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SOLVING CANCER

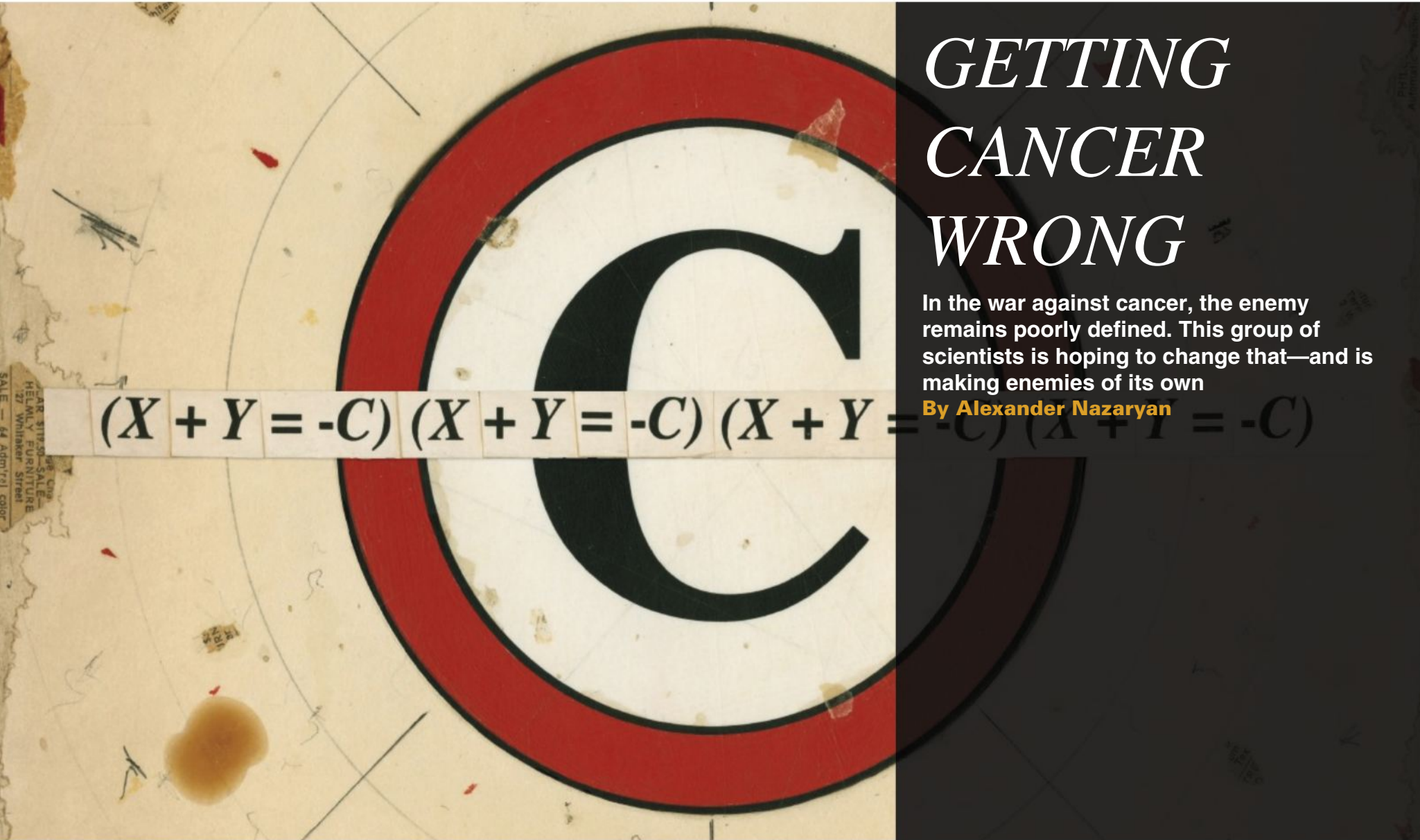
**YOU CAN'T CURE WHAT YOU
DON'T UNDERSTAND**

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Newsweek

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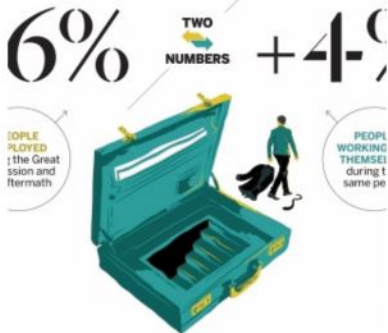
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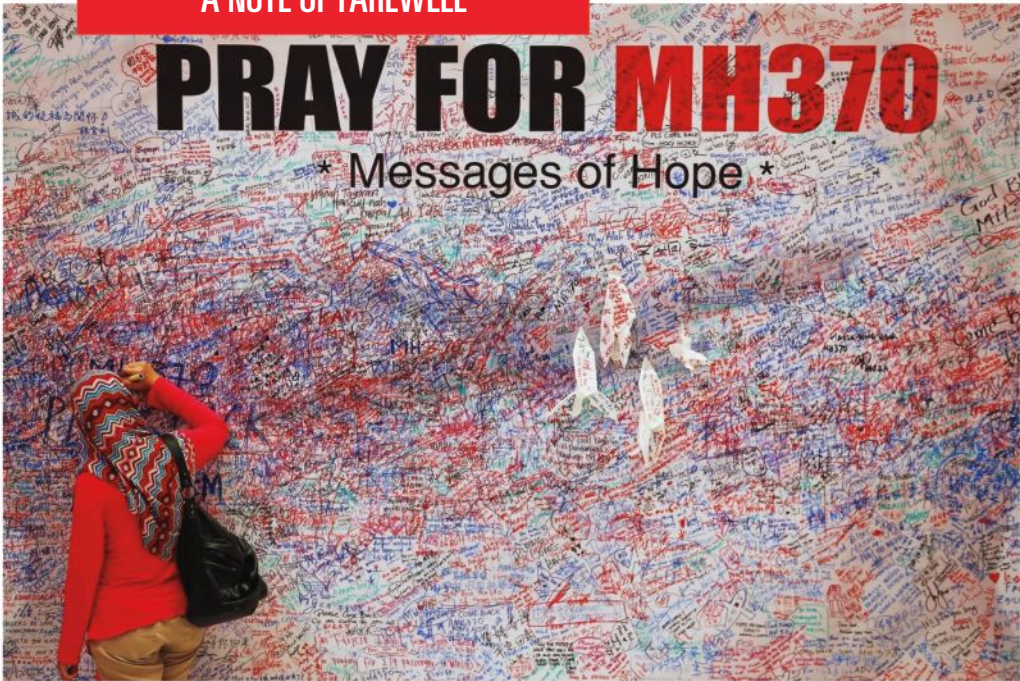
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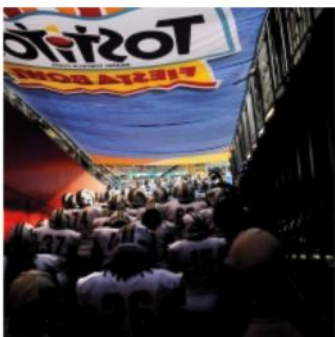
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Kyoko Hamada for Newsweek

GETTING CANCER WRONG

IN THE WAR AGAINST CANCER, THE ENEMY REMAINS POORLY DEFINED. THIS GROUP OF SCIENTISTS IS HOPING TO CHANGE THAT—AND IS MAKING ENEMIES OF ITS OWN

By Alexander Nazaryan

From his fourth-floor window at Tampa's Moffitt Cancer Center, Robert A. Gatenby can look down to where patients stand waiting for valets to retrieve their cars. They have gone through chemotherapy, biopsies, radiation. They are pale, anxious, resolute. Some will live and some will die: a

young woman with short hair, clutching her partner's hand; an older man, alone. Students from the nearby University of South Florida pop out of patients' cars. Peppy and dressed in blue vests, these cheerful valets look as if they could be working at a luxury hotel in the tropics. But nobody here is on vacation.

Gatenby says he sometimes sees patients retching after chemotherapy, which reminds the 62-year-old radiologist that his Integrated Mathematical Oncology Department—the only full-scale outfit of its kind in the nation—does not have the luxury of time. Mathematics is not generally known for urgency. Few lives hinge on proof of the twin prime conjecture, but the mathematicians and oncologists Gatenby has assembled in Tampa are trying to tame the chaos of cancer in part through the same differential equations that have tortured so many generations of calculus students. By mathematically modeling cancer, they hope to solve it, to make its movements as predictable as those of a hurricane. The patients down there, fresh from treatment, need shelter from the storm.

Gatenby's small corner of Moffitt bears little resemblance to a medical center: There are no white-coated doctors frantically rushing to save patients or synthesizing miracle cures deep into the night. You might think you've found yourself in a sleepy academic department where abstract ideas are kicked around like a soccer ball on the college green. Which, come to think of it, is actually a pretty accurate description of what goes on in Gatenby's lab, though not at all a pejorative one. The mathematicians in his employ are convinced that we do not really understand cancer and that, until we do, our finest efforts will be tantamount to swinging swords in utter darkness. As far as these Tampa iconoclasts are concerned, your average cancer doctor is trying to build a jetliner without having grasped aerodynamics: Say, how many wings should we slap on this thing?

A Malicious Green Cloud

We have been fighting the War on Cancer since 1971, when President Richard M. Nixon declared that the "time has come in America when the same kind of concentrated effort that split the atom and took man to the moon should be turned toward conquering this dread disease." Four decades later, 1,665,540 Americans per year hear the dreaded diagnosis, and about 585,720 die annually from some variety of the disease, according to the American Cancer Society. Smallpox and polio have been cured or largely eradicated, but cancer remains the same scourge it was 4,500 years ago, when the Egyptian doctor Imhotep mused, in what may have been civilization's first stab at oncology, about how to treat "bulging masses on [the] breast." Modern oncology makes incremental advances, with a melanoma drug that extends survival by three months passing for a major breakthrough. This is nobody's fault, but everybody's problem.

Gatenby is tired of a fight we keep losing. After 30 years, he has come to the uneasy conclusion that cancer is smarter than we are, and will find ways to evade our finest medical weaponry. The weary warrior wants to make peace with cancer's insurgent cells—though on his own terms, terms that would spare the lives of many more patients. To some within the medical establishment, this might seem preposterous, but Gatenby relishes the role of the outsider.

Gatenby grew up in the Rust Belt town of Erie, Pa., where 12 years of Catholic school instilled in him "an incredible hatred of dogma." At Princeton University, he studied physics with some of the greatest scientific minds of the 20th century. Figuring he wasn't fated to join the physics pantheon, Gatenby turned to medicine. But medical school at the University of Pennsylvania was dismayingly similar "to the rote learning of catechism" he remembered from Saint Luke School. It felt like he was "going backwards."

Whether in the lab, the classroom or the clinic, Western medicine relies on cautious experimentation, its zeal for

breakthroughs tempered by the Hippocratic injunction to do no harm. But that can foster a frustrating incrementalism that is itself injurious. David B. Agus, one of the nation's most prominent oncologists and a professor at the University of Southern California, explains that "you are not rewarded, in general, for taking risk. It's very scary to do something radically new."

Gatenby specialized in radiology and, after receiving his medical degree in 1977 and completing a residency, went to work in 1981 for the Fox Chase Cancer Center in Philadelphia. Fox Chase is to cancer research what the Boston Garden was to professional basketball. It was home to David A. Hungerford, one of two researchers responsible for discovering the Philadelphia Chromosome, a major clue to cancer's birth within the human genome. Among its current éminences grises is Alfred G. Knudson Jr., whose "two-hit" hypothesis holds that cancer is triggered by an unfortunate accumulation of errant genes, harmful outside events (too much sun, too much red meat) or a combination of the two.

The study of genes did not interest Gatenby back then, nor does it interest him now, even though much of medicine is now in the thrall of genomics. Gatenby wanted to discover cancer's "first principles," the basic ideas behind the seemingly sudden explosion of cells that want to kill the very body that nourishes them. Sure, you could know the BRCA1 gene better than you know your own mother, but unless you had some insight into why it caused a furiously impervious breast cancer, you were trying to find your way out of a forest by studying the bark of a single tree. Gatenby sought to understand cancer with the same totality that Newton had understood gravity.

As with Newton's famous laws of motion, mathematics seemed to hold the key. Math had been used to model the weather and financial markets, which like the human body are fickle and incredibly sensitive to outside forces (a run

on Greek banks; a low-pressure system moving down from Canada). Gatenby saw no reason the same could not hold true for cancer. He spent a year reading math, which puzzled his colleagues. Then, while visiting the Cloisters museum in upper Manhattan with his family, he took a sheet of stationery and started scratching down equations he thought could get him closer to cancer's fundamental truths.

"To say they hated it would not do justice," Gatenby says of the response of his Fox Chase colleagues. Other oncologists told him that "math modeling is for people too lazy to do the experiment" and that "cancer is too complicated to model." The latter is a refrain that, 30 years later, still dogs Gatenby and his staff at the Integrated Mathematical Oncology Department, which includes five mathematicians with no formal experience in medicine.

Among those five is Sandy Anderson, a young Scotsman who dresses as if he were on the way to a Beck concert. There is a bottle of single malt on his desk. "Of course cancer is complex," Anderson tells me, brogue rising. "But how can you say it's too complex? That complexity should be viewed as a challenge that we have to try and tackle. And just because there's complexity doesn't mean there aren't simple rules underlying it.

"What we'd love to do is have everybody's own little hurricane model for their cancer," he explains. This is less a metaphor than you may imagine. Anderson shows me computer models of a breast cancer's growth, the cells spreading like a malicious green cloud across the screen. Different versions of the model show what happens when different treatments are applied: Sometimes the cancer slows, but sometimes it explodes. This seems like an intuitively rational approach to the disease, predicting how it responds to a variety of treatments. But it isn't common. There are about a dozen drugs for breast cancer approved by the Food and Drug Administration. Depending on which form of the disease is diagnosed and at what stage

it's discovered, there's a maddening number of viable drug combinations. Best practices exist, but these can be anecdotal, doctors simply doing what they think works. The War on Cancer is fought by competing bands with their own weapons, cancer's chaos exacerbated by our own dismaying disorder. Anderson would like to provide the onco-soldiers with battlefield maps.

Wrong But Useful

Weather often came up during my time in Tampa, and not only because a wet dreariness lingered in the Florida skies. In 1961, Edward N. Lorenz of the Massachusetts Institute of Technology tried to create computer models for weather, only to stumble into the field of chaos theory. He saw that weather was entirely dependent on initial conditions, so that if he altered his inputs by even a fraction of a percentage, the weather model would fluctuate to an unexpected degree, in unexpected directions. Yet patterns did emerge. This would come to be called "deterministic chaos," for the way complex adaptive systems—the weather, the global economy, maybe cancer—can both hew to our expectations and routinely subvert them. Sometimes, autumn acts like autumn. But once in a while, in Lorenz's famous formulation, a butterfly causes a hurricane.

One refrain I heard several times at Moffitt was that "all models are wrong, but some are useful," a quip by the late mathematician George E.P. Box. A mouse injected with melanoma is only an imperfect model of human cancer; if it weren't, you wouldn't be reading this article today, for, as Anderson acidly notes, "We've solved cancer in mice a hundred thousand times." This is a model, too:

$$p(t) = Ct^{\Phi}C = (\Phi + 1)T^{-(\Phi+1)}.$$

If that freaks you out, don't worry—it freaks out a lot of clinicians. Gatenby and his team are doing the math for them, convinced that their models of cancer strike the right balance between specificity and universality.

