists have never prepared ourselves for an orchestral position because we have never expected anything to begin with, we're in a better position to adapt to this new world.

M When I was at Peabody, I saw a bunch of students going in and out of these rooms filled with electronic gear. Greg Boyle [Peab '85 (MM), '90 (DMA)], who I eventually studied with, said that Peabody had a very strong graduate program in computer music. I had been interested in the field during my undergraduate years, so I asked if I could sign up for the performance track of this degree. During this same time, I was working with a small group of composers in Charlottesville, Virginia, which led to a collaboration with bassoonist Dana Jessen and EMMI [Expressive Machines Musical Instruments]. These guys build wind and string musical robots that we eventually toured with throughout the U.S. and Europe.

G I'm also trying to create things that didn't exist before, though on a

smaller scale. I'm trying to get a concerto off the ground. It's tricky, because a good concerto costs \$30,000–40,000. I know it's going to be a valuable project, but you have to get people on board and meet deadlines, or it's not going to happen. If someone says, "I don't want to fundraise; I just want to play music," I say, "You better get into an ensemble where someone else has those skills because someone has to do that."

M Seventy-five percent of the music I play is music I've been involved in creating. The model of the last century where you give someone a commission and nine months later they give you a score doesn't fly anymore. This back-and-forth with a composer that happens over months and years is very exciting. The person is alive; I can talk to them and work with them. Young composers aren't as busy as they will be later in their careers, so you can get a larger proportion of their time.

G In the beginning it's a dance; you're both figuring out if you can work together. When a composer gives you something, they're trusting you to take care of the music. But you also have to trust the composer, that he's not going to hang you out to dry. Michael Hersch [Peab '95 (MM)] wrote *Last Autumn* for me in 2008. It's epic: two and a half hours of saxophone and cello. Michael first heard me play it, he went back and rewrote it because he knew what I could do—not just technically but also aesthetically. And when he wrote a second piece for me, *of ages manifest* for solo saxophone, it was even more personal.



Gary Louie is professor of saxophone at the Peabody Institute and an internationally recognized performer. The recipient of numerous awards and grants, he has performed at Lincoln Center in New York City, as a soloist with the National Symphony Orchestra at the Kennedy Center in Washington, D.C., at L'Opera Comique in Paris, at the Villa Medici in Rome, and many other locations worldwide.

PRINCIPLES AND PRACTICE OF FRIENDSHIP

Written by | REBECCA MESSNER, A&S '08

On the corner of East Monument Street and Broadway in East Baltimore, a tiny, three-story apartment building stands out amid the ever-developing zone of Johns Hopkins Hospital as a quaint reminder of the neighborhood's past. In the early 1960s, the building's second floor was home to Myron Weisfeldt, A&S '62, Med '65, and Barry Strauch, A&S '62, Med '65, third-year medical students who, after their first week there, almost got evicted for throwing an overly rambunctious spaghetti party. "One of us, and I know it wasn't me," says Strauch, "allowed a washcloth to go down the drain."

Today Strauch is chairman emeritus of the Department of Medicine at Inova Fairfax Hospital in Virginia. He also serves on the board of trustees of

Johns Hopkins' School of Medicine, and with his wife supported the construction of the Strauch Auditorium on the medical school campus. Weisfeldt is chair of the school's Department of Medicine. "We have not made a big point of telling everybody that we are longtime friends," says Weisfeldt, "but every once in a while at trustee meetings we have lunch together."

As students, Strauch and Weisfeldt were part of an old preparatory program that accepted students after just two years of undergraduate education. They would spend half the semester finishing their prerequisite courses at the Homewood campus and the other half at the medical school itself.

The accelerated program was eventually discontinued—on the assumption that it did not produce more meritorious students, Weisfeldt says—but it prepared Weisfeldt and Strauch for what turned into highly accelerated careers. Strauch, early in his work in nephrology, became instrumental in spreading the emerging practice of dialysis to hospitals around the United States. Weisfeldt, meanwhile, became director of the Division of Cardiology at the School of Medicine in his mid-30s, where he was part of the team, led by Michel Mirowski, that implanted the first defibrillators in humans.

The pair has lived up and down the East Coast—Strauch has worked at Yale University and the National Institutes of Health, Weisfeldt at Massachusetts General Hospital and Columbia Presbyterian Medical Center—without ever losing touch. Their families have vacationed together in Bethany Beach, Delaware, for decades, and the Strauches host Thanksgiving dinner every year for the Weisfeldts.

At Thanksgiving in 2001, Strauch gave Weisfeldt, who had recently become the William Osler Professor of Medicine at Johns Hopkins, a gift that he'd been hoping to give him for years—a first edition of Osler's famous textbook, *The Principles and Practice of Medicine*, first published in 1892. (William Osler was one of Johns Hopkins' four founding doctors.)