The other option is to keep chasing errant genes and trying to snuff them out, but that seems to many like a futile enterprise, sort of like trying to plug a leaking dam with wads of cotton. A tumor that weighs just 10 grams, Gatenby says, contains more cells than there are humans on earth. Nor are those cells a uniform gray mass, as the popular conception of cancer has it. As the tumor grows, different mutations may come to the fore, sort of the way a military assault may deploy infantry and artillery at different times in an attack. The cells of a single cancer differ within a single patient, and the same types of cancers differ from patient to patient. Talking about a prototypical cancer, then, is about as helpful as talking about a prototypical dog.

"It's almost like it's an intelligent opponent," says Donald A. Berry, who heads the biostatistics department at the M.D. Anderson Cancer Center in Houston. "It has many, many paths that it can take." Mathematics, Berry says, can "provide answers where biology runs into a wall."

One of those walls is the sheer amount of information cancer researchers would need to map every possible genetic mutation possible for the 200 cancers that can ravage the human body. Researchers have spent \$375 million to create the Cancer Genome Atlas, which is based on the screening of 10,000 cancer samples for the responsible genes. Some think that until we've sorted through about 100,000 samples, the cancer gene compendium will be woefully incomplete. "It would be crazy not to have the information," the geneticist Eric S. Lander told The New York Times.

But information brings its own delusions. Gatenby laments the "vast industry that's developed over molecular data." He is frustrated by the narrow focus of many of his colleagues. The bookshelves in his office don't hold the standard medical tomes; they are instead lined with rare physics texts from the early 20th century, including several volumes of the *Annalen der Physik*, which published the pioneering work of Einstein, Hertz and Planck. Nestled among these is a copy of *Everyone Poops*—Gatenby recently became a grandfather.

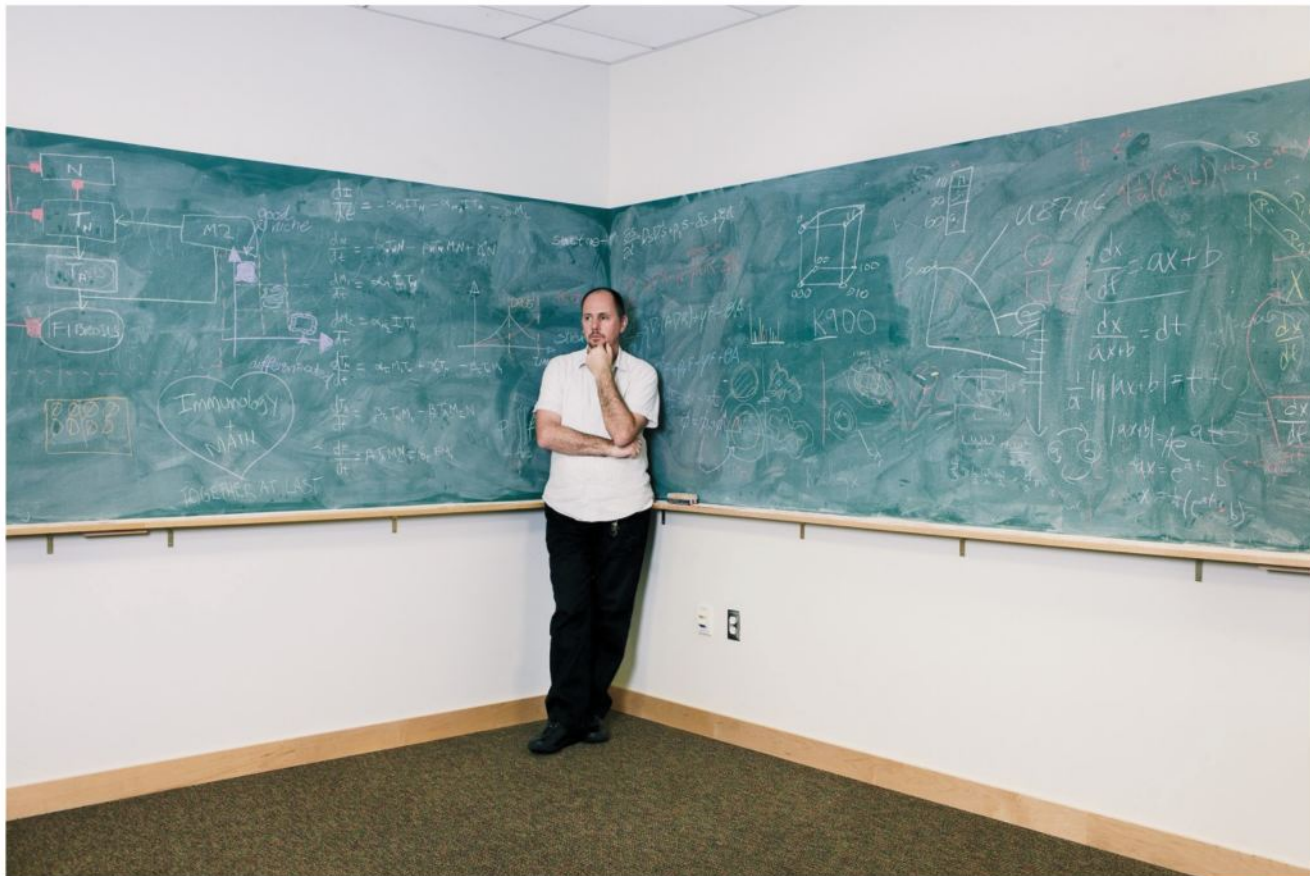
The most curious (and most telling) book on Gatenby's shelf is *The Truth in Small Doses: Why We're Losing the War on Cancer-and How to Win It*. Having survived Hodgkin's lymphoma as a young man, Clifton Leaf decided to investigate why cancer medicine had made so few advances in recent years. The resulting *Fortune* article in 2004, as well as his book last year, offers little cause for optimism, with their depiction of a medical culture whose caution has gradually ossified into maddening inertia.

"I like big thinkers," Leaf told me when I asked him about Gatenby's work. "He's a guy who doesn't get stuck in orthodoxy." As Leaf writes in his book, the whack-a-gene approach to cancer has its finest success story in Gleevec, which, since its introduction about a decade ago, has proved an adept warrior against chronic myelogenous leukemia.

It does exactly what proponents of the genetic approach to cancer hope, seeking out the tyrosine kinase enzymes that drive the growth of the once-deadly blood cancer. Time magazine put Gleevec on its cover in 2001, asking, "This little pill targets cancer cells with uncanny precision. Is it the breakthrough we've been waiting for?"

Unlike most solid-tumor cancers, the type of leukemia Gleevec cured is spurred by a single "driver" mutation. Render it inert, as Gleevec does, and the cancer is largely defeated. But few other iterations of the disease are so simple. The closest successor drug is Herceptin, which targets breast cancer tumors with the HER2-positive genetic alteration. Otherwise, targeted therapy has not fulfilled its promise; chasing after errant genes through the body is like trying to catch a school of tuna with a Ziploc bag.

And so Gatenby and his team have taken the opposite tack, going way big and trying to understand all of cancer, instead of just one or two genes. Gatenby told me a story about a cancer conference in Toronto where all attendees were introduced by the name and the molecule they were studying. He chuckles at this myopia, divorced from any greater vision of the Brobdingnagian disease.



Dr Sandy Anderson, Moffitt Center. Kyoko Hamada for Newsweek

'A Blind, Emotionless Alien'

Gatenby knows that all his equations will mean nothing if they don't help patients. Ultimately, he will have to convince the very clinicians who frustrate him that his abstractions can have real-world benefits. He needs to not only predict the hurricane but also save the cities in its path.

In 2000, Gatenby went to the University of Arizona and was named the head of radiology at its College of Medicine in 2005. It was here in the desert of Tucson that he had an intellectual conversion. He had been publishing mathematical models of cancer during the past two decades at Fox Chase, but now he began to understand the role that evolution plays in carcinogenesis. The first principles of cancer that he had been trying to find, Gatenby surmised, lay in the Darwinian concept of natural selection.

Gatenby's insight was brilliantly counterintuitive: Cancer is really, really good at evolution. So damn good that our bodies nourish it, even as it hijacks blood vessels and nutrients. It fools the immune system, nestling so deep

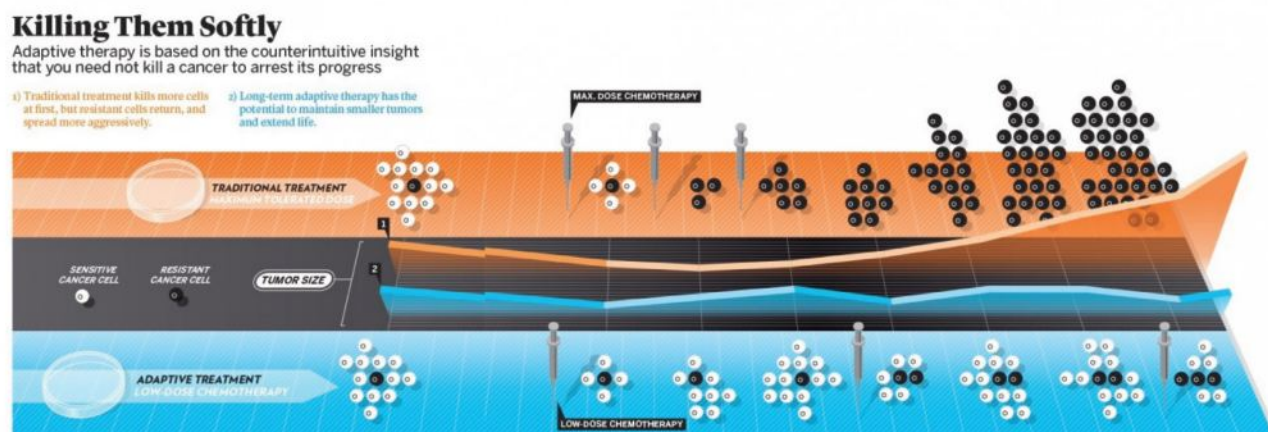
within normal tissue that we can't easily extract it. And then, in what amounts to suicide, it kills the very body in which it has taken root. The writer Christopher Hitchens once described the esophageal cancer that would soon kill him as a "blind, emotionless alien." But that alien is actually a native son.

Math could provide a map of cancer's movements; Gatenby now understood that only Darwin could explain why that movement was so hard to arrest. We were unwittingly helping that evolution along, turning all too many cancers into hurricanes. Worst of all, we were doing it in the name of saving lives.

Gatenby was convinced by studying pest management, of all disciplines. By the early 1970s, the agricultural industry had come to realize the limit of synthetic pesticides, which had been famously demonized by Rachel Carson's *Silent Spring* in 1962. They were not only potentially harmful to humans but possibly not all that good at protecting crops. If used indiscriminately, chemical agents would indeed kill plenty of insects, but those that survived had a resistance to the toxic substance, which could do nothing against the remaining pests, which were free to breed. This was the evolutionary version of the cliché about how the thing that doesn't kill you makes you stronger. Our efforts to vanquish the bugs forced evolution's hand.

A little more than a month after signing the National Cancer Act on December 23, 1971, Nixon addressed Congress on the nation's environmental challenges. Among the initiatives he introduced was Integrated Pest Management, which promised "judicious use of selective chemical pesticides in combination with nonchemical agents and methods," like the deployment of natural predators. Instead of trying to kill all bugs, Integrated Pest Management would try to control the population, less concerned with annihilation than watchful containment. There would always be some bugs; the goal was to keep

them from spreading, often by using less than the maximum dosage of pesticide.



Infographic by John Grimwade

[Click to enlarge](#)

The War on Cancer sold the American public (and much of the medical establishment) on the idea that cancers must be vanquished entirely, that no stalemate was possible. Thus the endless rounds of chemo a patient faces today, killing good cells with the bad. Gatenby thought that Integrated Pest Management offered a rejoinder to that all-or-nothing mentality. The bug guys had realized what the cancer guys hadn't: You raze an entire enemy city, and those who remain will be hardened insurgents with a lust to kill. But trim away strategically at the enemy's forces, and the rest of the population will be kept at bay. Treatment, in other words, may aggravate a cancer's growth by stripping away the easy-to-kill cells and leaving behind hardened carcinogenic warriors.

"Evolution will win this game," Gatenby tells me. Malignant cells will eventually evolve beyond the capacity of any drug to hold them at bay. Even the patients of wonder drug Gleevec face an eventual recrudescence of chronic myelogenous leukemia. The question is whether a mathematical understanding of how cancer progresses can lead to treatments that are less prone to aggravating resistant cells into proliferation.

Gatenby came to Moffitt in 2008 to fix the radiology department. Though he continues to do clinical rounds one day each week, his intellectual energies have clearly shifted to the Integrated Mathematical Oncology Department, which has six full-time members and about a dozen postdoctoral and graduate students. They know that many think they are on a quixotic quest. They know that the money is in drug development. They know that too many people are dying. And yet there they are, jovially scrawling equations on a blackboard.

Ravaged by Rambo

So how do you defeat a disease that is constantly evolving a resistance to our weapons?

Maybe by turning your swords into plowshares. In 2009, Gatenby published a paper in *Cancer Research* called "Adaptive Therapy." Gatenby posited that a tumor consisted, in essence, of chemo-sensitive cells, fast to proliferate, and chemo-resistant cells, more reluctant to grow. The standard practice of giving the maximum tolerated dose of chemo would clear out the sensitive cells, leaving behind a tough nugget of impervious cells, the al-Qaida rebels of the bunch. These previously dormant cells would now pour out of their caves, suddenly finding both space and nourishment to grow. And grow they would, with the barrier of the sensitive cells gone. In essence, cancer therapy was killing "good" cancer cells while leaving behind "bad" ones.

Gatenby used both mathematical models and in vivo experiments to show that adaptive therapy, which kept some of cancer's petty criminals around, actually held the most dangerous cells in abeyance. One of his co-authors on the 2009 paper was Ariosto S. Silva, a mathematician now at Moffitt. Silva, who is Brazilian, likes to explain cancer through the Rambo film *First Blood*, about a bloodthirsty Sylvester Stallone protagonist who is made an especially vicious killer because of the suffering he endured in Vietnam. Our approach to chemotherapy is turning cancer

cells into Rambos, Silva explained when I met him in Tampa.

A recent innovation is the use of ersatzdroges, or "fake drugs," which target chemo-resistant cells without killing them. In a draft paper titled "Sweat but No Gain," Gatenby and his Moffitt colleagues describe how multi-drug-resistant cells "continue to activate their membrane pumps to extrude the ersatzdroge as though it were a cytotoxic agent," that is, an actual chemotherapeutic drug. But it isn't. The cells don't know that, however, working furiously to defend themselves, "thus causing a decrease in fitness by limiting available resources for proliferation and invasion." While research into ersatzdroges is relatively new, Gatenby's paper suggests that tiring cells out instead of killing them does slow tumor growth. Instead of evolving with their resistance, the cells expend all their energy staying afloat.

Some oncologists are skeptical of Gatenby's approach. Robert Weinberg, the MIT cancer researcher who discovered the first cancer-causing gene, does not believe mathematical oncology is a fruitful pathway because it "lacks predictive powers that extend beyond predictions made from simple, intuitive assessments of future behavior," as he told me in an email. Others say that while Gatenby's evolutionary portrait of cancer is a clever analogy, it is not instructive for treatment of the disease. Marc B. Garnick, a urologic cancer specialist at the Beth Israel Deaconess Medical Center and Harvard Medical School, says Gatenby's ideas mirror the practice of metronomic therapy, which "has been around for decades." (Gatenby disputes this claim.)

But for clinicians frustrated with the current pace of progress in the War on Cancer, Gatenby at the very least offers a new way of thinking about a disease that has perplexed humanity for thousands of years.

Athena Atkipis, an evolutionary biologist and co-founder of the Center for Evolution and Cancer at the University of California, San Francisco (and a sometime colleague

of Gatenby's), likes to think of the different approaches to the War on Cancer in terms of Greek mythology. "My name is Athena, I know," she says by way of disclaimer before launching into an explanation: The god of war, Ares, understandably "likes a good fight." Athena, meanwhile, is a master strategist, always scheming about how to outwit the enemy. Her namesake would know better, Atkipis implies, than trying to "intimidate the cancer into retreating."

In Tampa, Gatenby and I went to dinner at a Cajun restaurant with Anderson and Silva, two of Moffitt's mathematicians. Downing his first drink, Anderson indicated his distaste for most of what passes for oncology today: "We keep measuring s**t without getting anything out of it." Everyone laughed. Gatenby complained about how the first fancy car he'd ever purchased had had its cool compromised by the installation of a car seat. Everyone laughed again. It was like the scene in *The Untouchables* when Eliot Ness, the famed Prohibition enforcer played by Kevin Costner, takes his lawmen out for a celebratory dinner after a huge cache of booze has been found and summarily destroyed. They are drunk with elation, but also a little anxious: The main target, Al Capone, remains at large. So it was in Chicago. So it was in Tampa, only with drinks.

"I've never seen a dogma I didn't hate," Gatenby told me. That was true at the Catholic school in Pennsylvania. And it is true today, at the hospital in Florida, where the cancer patients are waiting.



Ahmad Halabisaz/Xinhua/Corbis

CHOKING TO DEATH IN TEHRAN

**IRAN HAS SOME OF THE WORLD'S WORST POLLUTION;
TOXIC GAS, BAD POLICIES AND TRADE SANCTIONS
ARE THE MAIN CULPRITS**

By Azeen Ghorayshi

You can see the air in Tehran—a faintly acrid orange haze that obscures the towering mountains that ring the sprawling metropolis. The white marble facades of the city's soaring cement buildings are covered with a thick layer of gray soot. Walking around the city center, women, children and the elderly can often be seen wearing facemasks, or

clutching veils across their faces. In this smog, blinking stings the eyes; breathing burns the throat. And in the mornings, when the air is particularly bad, the sidewalks are empty.

But the traffic—a mass of 3 million cars gridlocked and spitting out toxic exhaust—grinds on.

According to the latest World Health Organization **numbers**, four of the 10 worst-polluted cities in the world are in Iran. The number one slot was awarded to the small Iranian industrial city of Ahvaz, which has three times the concentration of pollutants as Beijing. Tehran, though not in the top 10 polluted cities overall, checks in at number 82 (of 1099), with roughly four times the concentration of polluting particles as smog-blighted Los Angeles. It's also the country's capital and the largest city in western Asia, a metropolis of over 8 million people with an outsized political influence in the region and a growing global presence.

When asked how the pollution in the country came to be this bad, many Iranian citizens and government officials point to U.S.-led trade sanctions that cut off access to the country's much-needed motor gasoline imports, and the technology needed to effectively produce home-grown gas. The sanctions, they say, have forced Iran to use outdated equipment and produce toxic formulations of cheap petroleum just to keep the country's **21 million cars** from running on empty.

But some experts say the problem is more complicated, and the blame should be shared. They argue that the sanctions, though problematic, merely took the lid off of festering issues that had been building for many decades: a drastic population increase, mismanagement and—in some cases—corruption.

The air pollution crisis is now pervasive. "It's the single worst problem people in the city have to deal with, day in and day out," says a Tehran cab driver who had been

complaining about the high pollution levels that day. "We can't not talk about it."

During bad periods, school is cancelled for a week at a time; the sick and elderly are told not to leave their homes; and people are banned from driving their cars on designated days of the week.

And people are dying from what they inhale. In 2013, the Health Ministry announced that **up to 4,460** Tehran residents died due to air pollution, equivalent to roughly 25 percent of the total number of deaths in the city each year.

Debates over the city's growing air pollution woes have intensified—and there has even been talk of **relocating the capital**, in part to get away from the lethal pollution. In 2013, a parliamentary proposal to choose another capital city received 110 yeas from the 214 Chamber-members present for the vote; supporters of the change cited the pollution, debilitating traffic jams and high earthquake risks. Such a move would be incredibly costly, so it's unlikely to happen, but the fact that it is being seriously considered shows that many Iranians finally realize they are in the midst of an environmental disaster.

Lethal Gasoline

It's easy to blame the United States for that orange haze. On July 1, 2010, President Obama signed an amendment to the 1996 Iran Sanctions Act that imposed penalties on foreign entities for selling refined gasoline to the country. The sanctions were a response to the country's growing nuclear program; the White House hoped they would force then-president Mahmoud Ahmadinejad to halt the country's nuclear programs.

At the time, restricting gasoline was seen as the best way to put pressure on Iran. Despite its thriving exports of crude oil, in 2010 Iran was dependent on imports for roughly **40 percent of its gasoline**. It was the **sixth biggest importer of fuel** in the world, just behind the U.S. The new

sanctions restricted the sale of gasoline to Iran, as well as any equipment or services that would aid the country in developing its own refining processes.

Initially, Ahmadinejad dismissed the sanctions as "futile," claiming that, "within a week we will reach the phase of self-sufficiency in producing petrol." But immediately after the new sanctions were signed, gasoline deliveries to Iran dropped from roughly **120,000 barrels a day** to 30,000 barrels a day. Iran was suddenly gasping for gas.

At the time the sanctions went into place, Reza (a retired engineer who asked that Newsweek not use his real name out of concern for his privacy) was working in the petrochemical industry—which makes plastics, industrial chemicals and other goods out of crude oil. He says that the sanctions led directly to the production of a dangerous new form of gasoline. Throughout the country, the list of possible alternatives to imported gasoline was short, and time was running out. Iran's limited number of oil refineries tried to figure out how to produce more gasoline, but without outside help, they couldn't do much. Instead, they decided to bump up their gasoline's octane number by mixing in benzene, a byproduct from the petrochemical refining process that is known for being great at burning for fuel—but is also a highly toxic carcinogen.

"When you don't have what you need, you do what you have to do," says Reza. "But no one should be mixing benzene with gasoline."

While no one knows for certain how much benzene made it into Iran's gas, research has made it clear that much of it is highly toxic. The head of the Iranian parliamentary committee for health care claimed that Iranian petroleum at one point contained **10 times** the level of contaminants of imported fuel, and environmental investigators found that diesel gas sold in Tehran showed roughly **800 times** the **international standard** for sulfur.

The Grim Harvest

These days, Hamid Kashani lives in Virginia, but he spent most of his life in Tehran. Last summer, he returned to the Iranian capital after a three-year absence to manage his telecommunications business. "The air pollution had gotten much worse," Kashani tells Newsweek. "After just a few days, my hands and feet began swelling unbearably, and I began having problems breathing."



An Iranian girl wearing a mask walks on a street in Teheran, capital of Iran, Nov. 28, 2010. Xinhua/Eyevine/Redux

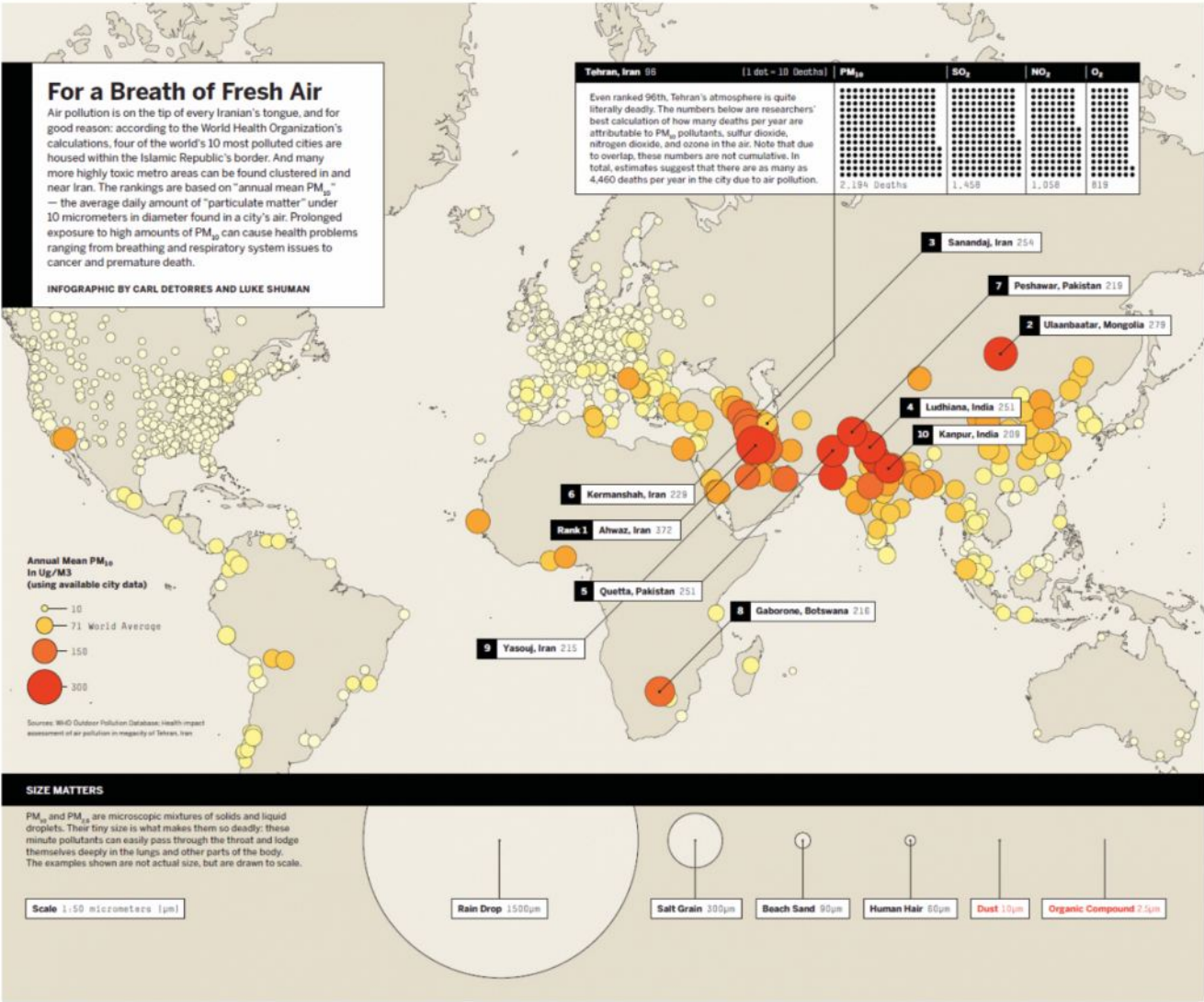
Kashani's doctor also found that his blood pressure was elevated, and started prescribing him higher and higher doses of medications. But nothing would alleviate the swelling or bring his blood pressure down. His doctor told him his problems were caused by Tehran's air and eventually warned him not to leave the house when pollution reached dangerous levels; Kashani says that for most of his time Tehran, this turned out to be four to five days each week. As his breathing began to get worse and staying in Tehran increasingly seemed a lethal choice, Kashani left his

business half-finished and returned to Virginia, where his blood pressure has since stabilized.

Kaveh Madani, a lecturer in environmental management at Imperial College London, says his uncle's friend recently died of an asthma attack one particularly polluted day in Tehran when he made the fatal mistake of leaving the house without his inhaler. "By the time he came home to get it, he passed while his wife was bringing it to him," Madani tells *Newsweek*.

And last December, prominent Iranian film director Dariush Mehrjui criticized the government after his sister, award-winning film art director Jila Mehrjui, died prematurely of heart disease. "One thing that makes me furious is the cause of her death," Mehrjui said at her funeral. "This air pollution is killing everybody; all of my friends are suffering from cancer. Where is the head of our Department of Environment?"

Taken individually, the long list of health issues—from less serious afflictions like headaches and nosebleeds all the way up to life-threatening issues like heart attacks and lung disease—can't be definitively traced back to a single environmental cause. But in large-scale epidemiological studies of Tehran, the ties between increased health problems and the growing air pollution are becoming painfully clear.



Infographic by Carl DeTorres and Luke Shuman

[Click to enlarge](#)

Pollution has been directly **linked** to 11.6 percent more hospital emergency room visits every year, and to the rising rates of **acute asthma**, **heart disease**, lung cancer, and more. It's estimated that roughly **35 percent** of children in Tehran have developed asthma or allergies as a result of man-made air pollutants.

In 2012, Masud Yunesian, a professor of epidemiology at Tehran University of Medical Sciences, conducted a **study** on mortality rates in Tehran. Yunesian took information gathered at the city's 25 air pollution monitoring stations, and—using a mathematical model designed by the World Health Organization—made his best estimate of how many lives could have been saved if the air in Tehran met internationally accepted standards of "healthy."

His study showed that roughly 2,200 deaths occurred as a result of exposure to PM10, a class of particles smaller than 10 microns in diameter produced as a byproduct of car emissions. PM10 particles are dangerous precisely because their small size allows them to travel deeper into the lungs than particles found in nature. The World Health Organization **says** these particles are a prime contributor to the high cancer rates found in the world's most-polluted cities, like Tehran.

There is no escaping the bad air. In Tehran, the number of "healthy" days—when levels of pollution measured at all of the city's 25 monitoring stations fall under the maximum concentrations—are exceedingly rare. By late February, according to the governor of the province of Tehran, the city has had only **four "healthy" days** in the year to that date.

And the worst days can be deadly. According to Yunesian, when there is a rise in air pollution, one or two days later there is a rise in the number of deaths city-wide. "Usually the elderly and those that already have chronic conditions are the most sensitive," he says. This is the so-called "harvesting effect," a phenomenon also seen in heat waves and cold spells, where the elderly, the young, and the ill are pushed to the brink by extreme environmental circumstances.

The High Cost of Clean Air

Protecting the environment is written into Iran's constitution: "The preservation of the environment, in which the present as well as the future generations have a right to flourishing social existence, is regarded as a public duty in the Islamic republic. Economic and other activities that inevitably involve pollution of the environment or cause irreparable damage to it are therefore forbidden." That remains the government's official line.

The reality, many environmental policy experts believe, is that years of poor governmental oversight have created a ruined—and increasingly dangerous—cityscape. "The

[2010] sanctions basically took the veil off the catastrophic mismanagement that had already been going on," says Sam Khosravi, a former journalist and environmental consultant, who lived in Tehran for 30 years and is currently working toward a Ph.D. in natural resources management in the Netherlands. The real problem, says Khosravi, goes back to issues of regulation that stretch back decades further than the sanctions.