"My plan when I bought it 22, 24 years ago was to give it to him when he became the Osler Professor of Medicine," Strauch says. "I said there's no way he could be in that position and not have that book."



Longtime friends and former med school roommates Barry Strauch (left) and Myron Weisfeldt.

WELCOME TO THE DISTRICT

Written by | MARIANNE AMOSS

For Johns Hopkins graduates new to the district, the Washington, D.C., Young Alumni Committee serves as the welcome wagon. It maintains a dossier on the city called the “Manual to Living in Washington, D.C.,” which offers information on everything from apartments and roommates to recreational sports leagues to local farmers’ markets.

The committee also provides an opportunity for alumni looking for volunteer work in their new city. Since 2010, it has offered computer literacy classes to the members of Back on My Feet, a nonprofit that imparts confidence and self-sufficiency to homeless people through running, along with financial literacy classes and job-training opportunities.

Lee Ouyang, Engr ’10, and Pierre Hage, A&S ’10, both members of the D.C. committee, launched the computer literacy initiative in 2010. They ask volunteers to commit to one six-week training session at a time, in which they teach Back on My Feet members the basics of Microsoft Office, online job searching, and email. “My thinking has always been, we do have a lot of those social happy hour-type things, but it would be nice to have a component where we could say, ‘You want to volunteer? Here’s something simple,’” says Ouyang, who is the committee’s service chair. “Most people in their jobs deal regularly with computers and have a good enough grasp to where they can teach someone who might not have been exposed to computers as much.”

The list of volunteers now numbers 60, and the program has outgrown Back on My Feet’s northwest D.C.

headquarters, now also operating at the Rita Bright Family and Youth Center. Hage, who volunteered with the nonprofit as an undergraduate, says the committee is considering expanding the program, working with JHU young alumni committees in Boston, Baltimore, and other cities where Back on My Feet also has

branches. In the meantime, the plan is to continue growing the successful program in the district. “A few of [the participants] have gotten jobs already,” Hage says. “It may not always be a job where they use the skills [we teach them]—they may just use the skills to apply for jobs. Either way, we’re glad to help.”



THESE WOMEN MEAN BUSINESS

Written by | RACHEL WALLACH

As women appear increasingly visible in influential positions, it's all too easy to think that's the new norm. "In reality, it's still not very common," says Robin Schaffer, A&S '10. "It's just important for women to build that network and find a mentor so they can advance their careers."

Schaffer is a member of the Women in Business affinity group, created in October 2011 to provide opportunities for Johns Hopkins women to advance their personal and professional development and to make connections with one another. Through events such as networking receptions and panel discussions, the group brings together women in the Baltimore-Washington-Northern Virginia area to discuss topics of interest, share resources and experiences, and network with professionals at all stages in their careers.

"We have all these really smart, successful women at Hopkins, but there hasn't been an accessible way for them to make connections with each other," says Elena Thompson, senior associate director of affinity engagement, who launched the group along with assistant director Ridia Anderson. By cutting across traditional alumni boundaries, such as year of graduation and university division, the group has reached some 480 alumni, students, and friends of Johns Hopkins with mutual interests rooted in their current lives and professions. The shared educational background of Hopkins provides a common thread, says Schaffer, reminding her of the camaraderie she felt on the swim team as an undergraduate.



Four members of the Women in Business affinity group get together. Since it was launched in 2011, the group has reached some 480 alumni, students, and friends of Johns Hopkins.

The group focuses on creating the kind of environment where some spark may ignite, whether it's something a speaker says or a conversation between two members who happen to sit next to each other at an event. Building on input from members and participants, the Women in Business committee tries to identify topics for activities that will speak to the membership—work-life balance, entrepreneurship, and negotiation skills, for example—and leave plenty of time for relationships to develop, since networking is always a component.

After attending a recent event, Danielle Tergis, Bus '08 (MS), says she was already familiar with the suggestions about opening separate savings

accounts for specific purposes, creating multiple income streams, and setting goals by writing them down and sharing them out loud. But somehow, when she heard the same advice at the *Remarkable Women: Leadership Strategies for 2013* conference in March, it hit home more powerfully. "Within hours, I started doing it," she says.

Members say there's a positive vibe to the group that makes them feel safe to engage in deep discussions and share real experiences. "That puts you in a different mindset; you're just more open to things," Tergis says.

For more information about Johns Hopkins affinity groups and communities, visit alumni.jhu.edu/jhaffinities.

1959

Guy Maseritz, A&S '59, '61 (MA), has practiced law for more than 45 years. Last year his article “No Inventions, No Innovations: Reassessing the Government’s Antitrust Case Against United States Steel Corporation” was published as the lead article in the *Journal of Business and Technology Law*. He worked on the article for more than three years while practicing law full time and reports, “It is a labor of love.”