"Why were we relying so heavily on gasoline imports in the first place?" he says. "Why is there a monopoly of domestic cars, with not enough monitoring of quality? Why have annual smog checks been changed to happen every five years?"

According to Madani, Iran has purposely ignored long-term measures—such as protection of the environment—in favor of short-term development and political stability. In a city like Tehran with booming overpopulation, that means "build bigger, put more infrastructure in place—without really caring about the environmental side of it," he says. "The Iranian government is a crisis manager by necessity. You see a problem, you try to fix it. But it's reactive versus proactive."

Tehran's biggest problem goes back to cars. The city can safely accommodate **700,000 vehicles**, according to researchers—but currently has more 3 million congesting its streets, producing nearly **75 percent** of Tehran's air pollution. Of these, more than a million are over 20 years old and don't meet fuel-emission standards. Particularly when run on gas like the benzene-contaminated fuel produced after the sanctions, these cars are a prime source of those toxic particulates.

Many argue that the government needs to be doing more to get old cars off the road. And policies like exorbitantly high importation taxes on nondomestic vehicles only serve to create monopolies back at home, with no incentives to raise the industry standards for vehicle emissions.

"This is not an issue of today. We're really happy to sell our oil and get easy revenue, but we didn't build any infrastructure," a researcher in Iranian environmental policy who asked not to be named told Newsweek. "I'm not saying the sanctions have no impact, but they function as catalyzers. Add corruption to that, and add an extremely ineffective and mismanaged Environmental Protection Organization (EPO) with very little jurisdictional power, and you will get the result Iran has."

From an environmental planning perspective, the current crisis also has everything to do with Iran's international status, which suffered huge losses in the last eight years. "The political relations of Iran have an effect on this situation. You plan differently when you're friends with the rest of the world," Madani says.

But under its new administration, Iran is beginning to open up to the global community—which also means tackling its regulatory issues back home. New President Hassan Rouhani has already appointed scientist, journalist and environmental activist Massoumeh Ebtekar as the head of the state's EPO. Ebtekar previously held the position before Ahmadinejad's presidency, and she has been vocal about her belief that the government under Ahmadinejad blatantly ignored the country's escalating environmental issues. "The problem of pollution would have been resolvable with proper planning," she said in an [interview](#) at the beginning of March. "All of these efforts were disrupted eight years ago."

Ahmadinejad's government didn't just create poor top-down management of environmental policies; the lack of transparency during his presidency had a trickle-down effect that created a culture of distrust and, as a result, little progress at the grassroots level. "There used to be a lot of environmental groups working on these issues," says Khosravi. "In the last eight years these were totally

discredited because Ahmadinejad characterized them as outsiders, and therefore untrustworthy."

Change may be long coming in Iran; in 2013, the country was **ranked** 144 out of 177 in perceived corruption by Transparency International. But at the very least, the new leadership, including Ebtekar, continues to say all the right things, and seems committed to repositioning the country as a responsible global citizen.

The Air Quality Control Company of Tehran has come up with a **new slogan** for the city—"Tehran: a City With Healthy Air at 2020"—and a recent **announcement** by the head of the National Iranian Oil Products Distribution Company claimed that only "clean" petroleum would be sold at the pump starting in mid-February.

In addition, Ebtekar, perhaps drawing on her strong activist ties, has made it clear that educating citizens via nongovernmental organizations is going to be a necessary part of Iran's new era of environmental responsibility.

In January, the U.S. and the E.U. enacted **modest sanctions relief** in exchange for Iran's suspension of its most sensitive nuclear program activities. Soon after, Ebtekar announced that the country could reinstate the importation of standard equipment like catalytic converters for car manufacturing, necessary for reducing emissions of harmful gases into the air.

After years of running unchecked, the auto industry has, in Ebtekar's words, "been warned" that the government is "geared up to take serious action." By this coming spring, the EPO will implement the—albeit still modest—2005 Euro 4 standards for vehicle emissions. (**Euro 6** will be rolled out this year across the European continent.)

Lethal air pollution has already been dumped on Iran over decades of neglect and lack of governmental transparency. But it appears a cultural shift may finally be

taking place: There are even plans under way for a national hybrid car project.



Tom Pilston/Panos

FRONTIERS WITHOUT MEDICINE

**ON THE SYRIAN FRONT LINE, CIVILIANS ARE DYING
FROM CURABLE DISEASES**

By Janine di Giovanni

It did not take long for the infant to die. A half-hour after her parents brought her into the makeshift emergency room lit by hazy flashlights, she was gone. The 26-year-old doctor, a third-year resident, worked frantically over her lifeless body. He had not slept for a day, but was determined to save her life.

The doctor, who goes by just the name Dr. Hamza, lost the battle. After a few minutes' resuscitation, the girl died.

The doctor wrapped a triangular cloth around the small corpse. Her mother slumped on a chair, in shock. Her father paced the room. They had not yet named her.

This baby did not die of shrapnel wounds or a sniper's bullet. She died from a respiratory illness. According to the charity Save the Children, the majority of children's diseases in Syria—measles, diarrhea and respiratory illnesses—are treatable.

"When I see a wizened dead baby," said one U.N. officer. "I think: did they really die of starvation? Or did they die of some horrible disease? Or even a treatable one they can't get drugs for?"

Sixty percent of the hospitals in Syria are damaged or destroyed; half the doctors have fled the country. Medicine is heading backward several centuries.

Untrained doctors are operating on patients in storefront clinics. Herbal cures are sought by cancer sufferers.

And it gets worse. Save the Children reports that newborn babies are dying in incubators because of power cuts. Children's limbs are being amputated because there is no appropriate treatment. Metal bars are used to knock people out instead of anesthetic.

Hamza saw a 2-year-old die from an allergic reaction to antibiotics—simply because the hospital did not have a ventilator.

The beleaguered staff takes turns working in shifts, sleeping and eating, often without electricity or heating. Their eyes have the glazed look of people who have witnessed too much suffering.

Would the 15-day-old baby have lived if her parents had been able to reach the hospital sooner and had the proper drugs and equipment?

"Most likely. It was not a serious illness," said Hamza. "Her parents could not get to the hospital because of the bombing."

As they carried out the little body, someone said, "She is lucky. She won't have to grow up during this war."



*Syrian children take the polio vaccination at one of the health care centers in Damascus, Syria, Nov. 20, 2013.
Credit: Bassem Tellawi/Xinhua/Corbis*

As the grim third anniversary of the war passed on March 15 the Syrian people tried vainly to count the dead. The generally used figure is 140,000, but it may be higher. Everyone inside the country seems to have lost someone.

Many cannot leave because they are too old, too poor or simply have no way out of besieged territories. As the crisis accelerates, concern for the most vulnerable—the elderly, the poor, and the chronically and terminally ill—becomes more pressing.

The Syrian American Medical Society says there have been more than 200,000 "excess deaths." But according to Dr. Annie Sparrow, a public health specialist from Mount Sinai Hospital in New York, who works on the Syria crisis,

"Their most current estimates are in the order of 300,000 and about half those chronically ill have had treatment interrupted. "

"Lack of data means that the U.N. has given up counting the dead, let alone attempting to count those with chronic disease, so it is very hard to know," she said.

Three years of war have blown apart hospitals, clinics, rehabilitation centers, laboratories, pharmacies and warehouses storing drugs. For medical practitioners, this means a lack of medical services.

Chemotherapy, for instance, does not exist in Aleppo, even though al-Kindi Hospital was once one of the best cancer hospitals in Syria. Al Kindi is now a pile of rubble. In Homs, one activist reported that kidney dialysis is almost impossible.

Syria was once a model for medical systems in the region and the second-largest pharmaceuticals producer in the Middle East. But while Aleppo should have 2,500 doctors practicing today, Save the Children reports that they have 36.

There are few options for the terminally ill. Cancer patients must either go to Damascus or Turkey to be treated—if they can afford it—or die at home. There are no laboratories to monitor their white blood cell count. "Sometimes all we can give them is painkillers," said Hamza. "They suffer horribly."

First-aid responders of the Syrian Arab Red Crescent continue to operate. But they pay a heavy price: 34 killed since the conflict started.

"Makeshift doctors without degrees are setting up shop," said Dr. David Nott, a British surgeon who took unpaid leave to work in Syria and has freelanced for Doctors Without Borders and the International Committee of the Red Cross in Northern Syria. "These are untrained people acting on the side as doctors to make a few bob."

He heard about a car mechanic who had turned surgeon. "He reckons he can fix cars so he can fix people," said Nott.

While Nott spends most of his time operating on victims of barrel bombs—dropped from helicopters by President Bashar al-Assad's forces to inflict the worst possible damage on human beings—he said there is nothing to do for victims of chronic disease. "People with cancer, diabetes, hypertension are in trouble," Nott said. "They just die at home."

Other diseases, like diabetes, are also impossible to treat. Insulin, for instance, needs to be refrigerated, but sufferers often live without power for days so the drug spoils. "Because of this, people with chronic diseases come in with advanced symptoms, like wet gangrene from diabetes," Nott said.

Even where drugs are available, Hamza says they are expensive. The cost to his field hospital in Aleppo of medication to treat 1,500 patients with Type 1 diabetes for three months was nearly \$10,000.

"That's only one type of diabetes," he said. "We are not even talking about other forms. Or hypertension. Or heart disease."

The situation has become so bad that activists near Hama report that cancer patients, unable to receive chemotherapy or radiation, are resorting to camel milk and tropical fruit as alternative medicine. But camel milk is rare and costs about \$7 a kilo. That's a fortune these days in Syria.

"It's a silent war for kids who are chronically ill and can't receive treatment in Syria," said Juliette Touma from UNICEF. "They are at a higher risk to die without anyone noticing. The problem is there are 1 million children living in places under siege and in hard-to-reach places, and we cannot reach them on a regular basis."

In Damascus, Dr. Bassam Barakat, who is trying to open a children's clinic in Latakia, said that the before the

war, the government subsidized nearly 90 percent of cancer treatments.

"But since European and Western sanctions against Syria, we don't get drugs from big companies like Glaxo. We have to rely on drugs from Russia, China and Iran [whose governments back the regime]," he said. "Those drugs are all right. But the ones from Thailand and Philippines are really bad."

"But what we need the most is not even medicine," said the Aleppo doctor, Hamza, laughing at his own gallows humor. "It is to stop the bombing."



Baz Ratner/Reuters

UKRAINE'S BROKEN NUCLEAR PROMISES

**MANY UKRAINIANS NOW REGRET GIVING UP THEIR
NUCLEAR DEFENSE**

By Owen Matthews

Once, Ukraine boasted the world's third-largest nuclear arsenal. In the aftermath of the collapse of the USSR in 1991, authorities in newly independent Kiev found themselves in possession of 176 intercontinental ballistic missile (ICBM) launchers and 1,240 nuclear warheads, along with more than 3,000 tactical nuclear weapons.

Fearful of Russian intentions, Ukrainians were in no hurry to surrender their weapons of mass destruction. The West, equally fearful that the nukes could get into the wrong hands after the Ukrainians began selling ballistic-missile technology to Iran in 1992, raced to disarm the fledgling post-Soviet republics.

A deal was signed on February 5, 1994, by Bill Clinton, Boris Yeltsin, John Major and Leonid Kuchma—the then-leaders of the United States, Russia, United Kingdom and Ukraine—guaranteeing the security of Ukraine in exchange for the return of its ICBMs to Moscow's control. The last SS-24 missiles moved from Ukrainian territory in June 1996, leaving Kiev defenseless against its nuclear-armed neighbor.

That deal, known as the Budapest Memorandum on Security Assurances, was not a formal treaty but a diplomatic memorandum of understanding. Still, the terms couldn't be clearer: Russia, the U.S. and U.K. agreed "to respect the independence and sovereignty and the existing borders of Ukraine...reaffirm their obligation to refrain from the threat or use of force against the territorial integrity or political independence of Ukraine, and that none of their weapons will ever be used against Ukraine."

Twenty years on, politicians in Kiev are bitterly regretting the decision to trust the word of Washington and London. "We gave up nuclear weapons because of this agreement," says Ukrainian parliamentarian Pavlo Ryzanenko, a former world boxing champion and member of presidential candidate Vitali Klitschko's UDAR Party. "Now there's a strong sentiment in Ukraine that we made a big mistake."

Moscow says it has not violated the Budapest memorandum. Russian state media claims that the estimated 20,000 troops in unmarked uniforms now encircling Ukrainian army garrisons in Crimea are "local self-defense units" rather than Russian army regulars. Last week

Vladimir Putin told journalists that "anyone can buy Russian uniforms in a shop."

But few outside Russia—least of all the U.S. and U.K.—are buying that diplomatic fig leaf. "If indeed this is a Russian invasion of Crimea, and if we do conclude the [Budapest] memorandum is legally binding, then it's very difficult to avoid the conclusion that we're going to go to war with Russia," Sir Tony Brenton, who was British ambassador in Moscow from 2004 to 2008, told the BBC on March 15.

What is clear is that Russia's de facto annexation of Crimea is not only a violation of Ukrainian territorial integrity but, far more worrying, an assault on the world's nuclear nonproliferation agreements. De-nuking the former Soviet Union was one of the great, unsung triumphs of Clinton's presidency. If the U.S. and U.K.'s word, brokered by the U.N., cannot be trusted, many diplomats fear that there is little hope of getting threshold nuclear countries such as Iran to respect the Non-Proliferation Treaty.

"Everyone believed that for good or bad the United States would be the world's policeman," says Ryzanenko. "Now that function is being abandoned by President Obama, and because of that Russia invaded Crimea." In short, the lesson of Crimea is, according to Ryzanenko, "if you have nuclear weapons, people don't invade you."

"There is a great danger of sending mixed messages," says one senior diplomatic source close to back-channel negotiations between the U.S., Iran and China last year. "The Americans say, give up your nuclear program and we will guarantee your security. But the Iranians can say—you already told the Ukrainians that, and look where it got them."

There's another danger, too—of undermining the basic stability of the postwar world, which is based, according to Article 2 of the Charter of the United Nations, on the "inadmissibility of the threat or use of force against the territorial integrity and political independence of any

state...and nonrecognition of an acquisition of territory as a result of threat or use of force."

On March 15, Russia vetoed a strongly worded resolution in the United Nations Security Council unequivocally condemning Russian actions in Crimea. China, Russia's longtime ally on the Security Council, abstained.

There's another, even more detailed and binding, treaty that Russia's actions in Crimea defy. In 1975, the Soviet Union signed the Helsinki Accords, which bound the leading players of the Cold War to respect each others' international boundaries.

The Soviets pressed for the treaty because they feared that the West was trying to persuade East Germany to rejoin its prosperous Western neighbor. They set up a fundamental principle that international borders could not be neatly drawn around Europe's different ethnic communities.

In scrapping the norms of Helsinki Accords, Putin has opened the whole post-Soviet security structure of the region to debate. That could open up multiple cans of worms. Already Russia has begun stirring up trouble in Moldova using the pro-Moscow Gagauz minority to oppose its association agreement with the European Union, as well as supporting Serbian resistance to a new political union in Bosnia's Republika Srpska.

If Putin's plan really is to redraw the maps of the former Soviet Empire using the rights of oppressed ethnic Russians, he could look to Kazakhstan, which has a 40 percent Russian population; as does NATO and European Union member Latvia.

Narva, Estonia also has a large and restive Russian majority. "There is a patchwork of nationalities in the east of Europe and the west," Poland's Foreign Minister Radosław Sikorski told CNN. "We find ways of resolving these issues

and pretty much we rub along. This is the way it has worked until now."

No longer, apparently. But will Putin be ready to deal with calls for independence from inside Russia itself? From the Muslim republics of Tatarstan, Dagestan and Chechnya—or from the oil and diamond rich Siberian Sakha Republic?

Meanwhile, as the White House denounced Sunday's referendum in Crimea as "dangerous and destabilizing" and a "violation of international law," Russian media stepped up its anti-U.S. rhetoric at home. "Russia is the only country in the world ready to turn the U.S. into radioactive ash," said television host Dmitry Kiselyov, an anchorman on the state-owned Russia One channel.

The same channel carried a discussion between Kremlin-favored pundit Aleksandr Dugin and the nationalist writer Aleksandr Prokhanov which concluded that 70,000 antiwar protesters who came out on the streets of Moscow on Saturday were "traitors." Last week a letter supporting Putin's actions in Crimea was signed by 200 top cultural figures—including Oscar-winning film director Nikita Mikhalkov—a practice of forcing people to declare themselves with the regime or against it borrowed from Stalinist days.

Putin has also acted swiftly and ruthlessly to extinguish last flickers of domestic opposition in the media and to crack down on Internet freedom. A new law drafted by Andrei Lugovoi—named by British police as the prime suspect in the 2007 polonium murder of Alexander Litvinenko in London and now a Duma deputy—allows for websites to be closed without warrant for calling for unsanctioned rallies. Already half a dozen mildly oppositional online media have been blocked and independent media owners who are still in business have moved quickly to fire editors who are less than slavishly loyal to the Kremlin.

The Kremlin-controlled media portray Putin's decisive action in Crimea as a huge win, as the West wrings its hands and Ukraine wallows in weakness and political dysfunction. In truth, Putin has embarked on a path that could prove deeply destabilizing to the world's security architecture—and could rebound fatally on his own multiethnic country.



Tom Perry

BOARDING SCHOOL PREDATORS

SOME OF BRITAIN'S ELITE BOYS' SCHOOLS ARE BEING FORCED TO CONFRONT THEIR SORDID PASTS

By Elisabeth Braw

When John Rolfe was 12, he was a star rugby player at Caldicott, a Catholic boys' school near London whose famous alumni include the British deputy prime minister, Nick Clegg.

At Caldicott, being good at sport meant falling into the hands of Roland Peter Wright, a charismatic teacher who went on to become headmaster.

Unfortunately for Rolfe, success on the rugby field came at a high price: sexual abuse. "Peter Wright would put his hand up my trousers and play with my genitals," Rolfe told Newsweek. "I liked the attention and the buzz of being good at sport, but I didn't like his hand up my trousers." His abuse came to an end only after he left Caldicott when he was 13.

Rolfe, now middle-aged with a good job, a wife and two grown sons, has suppressed the bad memories, but they haven't gone away. In recent years, this soft-spoken man finds himself at the center of a child sex abuse scandal engulfing many private schools.

Rolfe was not the only boy abused by Wright. Nor was Wright the only pedophile at Caldicott. And though Caldicott may top the chart of schools with teacher convictions, recent investigations and trials reveal widespread abuse at several of Britain's elite schools.

Convicted teachers taught at St. Paul's Cathedral Choir School, Wellington College, Haberdashers' Aske's, King's School Rochester and Downside Abbey, run by Benedictine monks.

Earlier this year, Wright, age 83, was sentenced to eight years for abusing five boys ages 8 to 13. A former Caldicott teaching assistant, John Addrison, is serving five years for abusing two boys there and five at Moor Park.

Teacher Hugh Henry, found guilty of molesting six boys at Caldicott and three at Gayhurst, threw himself under a train last month, two days before he was to be sentenced. To date, more than 70 teachers at British private schools have been convicted of abusing some 300 boys.

Yet these convictions may be just the beginning.

Liz Dux, an attorney at the firm Slater & Gordon, told Newsweek she represents "over 17 victims" of alleged sexual abuse at Ashdown House, whose alumni include London's mayor, Boris Johnson. "In the last two years, I have seen a large increase in claims against private schools," said Samantha Robson, a lawyer at Slee & Blackwell who specializes in child abuse cases. Pannone, another law practice representing sexual abuse victims, is handling allegations from pupils at 32 schools.

That's a big change from the past, according to Richard Scorer, Slater & Gordon's head of abuse cases, who said, "In the 1990s, most of the cases had to do with state-run care homes." Indeed, until recently sex abuse in Britain was seen as the domain of the Catholic Church and homes for underprivileged children.

The fact that private school pupils are reporting abuse represents a new development; these schools, after all, educate the sons of the elite. Indeed, the quality of education they provide encourages wealthy parents from around the world to pay fees that can top **30,000 pounds per year**.

"The atmosphere has changed, partly due to the Jimmy Savile investigation [involving a BBC disc jockey who abused several hundred boys, girls and adults] and partly due to the publicity from recent trials involving teachers at fee-paying schools," Scorer said. "It has also become more acceptable for well-off people to talk about having been victims of sexual abuse. The taboo has been lifted."

"I had one of the most privileged educations," said "Jack Smith," who between 10 and 12 was repeatedly abused at Aldwickbury. His English teacher "would play with my penis and make it erect and play with his own penis as well. What [the abusers] do is they stroke and fondle and get their pleasure from seeing young boys' first arousals."

Rolfe's younger brother, Alastair, was repeatedly raped at Caldicott by Martin Carson, a teacher who served only a year in prison for raping him and another boy. Perplexingly,

rape charges have been exceptional, as boys often willingly interacted with their abuser.

"If you were successful in sport, you could go to Peter Wright's room or his cottage in the evenings," Rolfe explained. "You went even though you knew the abuse would happen, because you didn't want to be the one who missed out on the fun."

Nobody knows the depravity at Caldicott better than Detective-Sergeant Joe Banfield of Thames Valley Police, who has investigated more than 20 cases there.

"There was abuse that happened when the boys were in bed," Banfield said. "The teachers would go into the dormitory and masturbate boys as they lay in their beds, and on some occasions the teachers performed oral sex on them. The second category is abuse that happened when Peter Wright took children from the dormitories to his room, where they performed mutual masturbation."

The third category was simulated sex. "He'd lie down behind the boy and massage himself until he ejaculated," Banfield explained.

"It's believed he stopped abusing in the 70s when he got married," Rolfe said. "But in those 20 years, let's say he abused five boys each year. That's 100 boys."

Victims were groomed to keep quiet. "It's surprising how quickly he could control me," said Rob Hastings, who was abused by his geography teacher as an 11-year-old at Downside. "It started with him inviting me to sit on his lap. Then he started fondling me."

Before long, Hastings was performing sex acts on the teacher, Richard White, who paid him 50 pence (83 cents) each time. But it wasn't money that ensured Hastings's loyalty. The dyslexic son of an Oxford academic and a businessman, he craved affection he wasn't receiving from his parents.

"Was I hurt? No. Was I slashed and strangled? No. In fact, sometimes it felt quite nice. As a child, you don't understand what's being done to you. Besides, I was confused. I was being shown love," said Tom Perry, who was abused by Wright and has become the driving force behind abuse victims' calls for justice.

"Some victims will be sexually aroused, which they confuse with consent," psychologist Elie Godsi said. "It may even distort the perpetrator's perception. He'll think to himself, 'Look, he's enjoying it!'"

Since 1986 there has been a toll-free help line, ChildLine, and most schools today have designated staff to whom pupils can report abuse in confidence. A generation ago such options didn't exist, and reporting abuse to parents would have proved too embarrassing. Rolfe assured his father there was no abuse at Caldicott.

At Caldicott, telling the school's matron—employed to attend to boys' pastoral care—wasn't an option either. As Mark Payge, a Wright victim, recounted in the documentary *Chosen*, one time his matron saw him leave his abuser's room and said, "You dirty little boy."

According to Godsi, the victims' high social status makes reporting abuse hard. "In upper-middle-class society, there's more of a stiff-upper-lip culture," he said. "You're told just to get on with things. And as adults, these victims have very high barriers to coming forward. They're doctors, lawyers, CEOs. If you're a CEO, you don't want people to know you were abused!"

Anne Carpenter, a forensic clinical psychologist at Scotland's Glasgow Trauma Centre, notes that children who have a stable home life and perform well academically can overcome sexual abuse. Others report permanently damaged relationships. Perry was so traumatized he doesn't even kiss his children.

Because Smith's teacher, Mulcahy Brown, is dead and Aldwickbury refused to apologize, he brought a civil case against the school that has just been settled. "The School has reported the allegations to the relevant authorities and has been informed that they do not intend to take any further action," Aldwickbury headmaster Vernon Hales wrote in an email.

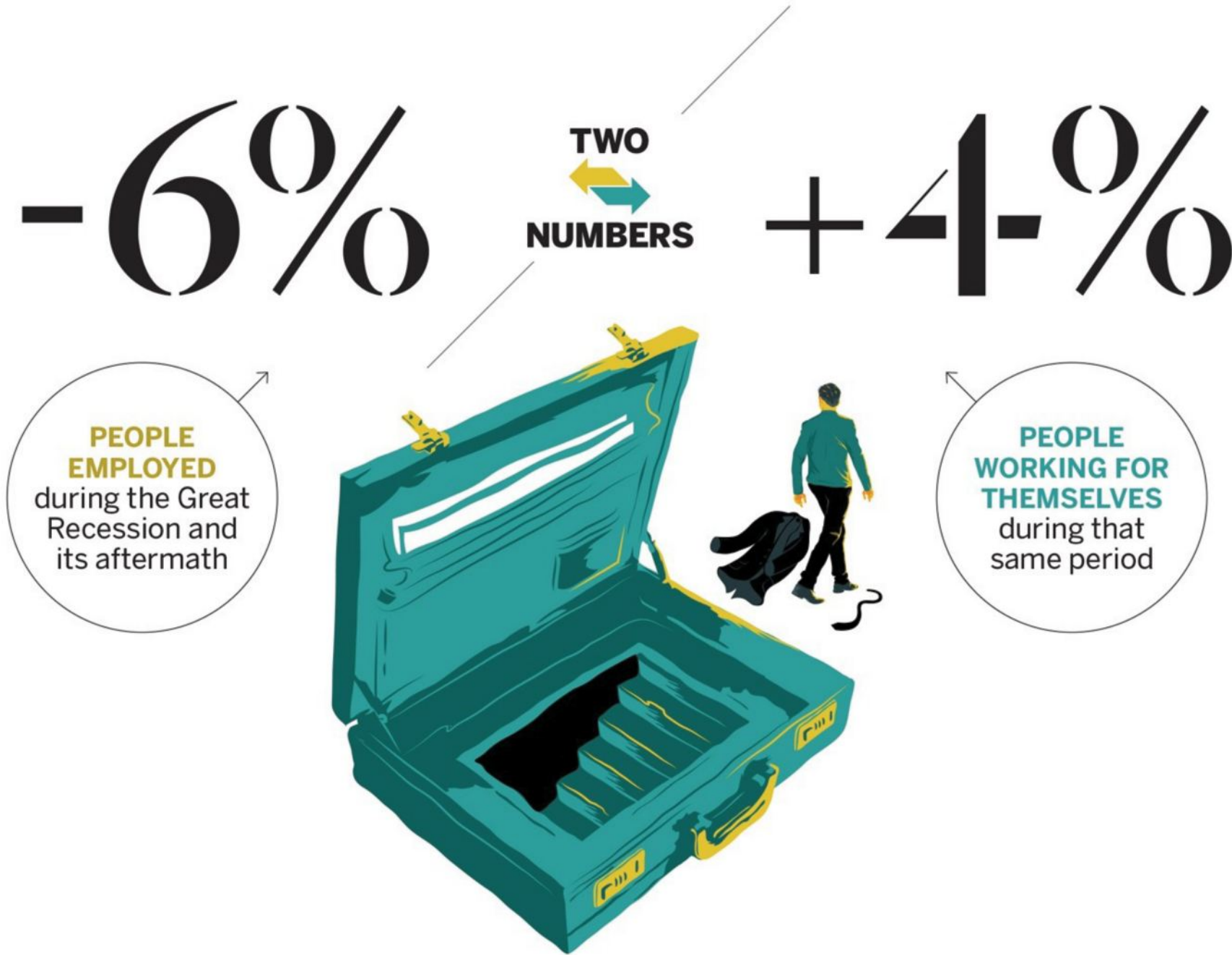
According to Scorer, in the 1960s, '70s and '80s, "there was a quite lax attitude towards teacher selection in fee-paying schools, with no criminal background checks required. As a result, it was relatively easy for pedophiles to get jobs."

Instead of reporting abusers to police, headmasters would often simply send them on their way. Henry and Addrison went on to molest children at other schools. Downside failed to report the abuse. White went on to molest Hastings. But there were good people, too. A Caldicott music teacher told the local vicar about Alastair Rolfe's abuse and signed an affidavit later used in court.

Teachers and staff are still under no legal obligation to report abuse. "We need an agency that functions like triage and sends credible allegations on to the police and social services," argues Perry, author of the Mandate Now campaign for mandatory child abuse reporting.

A spokesman for the Department for Education told Newsweek, "The government is not considering the introduction of mandatory reporting. Guidance is already absolutely clear."

Considering the pain involved with publicly identifying yourself as a sex abuse victim, Hastings is remarkably well-adjusted. Even so, he apologizes for sounding angry. "I'm not trying to bitch about Richard White," he said. "I'm just trying to say that I could have been saved. And I want to make sure that all our children are saved."



ILoveDust

LISTENING TO HERBERT HOOVER

**RUGGED INDIVIDUALISM IS ON THE RISE IN THE WAKE
OF THE GREAT RECESSION**

By Anna Bernasek

In 1928 on the eve of the Great Depression, Herbert Hoover coined the phrase "rugged individualism" to encourage Americans to help themselves and not look to government for assistance. Whether by choice or by circumstances, more Americans today are heeding Hoover's advice when it comes to work.

During the Great Recession and its immediate aftermath, a four-year period from 2007 to 2011, the number of single-person businesses increased 4 percent. During the same period, the number of people employed in traditional jobs dropped 6 percent.

The figures are enormous. The number of single-person businesses increased by 800,000, from 21.7 million to 22.5 million from 2007 to 2011. Compared with companies with employees, nonemployer firms make up three-quarters of all U.S. businesses.

According to the U.S. Census, most of the self-employed operate unincorporated businesses that may or may not be the owner's principal source of income. Overall, working for yourself doesn't seem to pay particularly well, though. The number of single-person firms is about 15 percent of the workforce, but those firms take in only 3 percent of all business receipts.

Along with high unemployment and sluggish job growth, the expanding ranks of the self-employed may reflect a weak labor market, as opposed to a growing desire to strike out on one's own. For some time now, companies have been saving lots of money by shrinking their workforces and outsourcing work to freelancers and consultants, who typically aren't paid benefits.

The pioneers who settled the American West were rugged individualists that Herbert Hoover would have approved of. But most of those pioneer families struggled for years to make ends meet and were delighted when railroads and factories offered steady work at good pay. Today's rugged individualists have lots to be proud of, and as the labor market improves, they should have brighter days ahead.