Arnold B. Silverman, Engr '59, is in his 50th year of practice specializing in intellectual property law, which he continues to enjoy tremendously. He has chaired the intellectual property law department at Eckert Seamans Cherin & Mellott LLC for 14 years and is currently senior counsel. He was honored with the University of Pittsburgh Law Alumni Association’s 2012 Distinguished Alumni Award for his commitment to Pitt Law and the surrounding community.

1960

Jack N. Alpert, A&S '60, recently decided to defer retirement and accepted an appointment as professor of neurology at the University of Texas Medical School at Houston. Several years ago, he received a teaching award from Alpha Omega Alpha, the national medical honor society, and wrote a neurology text published in 2011.

1961

John Marvin, A&S '61 (MA), composed the Sonata for Oboe and Piano, a three-movement piece that was premiered by the Alias Chamber Ensemble in Nashville, Tennessee, in February.

1966

Martha N. Hill, Nurs '66, SPH '86 (PhD), was named a 2013 Influential Marylander by *The Daily Record*, an honor that recognizes people who have made significant impacts in their fields and continue to be leaders in the state. She has been a member of the Johns Hopkins faculty since 1980 and dean of the School of Nursing since 2002.

Thrill of a Challenge

Dorry Segev, Med '96, SPH '09 (PhD), likes a challenge. “The things that don’t come easily have a very strong allure to me,” he says. It’s this attitude that has made him a renowned Johns Hopkins transplant surgeon—as well as an accomplished swing dancer. He and his mathematician wife, Sommer Gentry, are award-winning dancers and the founders of what is now known as the Mobtown Ballroom, Baltimore’s swing dance epicenter. They’re not just partners on the dance floor: In 2005, they created an algorithm for pairing up kidney patients and donors that has enabled thousands of transplants to take place; more recently, they’ve devised a way to make the distribution of donor livers more equitable across the country. “What results from our partnership is stronger and happier and more fulfilling than anything we could have achieved on our own,” Segev says, “which to me is the ultimate in a relationship and the ultimate in life.” **MARIANNE AMOSS**

1967

Edward R. B. McCabe, A&S '67, assumed the role of senior vice president and medical director of the March of Dimes Foundation in November 2012, overseeing the organization’s medical and clinical initiatives. Previously, he was executive director of the Linda Crnic Institute for Down Syndrome, as well as the Anna and John J. Sie Endowed Chair in

Down Syndrome Research and Clinical Care and a professor in the Department of Pediatrics at the University of Colorado School of Medicine from 2010 to 2012.

1972

Kathleen Campbell, A&S '72, '73 (MA), retired from the U.S. District Court for the Northern District of California where she was a career law clerk to a federal judge for 25 years.

1973

Warren Boyd, A&S '73, reports that he is a financial analyst with the U.S. Small Business Administration and was selected to participate in the SBA Leadership Development Program. He is a member of the Class of 1973 reunion committee.

Katherine Seavey Bryant, A&S '73, is the senior associate rector at St. James’ Episcopal Church in Virginia and reports: “I am in my seventh year serving as an Episcopal priest at a parish of 1,600 members and 600 worshippers on a Sunday. Leading trips to Haiti, leadership in a local ecumenical/interfaith organization, preaching, teaching—I love my ministry here, and I love these people.”

Robert Campbell, A&S '73, is a professor of orthopedic surgery and the director of the Center for Thoracic Insufficiency Syndrome at the Children’s Hospital of Philadelphia. He was awarded the Johns Hopkins University Distinguished Alumnus Award at this year’s reunion.

William Dichtel, A&S '73, is an otolaryngologist at the Guthrie Clinic in Sayre, Pennsylvania.

Guy Richard “Rick” Eigenbrode, A&S '73, is senior director of International Tax at the SanDisk Corporation in Milpitas, California.



PHOTOGRAPH BY KEITH WELLMER

Oliver Engel, A&S '73, is president of Mettrix Technology.

Jeffrey Gaitz, A&S '73, has been a neurologist for 31 years and has his own private practice in Houston. He is married and has three children.

Bill George, A&S '73, Ed '75 (MEd), is a pastor at Kensington Baptist Church in Maryland.

David Griesemer, A&S '73, Med '76, HS '78, is a professor at Tufts University School of Medicine and director of the Division of Pediatric Neurology at the Floating Hospital for Children at Tufts Medical Center. He specializes in seizures and epilepsy, neurobehavioral disorders, and traumatic brain injury and was recently recognized as a top doctor by *U.S. News & World Report*. He is married with four children and lives in Massachusetts.

Clarence "Ed" Henson Jr., A&S '73, is president of a media brokerage firm, Henson Media Inc., and owns four radio stations in Kentucky. He is married and has four children.

Kim Kashkashian, Peab '73, a violinist, won a Grammy for best classical instrumental solo in *Kurtág & Ligeti: Music for Viola*. She is on the faculty at the New England Conservatory, has been a soloist with orchestras all over the world, has toured with the string quartet of violinists Gidon Kremer and Daniel Phillips and cellist Yo-Yo Ma, and has expanded the solo viola playbook.