Robert Nickelsberg/Getty

THE RIGHT TO SILENCE YOUR PHONE

THE SUPREME COURT WILL SOON RULE ON THE ROLE OF SMARTPHONES IN CRIMES, AND WHETHER POLICE CAN SEARCH THEM

By Ian MacDougall

On the evening of April 23, 1968, Richard Jenks, a D.C. police officer, pulled over and arrested Willie Robinson for driving on a fraudulent permit. As Jenks patted Robinson down, the patrolman noticed a crumpled up cigarette pack in his coat pocket. "I could feel objects in the package," he would later testify, but "I knew they weren't cigarettes." His

intuition was right. They were 14 gelatin capsules filled with heroin. As any viewer of TV police procedurals knows, a police officer needs a warrant to execute a search. Jenks didn't have one, but, as the Supreme Court would **rule**, he didn't need one because Robinson was under arrest at the time.

More than 40 years later, on August 22, 2009, Charles Dunnigan, a patrol officer in San Diego, pulled over a Lexus with expired tags in the city's Lincoln Park neighborhood. Like Robinson, the driver—a local college student named David Riley—was driving with an invalid license. In the process of impounding his car, Dunnigan and another officer discovered, hidden under the hood and stuffed into gym socks, a .40-caliber Glock and .45-caliber Springfield pistol.

Dunnigan arrested Riley for illegal gun possession and, like Jenks, searched him and his effects, one of which was a Samsung smartphone. In two warrantless searches—one by Dunnigan at the scene and one by a gang detective at the police station hours later—police scrolled through Riley's contacts list, text messages, photographs and videos. Prosecutors used evidence taken from those searches to charge Riley in an unsolved gangland shooting that had taken place three weeks earlier. Riley, they claimed, was not just a local college student, but also a member of the Lincoln Park Bloods responsible for a brazen daytime shooting. He was convicted of attempted murder and related charges and was sentenced to 15 years to life prison.

This tale of two searches raises a question: When it comes to privacy, should the law treat a cell phone the same way it treats a crumpled pack of cigarettes? This April, the U.S. Supreme Court will weigh in on that question for the first time when it hears arguments over whether the searches of Riley's smartphone were legal. (The court will also hear a companion case involving the search of a flip phone in a Massachusetts drug case.) What the justices decide will have wide-ranging implications for both privacy

and law enforcement. Moreover, court observers say, it may signify an early effort by the justices to update old privacy doctrines in light of new technology at a time when privacy and technology—thanks to the disclosure of widespread surveillance by the National Security Agency—are at the forefront of the public consciousness.



LAPD officer Ryan Rycroft (L) goes through the purse of a woman who had an arrest warrant for possession of crack cocaine in South Los Angeles, November 12, 2008. Credit: Lucy Nicholson/Reuters

The Fourth Amendment to the U.S. Constitution requires police to obtain a warrant from a judge before executing a search. When police violate that amendment, the results of the illegal search can't be used to prosecute the person whose privacy rights the police infringed on. Nor may prosecutors use evidence later discovered because of the search—evidence dubbed, in a metaphor uncommonly colorful for the law, "fruit of the poisonous tree."

But like most bright-line legal rules, the warrant requirement is checkered with exceptions. The one that

let Jenks search Robinson's pack of cigarettes is called the "search incident to arrest" doctrine. The doctrine holds, in the words of leading Fourth Amendment scholar and George Washington University law professor Orin Kerr, that "'a full search of the person' is always permitted at the time of a lawful arrest." It grows out of two concerns. First, police need to ensure that suspects aren't armed. Second, waiting to get a warrant risks a **suspect destroying evidence**. (Think of a desperate cartoon character cramming an incriminating note into his mouth.)

Legally, not much has changed since the court decided *United States v. Robinson* in 1973. The same can't be said for the world outside the law books. "In 1973," Kerr **has written**, "a search of a person incident to arrest might include...a search through a person's pockets. Those pockets might contain keys, a wallet, cigarettes, or a small amount of narcotics." Today, those pockets almost inevitably contain a cell phone. **More than half** of those cell phones are smartphones, which Kerr calls "multifunctional computers that just happen to have telephone capabilities."

For privacy advocates, the rise of smartphones has fundamentally remolded the search incident to arrest doctrine, lending it an Orwellian cast. Without a warrant, they note, even the NSA can only collect **so-called metadata**—what number you've called, when, and for how long—not the contents of your phone calls, text messages and emails. But in most states, any law-enforcement official, from a beat cop to an FBI agent, can browse through your smartphone without a warrant so long as there's a reason to arrest you. "Every time the police pull someone over for failing to wear a seat belt or riding a bike without a helmet or for a DUI, that categorically allows police to fully inspect the contents—and even download the contents—of your cell phone," says Jeffrey Fisher, a Stanford law professor who will argue **Riley's case** before the Supreme Court. "That's a pretty harrowing prospect." For exactly the same reason,

the government has embraced the doctrine in the digital era. As one law-enforcement official told me, a cell phone is a "treasure trove of evidence."

Meanwhile, "the Supreme Court has been avoiding this issue for more than a decade," according to Thomas K. Clancy, a Fourth Amendment expert and law professor at the University of Mississippi. That has left outdated cases like *Robinson's* to guide police, prosecutors and lower courts. In a 2010 case involving employer searches of workplace pagers, Justice Anthony Kennedy acknowledged the court's caution outright: "The judiciary risks error by elaborating too fully on the Fourth Amendment implications of emerging technology before its role in society has become clear."

But there are rumblings among the justices that it may be time to bring Fourth Amendment jurisprudence into the 21st century. In the 2010 case, Justice Antonin Scalia wrote a separate opinion criticizing Justice Kennedy's cautious approach. "Applying the Fourth Amendment to new technologies may sometimes be difficult, but when it is necessary to decide a case we have no choice," he wrote. Other justices expressed similar sentiments in a case from 2012, *United States v. Jones*, which involved long-term GPS monitoring of a suspected drug trafficker's car. Justice Sonia Sotomayor wrote, in a concurring opinion, that parts of the court's search and seizure case law are "ill-suited to the digital age." While the majority ruled in favor of the defendant, its reasoning relied on principles of 18th century property law, and a separate concurrence by Justice Samuel Alito and three other justices criticized the majority for failing to write an opinion accounting for rapid technological developments.

These opinions leave Fisher optimistic that the court will rule in favor of his client. The concurring opinions in *Jones* "give you five justices that have said pretty forthrightly that new technology changes things, that you can't just take

precedent from the pre-digital era and apply it woodenly to digital technology," he says.

While nobody doubts that searching a cell phone is a significant invasion of privacy, privacy advocates and the law-enforcement community are divided sharply over the societal costs and benefits of limiting the search incident to arrest doctrine. The privacy side of the debate argues that warrantless searches of cell phones—in particular smartphones—are far too invasive, chill the use of communications technology and leave too much room for abuse. The law-enforcement side counters that restricting such searches will seriously impede them.

"You used to keep your money in a strongbox at home. Your papers were tied with ribbons on your desk. Your banking records and mortgage were kept at your home, as were your photos," says Bronson James, a criminal defense attorney who drafted a brief for the National Association of Criminal Defense Lawyers urging the court to hear Riley's case. "If the police come and raid my home today, all they'll find is laundry and dirty dishes. My financial records are on my phone. I can do my banking on my phone. All my correspondence is on my phone. My medical records go through my phone. All of my family photos are now in iPhoto, stored in the cloud." In one recent "run-of-the mill burglary" case James tried in Oregon, he says, a warrantless search of a cell phone produced "a 6,000-page printout of every email in that phone, every text message on that phone, every photo ever taken—photos of [the defendant's] children and everyday life.... This is not a crumpled up pack of cigarettes."

In Riley's case, Dunnigan—the arresting officer—noticed that words in Riley's contact list and text messages starting with the letter K were immediately preceded by the letter C. For those, like Dunnigan, versed in the arcana of Southern California street gangs, "CK" stood for "Crip Killer"—a synonym for a Blood. At least two hours after the arrest—

a time frame California courts still considered "incidental" to Riley's arrest—Duane Malinowski, a gang detective investigating the shooting Riley was later charged with, accessed, in his words, "a lot of stuff" on Riley's smartphone, "looking for evidence." On the phone, he found photographs of Riley flashing gang signs. In one photo, he posed with a man eyewitnesses identified as one of the shooters in front of a red 1982 Oldsmobile Cutlass they identified as the getaway car. The phone also contained videos of street fights, which California prosecutors described as "a common gang initiation" ritual. In the videos, according to **court filings**, Riley shouts "Get him, Blood!" and other words of encouragement to the raw recruits.

The importance of this evidence to the state's case is a matter of dispute. Attorneys representing California have argued that there was "ample independent evidence" to convict Riley. For instance, ballistics tests showed that the handguns found under the hood of his Lexus had been used to fire at least 20 rounds in the earlier shooting. Cell phone records placed Riley's phone near the scene of the shooting and, half an hour later, near where the getaway car was hidden.

On the other hand, eyewitnesses to the shooting couldn't positively identify Riley. Two of those witnesses identified another man as one of the shooters, Stephon Redford, "a guy in the gang who had regular access to the car" and "matched [Riley's] description on some level," Patrick Ford, one of Riley's attorneys, told me. DNA lifted from one of the guns found in Riley's Lexus and other evidence also implicated Redford, according to defense court filings. (Redford was never charged.) Most significantly, Riley's first trial ended in a hung jury. The state's circumstantial case left some reasonable doubt.

Law-enforcement officials fear exactly what Riley's lawyers hope for—that otherwise valid evidence will be excluded from trial based on a technical error, failing to

get a warrant. If that happens, they argue, more dangerous criminals will go free. "It'd be catastrophic from a law-enforcement perspective" to limit the search incident to arrest doctrine, says Mike Lewis, the sheriff of Wicomico County in Maryland, and until recently the president of the Maryland Sheriffs' Association. "It'd take us back 50 years. Everybody knows we live in a very mobile society, and every day people use cell phones to communicate. But every day people also use cell phones to conspire to commit crimes."

Without searches incident to arrest, those conspiracies might go undetected, even if police manage to arrest one conspirator. "In some cases you're going to have enough probable cause to get a warrant without looking at the phone," says Karen Kruger, a board member of the Legal Officers' Section of the International Association of Chiefs of Police and a partner at the law firm Funk & Bolton. "But in other cases, you're not, and [suspects] are going to be able to take the phone and walk away with evidence." As Kevin Boyle, general counsel for the International Union of Police Associations, put it to me, "If there was an opportunity there and it disappears, you'd lose that chance to solve a crime."

Time, lawyers for the state argue in Riley's case, is another factor. In the time it takes to get a warrant, a suspect or his confederates could wipe a phone's memory, destroying evidence. A delay might also mean that police fail to detect ongoing crime. Lewis told me that, during his career, warrantless searches of arrested suspects' cell phones had been "critical" to the detection and interdiction of ongoing drug trafficking crimes along the Interstate 95 corridor.

Riley's attorneys counter that there are less invasive ways to prevent evidence destruction than a warrantless search. Police could secure the phone in a Faraday bag, which—like the lining of a microwave—prevents radio waves from entering or leaving, while they wait to get a warrant. Or they could simply turn off the phone. Privacy

advocates also question how common remote wiping is. No law-enforcement officer I spoke to for this story had ever heard of it happening. (Attorneys representing California did not respond to requests for comment, and the San Diego District Attorney's Office, which prosecuted Riley, declined to comment, citing the pending appeal.)

As for delay, police can today obtain search warrants with ease by phone or email, Ford says, which reduces the risk posed by delay. But others call that an overstatement. Even with telephonic warrants, according to Boyle, "if you get it done within an hour, you're doing it pretty quickly. The idea that an officer is standing out next to a car he just pulled over and quickly getting a warrant to search the phone—it's not going to be done that quickly."

To privacy advocates, these law-enforcement arguments prove too much. "The same argument could be made for searching people's houses or searching people randomly on the street," says Andrew Pincus, a partner at the law firm Mayer Brown who drafted a brief on behalf of two pro-privacy groups urging the court to hear Riley's case. "It's always the case that if the government could do everything it wanted to, it could find more crime. But we'd also be less free."

Hanni Fakhoury, a staff attorney for the Electronic Frontier Foundation, one of the groups for which Pincus drafted the brief, put it another way: "It's like saying criminals use cars to drive to the scene of crimes and therefore we should get permission to search every car. Everybody uses cell phones. We shouldn't penalize people for taking advantage of technological advances."

To be sure, only people who are arrested are affected by the search incident to arrest doctrine. But the Supreme Court has said, Fakhoury and others pointed out, that police can arrest a person for a violation in **any crime**, no matter how minor. In addition, the court has said that it's perfectly legal to stop a car for a minor traffic infraction as a **pretext to**

investigate a more serious crime. Combined, these doctrines, Ford says, provide "a sneaky way for police to go on a fishing expedition, hoping they can bump into something better."

Robinson's attorneys argued just that point in 1973, claiming that Jenks, the patrolman, was aware of Robinson's prior drug convictions and had used the fraudulent permit as an excuse to search him for drugs. There's no evidence Dunnigan knew Riley was under suspicion in the earlier shooting. Nor is there any suggestion that Malinowski, the gang detective, encouraged officers to stop Riley. Malinowski had begun to suspect Riley was involved the day after the shooting, when witnesses identified the red Oldsmobile Cutlass, which was registered to Riley, as the getaway car. But without stronger evidence of Riley's involvement, Malinowski had been unable to charge him. It's not hard to imagine, in a different case, that a detective in Malinowski's position might ask officers to look for a reason to pull somebody like Riley over in hopes of finding grounds to arrest him and search his cell phone—the "treasure trove of evidence." Less devious but also less hypothetical, Ford says he can't rule out that Riley's profile—a young black man driving a luxury car in a known gang neighborhood—led to the traffic stop: "What we don't know is, were there four people driving around with expired tags that weren't stopped, and the person who they did stop and search was a guy his age that looked like him in his Lexus?" (Dunnigan testified that he pulled Riley over purely because his tags were expired. The San Diego Police Department did not return calls seeking comment.)

Ford also points to the disproportionate effect on neighborhoods where high police activity means a lot of innocent people find themselves arrested—and find the private life stored on their smartphones invaded—in error. "In my practice, I see it all the time," Ford, who is based in San Diego, tells Newsweek. "Within a gang neighborhood

there are young men who make the choice to be in a gang, and there are young men who make the choice to avoid the gang because they think that's the right thing to do. But in police officers' minds, when they stop people, it looks like everybody's a gang member. You will guarantee that innocent people will be swept up in these kinds of searches."

Although the cases currently before the court deal with gun and drug crimes, in other cases, "an arrest can be a ruse for all sorts of other nefarious behavior," Fakhoury says. "At Occupy [Wall Street] protests a lot of people would get arrested but never charged.... All of a sudden, police can go to a protest, arrest people for disorderly conduct, look through their phones to see who's associated with these people—go through pictures, emails, text messages. That creates a real chilling effect on the right to free assembly and expression and speech."

Last year, the American Civil Liberties Union and others filed **a lawsuit** alleging that police in San Francisco searched the cell phone of a political activist—after arresting him for an act of peaceful civil disobedience—and quoted in a police report text messages relating to the activist's political activity.

Meanwhile, Riley awaits the court's opinion in California's Kern Valley State Prison. He told me in a brief handwritten letter that he is "excited" that the court chose his case as a means to address the search incident to arrest doctrine in the digital era. Riley declined to go into details related to the case, citing the pending appeal. But Ford says that, "going forward, I imagine he will be suspicious of pretextual searches of his phone. I think there's heightened suspicion, now that we live in times where it's possible for the police to search the contents of a cell phone without a warrant. That should give everybody pause."



Yury Kirnichny/AFP/Getty

YAROSH: RUSSIANS, RISE UP AGAINST PUTIN!

**THE RIGHT SECTOR LEADER ON FASCISM, FREEDOM
AND FIGHTING HOUSE TO HOUSE**

By Anna Nemtsova

Newsweek spoke with Dmitry Yarosh, 42, a leader of the Right Sector, a once obscure right-wing group that is now at the center of a geopolitical standoff between Russia and the United States.

NEWSWEEK: Is it true that you have been training Right Sector forces for more than 20 years?

YAROSH: I was training paramilitary troops for almost 25 years. Although we just came out of the revolution, my guys are continuing military training all across Ukraine, ready to cleanse the country of the occupiers.

How many are you?

I cannot give you the exact number, as our structure and divisions are constantly growing all over Ukraine, but more than 10,000 people for sure. We have certain preconditions for our recruits: patriotism and other criteria for proper behavior.

Are you aware that a Moscow court is trying you for calling for terrorist actions against Russia?

That is Putin's idea. He is a political corpse.

Do you have many war veterans in your ranks? Are your forces a part of Ukraine's army?

As soon as Russia declared war, we recruited retired officers, generals of the interior ministry and security agencies. We are coordinating our actions with the council of the National Security and Defense, as well as with the army's general headquarters. We are currently negotiating to put our forces on a proper legal footing.

What is Right Sector's response to a vote to secede Crimea from the Ukraine?

Right Sector, together with all other Ukrainian citizens, is ready to defend Ukraine's territorial integrity by all possible means. In case the Kremlin decides to attack us, they will have a major partisan war on Ukraine territory.

Do you think Ukraine has enough forces to defend itself?

I am realistic about the pitiful conditions of our military forces, including Right Sector. Our army is many hundreds of times weaker than Russia's, so it's important for Ukraine to do everything to resolve the crisis through negotiations.

Why do you call your organization paramilitary? Are you armed just with Kalashnikovs or do you also have more serious weapons?

As in any army, we have specialists trained to shoot S-300 missiles. In case of a partisan war, there will be shooting from every house.

Do you realize that the majority of Russians, including cultural and intellectual leaders, support Putin's actions in Crimea because they see you as a leader of a fascist, radical movement? Are you ready to become the reason for the end of years of Russian-Ukrainian friendship?

Unfortunately, Russia is largely brainwashed. Ukrainian nationalists have nothing to do with fascism. The powerful Russian propaganda machine knows what it's doing. The beliefs of Right Sector are against chauvinism. We base our views on nationalist ideas. The proof is that 40 percent of our members speak Russian; Jews and other nationals feel comfortable in our forces.

What then makes your movement "right"?

Ukraine deserves to have its own national state. That is what makes our movement right.

Was your book Nation and Revolution—in which you define your movement's enemies as the Russian Federation and the Russian Orthodox Church—a prediction of "the liberating war" of the Ukrainian nation?

The book is a collection of my articles that was criticized when it came out. But now we see that it predicted many events that have since happened. I would advise Russian citizens to start their struggle against Putin's fascist regime. That would be the best guarantee of friendship between Russian and the Ukrainian people. So long as Putin is in power, Russian imperialism will always be putting improper pressure upon Ukraine.

Why do you refer to the Russian president, who enjoys high popularity ratings, as a fascist?

Putin built up his power by fascistic methods. He ignored the constitutional rights of Russian citizens. In Russia, police beat up those taking part in mass protests in Moscow and St. Petersburg. That smells of fascist methods to me. They arrest protesters carrying antiwar signs. That is fascism.

It is broadly believed in Ukraine that the revolution would not have happened without Right Sector. What kind of revolution was it?

We had a nationalist revolution to create a state where Ukrainian people would be the master of their own destiny in their own land. Until now, we have had an occupying regime. We'll do everything to give our people full freedom, justice and a share of the nation's wealth.

Your men are all over the center of Kiev. Why do you and your men wear black uniforms?

This is not an official uniform. We bought uniforms sold to security guards. [And] I have taken professional advice about strengthening our security [because] we have been given information that some Russian forces are interested in kidnapping, arresting or liquidating me.

Who is shooting on the Maidan every night?

That is not my people. My men never use their weapons unless there is a specific need.

You are running for president. What special qualifications do you have to be a politician? Do you think you have a chance to win the presidential election?

I graduated from university, specializing in Ukrainian language and literature. I never intended to be a politician. But since January 19 of this year, I have been responsible for all the events. We have seen two miracles happen already: Politicians have not betrayed the revolutionary spirit of the Maidan; and we won the revolution. I expect one more miracle to take place at the presidential election.

Did your movement support Chechen insurgencies in Russia?

We supported the first Chechen war against Russian empire. We sent a delegation to Chechnya. We helped treat the Chechen wounded here. And we publish Chechen books.

Did you really call for Islamic insurgencies to support Ukraine in the war against Russia? Did any of your men meet with the Chechen insurgency leader Doku Umarov?

I didn't say that. I am not sure [who met Umarov]. When we were helping Chechnya, Doku Umarov was just an ordinary field commander. We are not supporters of the Islamist war against defenseless women and children.

Ukraine's former president, Viktor Yanukovych, has said the new leadership in Kiev is going to raise Bandera flag that is considered fascist in Russia. Is that true?

We stood under red and black flags throughout the revolution. Red Ukrainian blood spilled on the black Ukrainian earth—that flag is the symbol of the national revolution. I am convinced that this flag will bring us freedom.

Who finances you? Do you think the West is going to support Ukraine?

As a matter of principle, I do not take money from oligarchs, as we do not want to be dependent. We received some U.S. dollars from the Ukrainian diaspora. Otherwise the entire country supports the Right Sector.

I am sure that if Russians bombed Kiev—and we believe there is fifty-fifty chance that will happen—NATO will not come to fight for Ukraine. Europe has betrayed Ukraine many times. We are not counting on its help. We can count only on our own forces and our ingenuity.



Ahmad Masood/Reuters

CELEBRATING HOLI, THE FESTIVAL OF COLORS, IN INDIA

**A WIDOW THROWS FLOWERS INTO THE AIR
DURING THE HOLI CELEBRATIONS ORGANISED BY
NON-GOVERNMENTAL ORGANIZATION SULABH
INTERNATIONAL AT A WIDOWS' ASHRAM IN
VRINDAVAN IN THE NORTHERN INDIAN STATE OF UTTAR
PRADESH MARCH 14, 2014.**

By Reuters

A widow throws flowers into the air during the Holi celebrations organised by non-governmental organization Sulabh International at a widows' ashram in Vrindavan in the northern Indian state of Uttar Pradesh March 14, 2014. Traditionally in Hindu culture, widows are expected to renounce earthly pleasure so they do not celebrate Holi. But women at the shelter for widows, who have been abandoned by their families, celebrated the festival by throwing flowers and coloured powder. Holi, also known as the Festival of Colors, heralds the beginning of spring and is celebrated all over India.



Ammar Abdullah/Reuters

LAST STOP

ALEPPO, SYRIA-THIS DEVASTATING SCENE IN THE AL-SUKARI DISTRICT IS THE RESULT OF BARREL BOMBS DEPLOYED BY FORCES ALIGNED WITH THE SYRIAN GOVERNMENT, ACCORDING TO OPPOSITION FORCES.

By Rob Verger

Aleppo, Syria-This devastating scene in the al-Sukari district is the result of barrel bombs deployed by forces aligned with the Syrian government, according to opposition forces. Earlier this week, the rebels fighting President Bashar al-Assad's government suffered a setback when the city of Yabroud, on the Lebanese border and an important supply transit point for the rebellion, was taken in another victory

by government forces. The conflict, now in its fourth year, is estimated to have claimed more than 100,000 lives; the United Nations has stopped trying to update that figure, citing a lack of reliable data.



Damir Sagolj/Reuters

A NOTE OF FAREWELL

KUALA LUMPUR, MALAYSIA-A WOMAN IN THE MALAYSIAN CAPITAL LEAVES A NOTE IN HONOR OF THE 239 PEOPLE ABOARD FLIGHT MH370, WHICH DISAPPEARED FROM RADAR SCREENS ON THE MORNING OF MARCH 8.

By Rob Verger

Kuala Lumpur, Malaysia-A woman in the Malaysian capital leaves a note in honor of the 239 people aboard Flight MH370, which disappeared from radar screens on the morning of March 8. After a week of fruitless searching, the plane is now believed to have been commandeered by someone-possibly even the pilot or co-pilot-and taken one

of two routes west. Teams from more than 25 countries are now searching for the missing aircraft and as of press time, its fate remained unknown. The last words from the cockpit, uttered around the same time two communications systems were switched off, were "All right, good night."



Natalie Keyssar

TRACKS OF THEIR TEAR GAS

CARACAS, VENEZUELA-A PROTESTER IN THE CAPITAL RUNS TO DISPOSE OF A GAS CANISTER IN THE ONGOING BATTLE BETWEEN DEMONSTRATORS AND SECURITY FORCES.

By Rob Verger

Caracas, Venezuela-A protester in the capital runs to dispose of a gas canister in the ongoing battle between demonstrators and security forces. On Monday, a National Guard captain died after being shot in the city of Maracay-the 29th victim of the antigovernment protests that began

last year. Demonstrators blame the socialist government of President Nicolas Maduro for the country's high crime rate, inflation and a paucity of basic goods like flour. Earlier this week, security forces cleared protesters and the barricades they'd built from Caracas's Plaza Altamira.



Shaminder Dulai for Newsweek

THE FIRST DAY OF SPRING

OMAR SEGAL, 11, TRIES TO BALANCE HIS FOURTEENTH EGG ON ITS END, DURING A SPRING EQUINOX CELEBRATION IN LOWER MANHATTAN. THERE'S A MYTH THAT EGGS WILL ONLY BALANCE ON THEIR END ON THE EQUINOX. ADHERENTS SAY THE PRACTICE BRINGS GOOD LUCK.

By Shaminder Dulai

Omar Segal, 11, tries to balance his fourteenth egg on its end, during a Spring equinox celebration in lower Manhattan. There's a myth that eggs will only balance on

their end on the equinox. Adherents say the practice brings good luck.



Sergei Supinsky/AFP/Getty

MARCHING ORDERS

GONCHAROVSKOYE, UKRAINE-AN OLD-FASHIONED SOVIET-STYLE 97 PERCENT OF CRIMEANS WHO WENT TO THE POLLS SUNDAY VOTED TO BECOME PART OF RUSSIA, AND THE INTERNATIONAL RESPONSE WAS SWIFT.

By Rob Verger

Goncharovskoye, Ukraine-An old-fashioned Soviet-style 97 percent of Crimeans who went to the polls Sunday voted to become part of Russia, and the international response was swift: Both the United States and European Union said they did not recognize the legitimacy of that referendum and levied sanctions against specific officials in Ukraine

and Russia connected with Russia's takeover of Crimea. The U.S. sanctions "will continue to increase the cost on Russia and on those responsible for what is happening in Ukraine," President Barack Obama said on Monday. Earlier this month, Ukrainian troops drill as fears of further Russian encroachment grew.



Peter Conheim/Tarantuland

PLAYING WITH SPIDERS

**RESEARCHERS HAVE PRODUCED 20 MEDICATIONS
USING A NEW SCIENTIFIC TECHNIQUE**

By Ben Wolford

Anybody who has been pricked by a wasp or bitten by a water moccasin knows venom can be extremely painful. Some of those poisonous juices are so toxic they're fatal: Snakes alone kill 100,000 people every year, **according** to the World Health Organization. But while venom can inflict serious pain, a team of researchers has found a new way to exploit venom's untapped potential to do just the opposite.

Biologists **estimate** there are 173,000 venomous species—from lizards and spiders to fish and even platypuses—brewing varieties of proteins and peptides thought to number in the tens of millions. Zoltan Takacs, president of World Toxin Bank in New York (and not involved in the research), explains that each of the molecules in a given venom has its own unique target. Those targets are called ion channels. They're the pores of a cell's surface, where information comes and goes—including shoots of pain running along a chain of nerve cells. Some of the molecules in venom can mute those pathways, blocking the pain.

Just one problem: There's no way to know which of the millions of molecules might do the trick until you test it out. Researchers have screened fewer than 2,000 and produced no more than 20 medications. One of those is a painkiller called **Ziconotide**, derived from the venom of a tropical sea snail.

To accelerate venom testing, Michael N. Nitabach, an associate professor of Cellular and Molecular Physiology and of Genetics at Yale University, and his colleagues designed a **new method** called "toxineering" that works by screening for potential blockers of pain-specific channels. They tried it out with 100 toxins produced in several species of spiders. And they found a match; the Peruvian green velvet tarantula makes a molecule that stifles TRPA1, an ion channel responsible for certain kinds of chronic pain.

That doesn't mean you should expect to find Peruvian tarantula extract next to aspirin in the pharmacy any time soon. Drug production can take decades, and "we're not even out of the culture dish at this point," Nitabach tells Newsweek. Nonetheless, he has begun talks with drug companies and plans to begin scaling up toxineering to screen thousands more venoms.



Maëlle Doliveux

CASHING IN ON KINDNESS

**RESEARCH SAYS YOU CAN BE COMPASSIONATE AT
WORK AND BOOST THE BOTTOM LINE**

By Bonnie Tsui

On February 24, the Dalai Lama came to Silicon Valley to talk business. As with most public appearances made by His Holiness, the event was mobbed. Four thousand people packed the Leavey Center, Santa Clara University's basketball arena, for a glimpse of his red robes—occasional cries of "We love you, Dalai Lama!" were heard—and

countless others watched a live streaming broadcast online. The topic of discussion? How to be a better boss.

The ennui and existential despair that comes from spending long hours hunched over in a cubicle, eating lunch at your desk, and counting the days until your next vacation aren't conducive to kindness. The question is: How do you change it?

Traditional business thinking focuses on extracting the maximum from workers—and maximizing profits in the process. But the pressure we feel to perform well and get results makes our blood pressure rise and our stress levels skyrocket, even absent an overtly abusive boss or competitive colleagues.

The Dalai Lama, naturally, is a great proponent of the Buddhist principle of compassion; **tonglen** is the Tibetan word for the practice of connecting with the suffering of others. According to the Dalai Lama, our individual happiness is inextricably tied to the happiness of those around us. But only recently have scientists begun to quantify the impact of compassion at work—the place where most of us spend the majority of our waking hours.

The epidemic of workplace stress, anxiety and depression costs U.S. businesses an estimated **\$200 billion to \$300 billion** a year in lost productivity, employee turnover and legal, medical and insurance bills. Six years ago, the Dalai Lama helped establish and fund the Center for Compassion and Altruism Research and Education (CCARE), an institute at Stanford's School of Medicine that defines its mission as undertaking "a rigorous scientific study of the neural, mental and social bases of compassion and altruistic behavior." The Dalai Lama's contribution, \$150,000, was the largest **donation** he had ever made to a non-Tibetan cause.