Jay Lenrow, A&S '73, works as office council for Adelberg, Rudow, Dorf + Hender LLC, in Baltimore. He currently serves as the vice president of the Johns Hopkins Alumni Council, the governing body of the Alumni Association, and was elected a university trustee as of June 2012. He is also the executive vice president of the Northeast Region, Boy Scouts of America.

1975

Sungrai Sohn, Peab '75, teaches violin, directs the chamber music program and string orchestra, and is head of the string department at Sarah Lawrence College. He also serves as chair adjudicator for the New York Music Competition. His performance of the "Violinist in the Mall" was a co-winner of the contemporary music competition Friends and Enemies. In collaboration with the Amasi Piano Trio, in 2012 he released a CD of Parker, Piazzolla, and Rachmaninoff trios. Sohn was featured in the documentary *To Have and To Give*, which premiered in 2012 and describes the experience of his living-donor liver transplant from his brother-in-law David Esposito in 2001.

1979

Stuart W. Davidson, A&S '79, is an attorney with the union-side law firm Willig, Williams & Davidson in Philadelphia. He was recently selected for inclusion in *The Best Lawyers in America® 2013* (Copyright 2013 by Woodward/White Inc. of Aiken, South Carolina).

1983

Robert Caverly, Engr '83 (PhD), was named a fellow of the IEEE in January for contributions to modeling and design of radio frequency switching devices. He lives in Villanova, Pennsylvania.

1987

Kevin B. Johnson, Med '87, '90 (PGF), HS '90, was named a Cornelius Vanderbilt Professor at Vanderbilt University, where he has been on the faculty since 2002. He also serves as chair of the Department of Biomedical Informatics and professor of pediatrics at the university's School of Medicine.

1988

Sarah Ashe-Donnem, A&S '88, reports, "I am enjoying staying home with my kids now, for the majority of my time. Previously, I was using my degree in social work to direct a residential treatment center. Currently I also consult part time with schools."

Amitava Biswas, A&S '88, SAIS '89, is currently planning on retiring to a quiet life in the Vermont woods starting in April after 14 chaotic years in Southeast Asia.

Lora Bonser, Engr '88, attended the University of Texas at Austin, where she earned a doctorate in chemical engineering in 1994. She is married with five children.

Jess Bunshaft, A&S '88, is currently vice president for Human Resources at St. Catherine of Siena Medical Center in New York.

Brian Funaki, A&S '88, is a professor and section chief of Vascular and Interventional Radiology at the University of Chicago.

Stanton Golding, A&S '88, is CEO of MBH Enterprises in Denver.

Navin Gupta, Engr '88, is married with two children and works as a physician for Cardiovascular Consultants.

Sion Harris, A&S '88, is an assistant professor of pediatrics at Harvard Medical School.

1989

Jeanne-Aimee DeMarrais, SPH '89 (MHS), is the adviser for Save the Children's Domestic Emergencies programs and led the organization's response to Superstorm Sandy, helping meet the needs of 44,000 children and families through child programming, goods distributions, and child care recovery initiatives. She was also instrumental in providing immediate assistance to

Newtown, Connecticut, in the days following the Sandy Hook tragedy, setting up safe child play areas where kids could just be kids while their parents received counseling.

Eric G. Orlinsky, A&S '89, chair of Corporate Practice at Saul Ewing LLP, has been elected to the Maryland State Bar Association Board of Governors for the 2013-14 term. He is governor of the MSBA Business Law Section. Orlinsky is a fellow of the American Bar Foundation, has been named one of "Maryland's Legal Elite" by Baltimore SmartCEO, and has been selected for inclusion in *Maryland Super Lawyers* every year since 2010.

1991

Katrina Armstrong, Med '91, '94 (PGF), HS '94, was named physician-in-chief of the Department of Medicine at Massachusetts General Hospital. She is the first woman to hold this position. She previously served as chief of the Division of General Internal Medicine and professor of medicine and obstetrics and gynecology at the Perelman School of Medicine at the University of Pennsylvania. She is known for her work as an investigator in the areas of medical decision making, quality of care, and cancer prevention and outcomes.

1993

Thomas Fu, Engr '93 (PhD), a civilian engineer at the Naval Surface Warfare Center, Carderock Division, was named a 2013 Asian American Engineer of the Year. He is honored for his pioneering contributions in the field of submarine and surface ship dynamics, which include nonacoustic hydrodynamic signatures and wakes, wave



Space Communicator

In February, Solomon Golomb, A&S '51, received the prestigious National Medal of Science for his landmark contributions to engineering and mathematics. It's the latest achievement in his extraordinary career in the communications technology field, which barely existed when he began working at NASA's Jet Propulsion Laboratory in the 1950s. Golomb's work is highly abstract but has practical applications; his mathematical coding schemes, for instance, are responsible for the clarity of the images captured by the Mars rover Curiosity, enabling huge amounts of data to be compressed and transmitted to Earth without losing information. "When I'm happiest as an engineer is when things I've worked on get used widely," he says. As University Professor and Distinguished Professor of Electrical Engineering and Mathematics at the University of Southern California, his home for more than 50 years, Golomb stays busy with teaching and research—but he still finds time to stump Johns Hopkins Magazine readers with his Golomb's Gambits column, which he's been contributing to the magazine for nearly 30 years. MARIANNE AMOSS

breaking, wave impact and slamming, and general hydrodynamics utilizing innovative experiments, both at model- and full-scale.

1994

Ethan J. Skolnick, A&S '94, covers the Miami Heat for *The Palm Beach Post*.

1995

John P. Grant, A&S '95, is a senior adviser of governmental affairs in the Washington, D.C., office of Husch Blackwell, a litigation and business services law firm. He rejoined the firm in 2013, following his previous work there as a lobbyist from 2001 to 2006. From 2006 until this year, he was president of J.P. Grant LLC, providing federal and state lobbying, policy development, media and grassroots coordina-

tion for the residential real estate investing industry, and political intelligence reporting to hedge funds and investment banks.

1997

Michael Lee Makfinsky, Bus '97 (MS), '02 (MBA), was promoted to account general manager at CSC in April. He directs cyber and information operations programs within CSC's Defense Sector.

1998

Christine Ayash, A&S '98, SPH '99, received a doctorate in public health from Boston University School of Public Health in 2010. She now lives in Massachusetts.

Brooke Buckley, A&S '98, works for the Anne Arundel Health System in Maryland as a general surgeon. She earned a medical degree from Ohio State University in 2002.

Amy Duncan, A&S '98, expects to graduate with a master's degree in social work from the University of Southern California in 2014.

1999

Maki Hsieh, A&S '99, a violinist and opera singer, is working to create a new musical genre called electronic opera and violin, described as "a modern twist to classical techniques and Asian traditions." She is auditioning for the television show *America's Got Talent*.

2000

Traci Thompson Ferguson, Med '00, HS '03, contributed a chapter to *Lessons Learned: Stories from Women in Medical Management*, a book published by the American College of Physician Executives about the status of women physicians as health care leaders

today. Ferguson is currently a senior medical director for a national health plan and oversees the plan's utilization management department.

Leslie Miller Greenspan, A&S '00, is an associate at Stradley Ronon, where she focuses on securities litigation, intellectual property litigation, and complex commercial disputes. She recently served on a merit selection panel of five lawyers and two nonlawyers to decide upon the reappointment of a U.S. magistrate judge of the U.S. District Court for the Eastern District of Pennsylvania.

Shoshana Sondra Shamberg, Ed '00 (MS), is an occupational therapist and president of Abilities OT Services and Seminars Inc. and the Irlen Visual Learning Center. She was recently recognized by Worldwide Who's Who for showing dedication, leadership, and excellence in health care consulting services and also honored for her contributions to the occupational therapy practice by the American Occupational Therapy Association.

Mark Stibich, SPH '00, '05 (PhD), and Julie Stachowiak, SPH '05 (PhD), are a husband-wife team and founders of Xenex, a company created to market use of pulse xenon UV disinfection services to decontaminate patient care environments. The couple was performing research when they learned of air disinfection technology being used to combat airborne tuberculosis and invented the Xenex "robot" to perform the disinfection. The device is rolled into a hospital room by a housekeeper and flashes a bright UV light for 5–10 minutes, killing the microorganisms lurking on high-touch surfaces (bedrails, tray table, remotes, bathroom door, etc.) as well as the hard-to-reach surfaces (curtains, artwork, ceiling, floor, etc.).

ALUMNI NEWS & NOTES

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2003

Stephen B. Brauerman, A&S '03, was elected as a director of the Wilmington, Delaware, law firm Bayard P.A. He concentrates his practice in the areas involving fiduciary duty claims, corporate and alternative entity control disputes, advancement/indemnification, breach of contract, antitrust, securities, patent infringement, copyright infringement, and trademark matters.

2004

Ramona Bajema, SAIS '04, is Japan program manager for AmeriCares, overseeing relief efforts in the country in the wake of the 2011 earthquake and tsunami, from rebuilding health care facilities to supporting programs that restore a sense of normalcy for evacuees still adjusting to new surroundings and coping with loss. Currently, her work focuses largely on mental health counseling and support

programs, including an innovative garden therapy program that was highlighted in *The Wall Street Journal*.

2005

Janine Van Norman, A&S '05 (MS), is chief of the Branch of Foreign Species, Endangered Species Program, in the U.S. Fish and Wildlife Service. She is the first person to hold this position, and helps protect animals and plants native to foreign countries that are at risk of becoming extinct. There are more than 600 foreign species protected under the federal Endangered Species Act.

2008

Yasmene Mumby, A&S '08, Ed '10 (MAT), is director of community engagement for KIPP Baltimore, a nonprofit created to operate schools in Baltimore City

that will lead students from low socioeconomic backgrounds and a diversity of skill levels to attend four-year colleges. In June 2012, she was elected co-chair of the Baltimore Education Coalition, a citywide group whose mission is to ensure that all children in Baltimore City receive an excellent education. Mumby played a key role in rallying support for the \$1 billion in state funding to renovate or replace city schools, which passed in the Maryland state legislature in April. Currently, she is a student at the University of Maryland Francis King Carey School of Law.

Paul Rabil, A&S '08, lobbied on Capitol Hill to fight childhood obesity and pass legislation that would help Americans become more physically fit during the 14th annual National Health Through Fitness Day. Rabil plays major league lacrosse and was named Warrior MLL Offensive Player of the Year in 2011 and 2012.

GOLOMB'S ANSWERS

Some Irregular Verbs

Solutions (Puzzle on page 65)

Pattern A verbs

- begin, began, begun
- drink, drank, drunk
- ring, rang, rung
- shrink, shrank, shrank
- sing, sang, sung
- sink, sank, sunk
- spring, sprang, sprung
- stink, stank, stunk
- swim, swam, swum

Pattern B verbs

- cling, clung, clung
- fling, flung, flung
- sling, slung, slung
- slink, slunk, slunk
- spin, spun, spun
- stick, stuck, stuck
- sting, stung, stung
- string, strung, strung
- swing, swung, swung
- wring, wrung, wrung

Notes: My *Cassell Concise Dictionary* (from the U.K.) has "usage notes" warning that using *shrank*, *sunk*, and *sprung* as past tenses, instead of *shrank*, *sank*, and *sprang*, should be avoided in "standard English." (The movie title *Honey, I Shrank the Kids* ignored this advice.) The same dictionary still allows *span* as an alternate past tense of *spin*. My U.S. dictionaries are more tolerant of alternative past tense forms.

Variants

- win, won, won (Compare pronunciation with *spin*, *spun*, *spun*.)
- sit, sat, sat
- run, ran, run
- strike, struck, struck

Humor

- bring, brang (or brung), brung ("I'll leave with the one who brung me.")
- think, thunk, thunk ("Who'da thunk it?")

Notes: Over two-thirds of pattern A plus pattern B verbs begin with the letter *s*, and all except *stick* have a nasal sound (*m*, *n*, *ng*, *nk*) after the *i* of the present tense.

2009

Jonathan Bradley, Bus '09 (MBA), recently launched a nonprofit organization with a mission to help mentor children within Baltimore's schools and community to learn and practice necessary lifetime skills to live and lead a productive and quality life. He named the effort Cristata Cares, using the Greek word for "blue jay."

2012

Austin Allen, A&S '12 (MFA), has joined Rap Genius, a guide to the meaning of rap lyrics, to lead the site's new Poetry Brain initiative. The project received \$15 million in funding earlier this year to expand a social network of annotators of rap lyrics.

IN MEMORIAM

Maurice Chassin, A&S '33, Med '37, December 10, 2012, Chandler, Arizona.

Margaret N. Lewis, A&S '37 (PhD), November 23, 2012, Cambridge, Massachusetts.

George W. Mitchell Jr., A&S '38, Med '42, October 20, 2012, San Antonio, Texas.

Joan H. Gault, Med '40, December 17, 2012, Rising Sun, Maryland.

John Herbert "Jack" Miller, A&S '41, August 24, 2012, Wilmot, New Hampshire.

John Monfort "Jack" Remsen, Engr '41, March 19, Wilmington, Delaware.

Patricia M. Kirkwood, A&S '43 (PhD), December 14, 2012, Ithaca, New York.

Truman Charles "T.C." Richard, Engr '43, December 4, 2012, Akron, Ohio.

Thomas W. Simpson, Med '43, December 29, 2012, Philadelphia.

Sterling A. Alban, Engr '44, December 22, 2012, Manchester, Maryland.

Kathleen Brady Keith Horsley, Nurs '46 (Dipl), December 8, 2012, Raleigh, North Carolina.

Jeanne D. Webb, A&S '46, SPH '79, December 24, 2012, Austin, Texas.

A. Margaret Larson, SAIS '47, December 27, 2012, Bon Air, Virginia.

John Breslin, A&S '49, November 20, 2012, Woodbridge, Connecticut.

Edwin Carton, A&S '49, November 24, 2012, Chestnut Hill, Massachusetts.

W. Kennedy Cromwell III, SAIS '49, December 13, 2012, Sykesville, Maryland.

George E. McKinnon, Med '49, HS '53, December 2, 2012, Pueblo, Colorado.

Mae McDaniel Teeter, Nurs '49, December 11, 2012, Castle Rock, Colorado.

W. Jackson Hall, A&S '50, October 14, 2012, Rochester, New York.

Helmut Sonnenfeldt, A&S '50, '51 (MA), November 18, 2012, Chevy Chase, Maryland.

Francis Key Murray, A&S '51, December 2, 2012, Wilmington, Delaware.

Olga Cutler, Nurs '52, November 28, 2012, Jeffersonville, New York.

John Doss, Med '52, HS '53, November 4, 2012, Bolinas, California.

George W. Gaffney, Med '52, '60 (PGF), November 27, 2012, Monkton, Maryland.

Robert B. Mellins, Med '52, HS '53, December 12, 2012, New York.

Dorothy Mae Goodwin, Nurs '54, April 29, 2012, Mehoopany, Pennsylvania.

Ramon "Ray" Santamaria Jr., A&S '55, December 9, 2012, Cockeysville, Maryland.

John Gaetano Forte, A&S '56, November 19, 2012, Berkeley, California.

Richard D. Spellman, Engr '56, January 17, Exton, Pennsylvania.

Donald Culbertson, Engr '57, December 10, 2012, Pinehurst, North Carolina.

Frederick Rosenbloom, A&S '58, Med '62, November 11, 2012, Miami Beach, Florida.

John Edwin Young, HS '58, November 24, 2012, Hillsborough, California.

Robert A. Makofski, Engr '60 (MSE), December 25, 2012, Camden, Maine.

Donald R. Luster, A&S '61, December 14, 2012, Tolland, Connecticut.

Joseph Zuraw Sr., Engr '61, December 4, 2012, Towson, Maryland.

Harvey D. Kucherer, Engr '62, March 16, Monroeville, Pennsylvania.

Ronnie M. Elwell, Nurs '63 (Dipl), December 8, 2012, Nantucket, Massachusetts.

James E. Guinane, Med '63, November 14, 2012, Keene, New Hampshire.

O. Michael Colvin, HS '64, Med '68 (PGF), March 16, Chapel Hill, North Carolina.

Maureen McGrath Henderson, SPH '64 (MS), December 4, 2012, Seattle.

Carl Timothy Golumbeck, A&S '68, Med '71, HS '75, '85, July 21, 2012, Melbourne, Australia.

Joseph P. Hobbs, A&S '68 (MA), '69 (PhD), December 15, 2012, Raleigh, North Carolina.

Harvey G. Alexander, A&S '69 (MA), November 23, 2012, Baltimore.

William A. Bauer, Engr '69, October 28, 2012, Bluffton, South Carolina.

Charles H.W. "Henry" Foster, Engr '69 (PhD), October 4, 2012, Needham, Massachusetts.

Frederick Franklin Schaub, Engr '70, December 6, 2012, Bel Air, Maryland.

Richard Ben Cramer, A&S '71, January 7, Chestertown, Maryland.

Edwin J. Geisendaffer, Engr '72, '74, December 13, 2012, Fallston, Maryland.

Charles McCoy Johnson III, Med '72, HS '74, '77, December 22, 2012, Earlysville, Virginia.

Lee Terry Bacheler, A&S '74 (PhD), March 23, Chapel Hill, North Carolina.

Calvin C. Adams, SPH '75, November 16, 2012, Wilmington, Delaware.

Gary D. Chenoweth, Ed '77 (MS), August 29, 2012, Cockeysville, Maryland.

John Wesley Jones Jr., A&S '78 (MLA), December 3, 2012, Bel Air, Maryland.

Paul M. Sumerall, SAIS '82, December 20, 2012, Long Beach, California.

Ava Chitwood, A&S '84 (MA), '93 (PhD), November 1, 2012, Temple Terrace, Florida.

Kevin C. Hurley, A&S '85, November 29, 2012, Middlebury, Vermont.

Lois P. Griffiths, Bus '87, December 16, 2012, Punta Gorda, Florida.

Karen Lewand, Bus '88 (MAS), December 20, 2012, Baltimore.

Richard Grant Shifflet Jr., Engr '93, November 19, 2012, Baltimore.

Terry R. Armstrong, Bus '07 (Cert), '11 (MS/ITS), December 20, 2012, Capitol Heights, Maryland.

Anne Smedinghoff, A&S '09, April 6, 2013, Chicago.

LIKE FAMILY

Written by |

SARAH HEMMINGER, ENGR '02,
MED '10 (PhD)

I met Eddie at the beginning of his sophomore year at Dunbar High School. Abandoned by his mother, Eddie was living with his father, who struggled to make ends meet. Though a bright student, Eddie was failing classes and in danger of dropping out.

I was a graduate student at Johns Hopkins, leading a fledgling nonprofit called the Incentive Mentoring Program. When Eddie first joined the program, he was moody and often complained about his father's strict rules, but he seemed like one of the "easy" kids. He regularly attended school, rarely missed a tutoring session, and was always the first to show up for IMP gatherings. By the summer after his junior year Eddie was hyper focused, spending the hot days inside studying for the SAT exam and composing his college essays. He also formed deeper bonds with his volunteer mentors, especially Tong Zhang, Med '11 (PhD). What Tong and I didn't know was that while he was making incredible progress academically things were crumbling at home. By the fall of his senior year, Eddie and his father were homeless.

For the next few months, Eddie bounced between Tong's apartment and my house (and the lab at Johns Hopkins where I worked), while we as 20-something grad students learned to co-parent a 16-year-old with Eddie's father and one another. Disagreements seemed never-ending. How much time should be allowed for video games versus homework? Who should play "bad cop"? Tong felt like I didn't make rules that took into

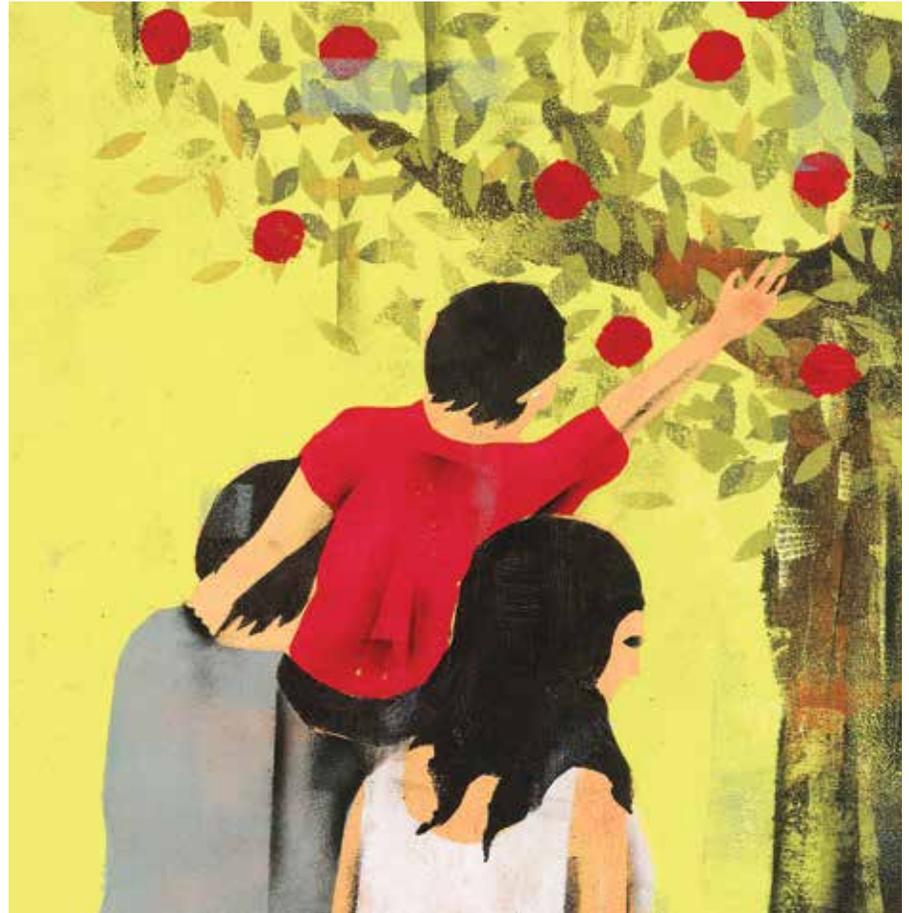


ILLUSTRATION BY DANIEL ZENDER

consideration Eddie's motivations. I felt like she didn't have my back when I set firm rules. It was difficult.

Believe it or not, this is exactly why my husband, Ryan, and I started IMP. Almost failing out of high school and homelessness were things Ryan had also experienced as a teenager. When his family fell apart, a group of teachers became his extended family, providing packed lunches, rides to school, and assistance to keep the electricity on in the winter. We wanted to create similar intentional families, doing whatever it takes—providing mentorship, making morning wake-up calls, coordinating clothing, furniture, and appliance donations—to help underperforming students during high school and after graduation.

After nine years, IMP has grown from a handful of volunteers to over 600, and it currently engages 127 students. So far, every one of our students has stayed with the program, graduated from high school, and been accepted to college, including Eddie.

Through our experience with Eddie, though it wasn't easy, Tong and I began to understand one another's deepest values. Today, we have transitioned from co-parents and volunteers to co-workers as IMP's chief operations and executive officers. In the end, it was clear that all of us—Eddie, Tong, and myself—needed the same thing: the chance to be part of an intentional family built on love and trust.

Sarah Hemminger is co-founder and CEO of the Incentive Mentoring Program.

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