Today scientists are exploring the links between compassion and productivity in the workplace. Our bodies respond to **positive social interactions at work** in surprisingly

robust ways: lower blood pressure and heart rate, a boosted immune system, optimal hormone levels. Health-care costs are **significantly higher** for stressed-out workers: One study showed expenditures that were a whopping 46 percent greater than for those employees with low levels of stress. And **more than half of the workers surveyed** by the American Psychological Association reported that they considered turning down a promotion, leaving a job or looking for a new job because of chronic stress. When there's office stress, high turnover follows—along with the additional time and cost of training new employees.

Being "pro-social"—helping out an overloaded co-worker, say, or forgiving another for mistakes—**stimulates the reward centers in the brain**. That was one takeaway from a CCARE Compassion and Business Conference held last spring. And when **we give to others**, it feels good, a study in the physiological effects of altruism found; the same brain areas light up when we receive money (or food, or sex).

And when we see someone else help another person, we experience a heightened state of well-being that researchers call elevation: In a **business setting**, when bosses are fair and self-sacrificing, they improve the morale of their employees, who in turn feel happier, more loyal and committed and are more likely to act in a helpful way for no particular reason. Creating an office culture of kindness, then, is contagious—and makes good business sense.

So can you teach co-workers to be more compassionate? Scientists say yes—compassion is just like physical fitness, in that it can be cultivated and maintained through practice. Think of it as exercises to find your happy place. CCARE's researchers have developed an eight-week compassion training program based, in part, on Tibetan Buddhist practices and principles of social psychology. In studies of the program—which focuses on techniques for collaboration, resilience and meditation—people who go through the training feel more empathy for others and are

happier, more satisfied, less stressed and less lonely. It is immensely popular; sessions are usually sold out weeks in advance, and everyone from tech workers and teachers to doctors and hospice workers have signed up.

"We train people in guided meditation, and support it with specific exercises in class that are lab-tested," says Monica Hanson, a senior teacher who has taught the compassion program at Stanford for four years. For example, one class will work on approaching difficult people or situations, which can be a daily occurrence in the workplace.


When things go wrong in the workplace, people are often most critical of themselves, so participants in another class write letters to themselves showing self-compassion. Participants think of real-life difficult situations they feel they mishandled, and then write helpful, supportive letters to their alter egos. While being understanding about your shortcomings can be tougher than being understanding of someone else, the practice gets results: One **recent UC Berkeley study**, "Self-Compassion Increases Self-Improvement Motivation," showed that students who were reminded to be self-compassionate after failing a test were motivated to work harder than those who were not.

Hanson is careful to point out that this kind of thinking isn't magical—it's work. "We don't put a Tiffany ribbon around it," she says. "But the techniques enable people to re-engage in a way that is different and meaningful and useful, where previously they were stuck." She admits that even she still has some skepticism every now and again. "But then I show up day after day, and I see it really works."

The practice of listening well, learning how to accept challenges and thinking about how to work with difficult colleagues to build compassion may seem soft, but it is immensely practical. "It not only helps people be happier at work, but also more invested in work, with a clear sense of priority and effectiveness," Hanson says. "It's cultivating a

willingness to take on challenges and move things forward, whereas before it was just avoidance and obstacles."

At Santa Clara, the Dalai Lama described modern work life as "a big machine," one that we're all a part of. As social animals, we all need to cooperate to succeed, he said. As he talked, he took care to look everyone in the eye as much as possible. Despite the self-centeredness that dominates business, taking others into account is actually better for your bottom line. "For your own interest, it's actually better to help others," he explained.



I BELIEVE IN
HONEST MONEY
GOLD, SILVER, AND BITCOIN

Sean Gallup/Getty

THE OTHER SIDE OF THE BITCOIN

**THEY'RE REAL, THEY'RE SPREADING AND YOU'LL BE
USING A DIGITAL CURRENCY SOON. BET ON IT**

By Kevin Maney

The stuff that makes people worry about **bitcoin**—its volatility, the notion that it's a nationless currency, the bizarreness of being able to "mine" money on a computer—are all part of a brilliant ploy designed to spread the cryptocurrency around the world. And it's working.

Yes, we're being tricked into adopting bitcoin, but this is necessary so that it can eventually become so effortless it can be used by grandmothers, illiterate migrant workers and even **Kardashians**.

That's my takeaway after discussing bitcoin with three of the most influential players in the emerging sector: tech investor **Marc Andreessen**, **Coinbase** Chief Executive Officer Brian Armstrong and **SecondMarket** CEO Barry Silbert. All are certain bitcoin will transform global commerce. They're also pretty certain that even some brilliant people like Warren Buffett, who recently **dissed** bitcoin on TV, can't see beyond the short-term wackiness to the long-term importance.

As Andreessen explained to me, bitcoin is a foundation technology—an infrastructure to be built upon. In that sense, it is like the protocols that make the Internet possible, or the alternating current that travels over the electric grid.

However, it's rarely a good idea to just build an infrastructure and hope people will come. There's a chicken/egg problem. You couldn't build an electrical grid before anything was invented to take advantage of it. But nobody would invent electric gadgets if there were no grid. Thomas Edison needed to invent the lightbulb and the grid at about the same time.

The currency called bitcoin is the lightbulb; the technology of bitcoin is the grid. Both had to be created at the same time. And the really clever part of this story is how the bitcoin contingent is making millions of people want the lightbulb so the grid can get built.

Let's start with bitcoin as a volatile currency. Over the past year, bitcoin **prices** have seen more sky-high ups and steep crashes than a North Korean test **missile**. To some, that might indicate it is a passing fad. But to others—like speculators—the volatility is almost as alluring as bacon.

That's a key part of the ploy. "Bitcoin needed a bootstrapping mechanism," Armstrong told me. "The gold rush to get bitcoin was the bootstrap."

The very idea that the value of bitcoin was rising fast drew in people who were willing to take a chance by buying the currency even when there were few ways to use it. Few merchants at the outset accepted bitcoin, but those early buyers didn't need it to be useful—they got in because they thought bitcoin would be a windfall investment. That started the spread of it.

As more people bought bitcoin, the value rose, which in turn drew in more investors. At first, the only merchants taking bitcoin were either brave or running illegal enterprises, but as merchants came to believe their customers held bitcoin that they might want to spend, mainstream merchants started accepting it—especially since a bitcoin transaction costs them practically nothing. The credit card companies demand a fee of around 3 percent on every purchase.

As more people and merchants get with the program, the system becomes more attractive to yet more merchants and users. About 20,000 merchants accept bitcoin now. Coinbase—software that lets users easily buy and exchange bitcoin—is approaching 1 million consumer wallets. Those are relatively small numbers, but bitcoin **adoption** is picking up speed.

These days, bitcoin still looks more like a currency than an infrastructure to most people. It's something you buy, like gold or euros. Its value compared with other currencies will fluctuate. While that is good for drawing speculators, it creates a big handicap as bitcoin tries to spread to the general public.

The handicap: My mom doesn't want to think in bitcoin. For that matter, I don't want to think in bitcoin. I like my dollars just fine—I understand how much they are worth and what they can buy. Most people want a second currency

about as much as an iPhone owner wants a second phone—running Windows.

But there's a way to fix that, and it's coming soon. Let's say I want to buy a \$100 helmet on **HockeyMonkey**. The helmet is priced in dollars, which I understand. HockeyMonkey might say I can pay with a credit card, or I can pay with bitcoin and save 3 percent—the fee HockeyMonkey would have to fork over to Visa or Mastercard. If I buy in bitcoin, software like Coinbase could use my dollars to buy \$100 in bitcoin just before the purchase, and instantly make the bitcoin transaction with HockeyMonkey. Essentially, I would never see a bitcoin or get exposed to its volatility. I would own bitcoin for a few seconds before it is sent to HockeyMonkey.

As that becomes the primary way bitcoin gets used, it's no longer a currency to most people. It's a payment system—a faster, cheaper, more global payment system than exists now. Andreessen believes it can disrupt credit cards.

To make that payment system work, bitcoin needs a robust market so dollars or euros or yen can constantly, instantly be exchanged for bitcoin in super-high volume. For a robust market to exist, bitcoin needs to be a "currency" that can be traded and speculated on. "You just can't bifurcate bitcoin currency from the technology," Silbert said. "Bitcoin will always need a monetary base."

So there's a big spiral at work. For bitcoin to get started, it needed to be a currency. For it to spread widely, it needs to appear to not be a currency. But to appear to not be a currency, it needs to be a currency.

And what about the whole **mining** thing? On the surface, it looks like geeks can set up industrial-strength computers in their mom's basement and create money just by calculating massive algorithms. The U.S. Treasury might as well let people counterfeit, right?

But mining is part of the grand bitcoin ploy. Bitcoin has no central computer system, no governing body, no mint. To track and verify every bitcoin holding and transaction takes tremendous computing resources. How to get that? Well, create a way for individuals to make money by doing bitcoin's computer processing.

That's what the miners are doing. They've been lured into building computers for bitcoin by the promise of being able to "make" some new bitcoins for themselves. Some succeed, some don't. Hard to say whether this is a brilliant motivating mechanism or a grand manipulation, but it has worked well.

The whole bitcoin scheme, in fact, seems to have worked very well, despite doubters and Buffetts. "Bitcoin is one of the most viral concepts I've ever encountered," Silbert said.

We've all been infected. And even this column is part of the contagion.



Philippe Psaila/Science Source

BUILDING THE BETTER LAB RAT

**CUTTING BACK ON ANIMAL TESTING ISN'T JUST GOOD
ETHICS, IT'S GOOD SCIENCE**

By John Ericson

Public support for animal testing has been in **steady decline** since the 1950s, dropping from above 90 percent in 1949 to only 57 percent in 2013. And that number is likely to fall even further, with younger demographics opposing animal experimentation in even greater numbers than previous generations.

For many laboratory scientists, this waning approval isn't cause for concern, because a near-identical trend is emerging within the research community, and more and more U.S. labs are using innovative cross-disciplinary technologies to spare at least some of the **25 million animals** used for research annually.

But while compassion and ethics are indeed factors, the new paradigm is actually driven by a striving for improvement that is a hallmark of the best science. In 2014, the limitations of animal testing appear to have caught up with research and development, leading many to **question** whether the practice is still relevant.

The most obvious problem is the fundamental biological difference between humans and the animals used in research. The inner workings of rat and human may be similar, but they are by no means identical. When it comes to drug discovery and development, these limitations can jeopardize every segment of the pharmaceutical pipeline, from synthesis to prescription. Side effects are missed, and millions of dollars are wasted. Even if a new chemical entity is deemed safe at the animal stage, it still only has an **8 percent chance** of being approved for human use.

That doesn't mean animal testing doesn't work—in fact, the Food and Drug Administration **mandates** its use in virtually all drug review processes. Pick any drug you've heard of; it was probably tested on a rat. But there is significant room for improvement.

A move away from animal testing will require some lateral thinking: Life must become a little more abstract. An example of this is called *in silico* modelling. It sounds complex, but it's really just a fancy term for computer simulation. After centuries of scholarship and decades of technological breakthroughs in computation, many biological reactions can now be emulated and predicted with sophisticated algorithms. "Advanced computer-modeling techniques can be used instead of animals in

disease research, drug development and chemical testing," Amy Clippinger, a cellular and molecular biologist who currently works with PETA, tells Newsweek. "Computer models...have saved millions of animals from suffering in toxicity testing experiments."

But machines will never be able to do everything a rat can. One of the more pressing issues is metabolite profiling, where researchers try to figure out what exactly will happen to the body when it tries to process a given pharmaceutical. After a chemical agent is ingested, it ultimately reacts with the liver, giving rise to a myriad of so-called metabolites—some of which are toxic. Metabolic profiling is aimed at spotting these bad seeds and removing them.

For a long time, animal testing has been the only way to derive these profiles. But these experiments are far from perfect, because they rarely yield a complete picture of all potential byproducts. Metabolites that are highly water-soluble, for example, are easy to miss, as they quickly disappear in conventional solvents. As a result, chemists are left relying on a process that veers uncomfortably close to guesswork.

"It's not the easiest job for a chemist to isolate these metabolites from biological fluids," **Mukund Chorghade**, a veteran chemist who spent two and a half decades in the pharmaceutical industry, tells Newsweek. "You're left with very small quantities, and now the big challenge for you is to understand what you have in your hand."

Chorghade, who also serves as chief scientific officer of the clinical intelligence company **Empiriko**, has spent the latter half of his life searching for a way to refine this investigative process in order to make it less dependent on animals. Last year, he broke through. "The idea was very simple: First of all, we started with liver cells, which can generate these metabolic products," he explains. After months of development, he and his team found

themselves with the chemical compound they now call the "chemosynthetic liver."

The innovation takes the place of animal mediums: Instead of running the drug through an animal liver, a chemist can now force the drug to react with the chemosynthetic liver. And while animal models give only the gist of the results, the chemosynthetic liver offers new clarity. "We can give you very accurate structural data—nothing is left to guess work," Chorghade explains. "We imagine a future where we're able to identify every possible metabolite."

In one sample trial, the chemosynthetic liver was able to catch a particularly nasty metabolite that would have set the developer back millions in dollars and countless hours of research. It did so by providing a level of specificity that would otherwise have required about 1,000 rats and 100 dogs.

Though still in its early phase, the method has already proven viable in 50 similar sample studies. That puts it halfway to FDA approval.

That project dovetails with a similar effort at Harvard's Wyss Institute, where researchers are currently developing "organs-on-chips"—microchips that can mimic the functions of vital organs. By suspending microfluidic channels of living human cells in clear polymer, the team is able to create tiny biological systems no bigger than a computer memory stick. "The pharmaceutical industry needs alternative ways to screen drug candidates in the laboratory," they **write**. "These microchips...could one day form an accurate alternative to traditional animal testing."

The proposed pipeline currently includes lung-on-a-chip, heart-on-a-chip, kidney-on-a-chip, and even brain-on-a-chip. The goal is to build 10 miniature systems and link them together, thereby mimicking whole-body physiology. A human-on-a-chip, if you will.

But even in light of these breakthroughs, few predict a definitive end to animal testing. The most progressive scientists will tell you animals are still indispensable in numerous areas of science, such as genetic engineering and the study of neurodegenerative disorders like Alzheimer's disease. Without animals, research in these fields would be nearly impossible.

Policymakers and scientific authorities are in agreement: U.S. research must do more to avoid and minimize animal testing. But the practice, they say, must reach a minimum—not a complete halt.



AP

A SUNKEN TREASURE TO SUE FOR

THE TITANIC OF THE 19TH CENTURY WENT DOWN IN A HURRICANE; RECOVERING ITS CARGO HAS BEEN AN ADVENTURE

By Karla Zabudovsky

Mike Milosh stared into the monitor showing video from a shipwreck two miles below him. His remotely operated vehicle, Nemo, had stirred up a cloud of sediment, and he was eagerly waiting for it to settle. When it did, he remembers, a pile of 50 gold bars appeared on the screen.

"There was a lot of high-fiving," says Milosh, a lead engineer for the 1989 mission to recover the cargo of treasure from the sunken S.S. Central America.

More than \$40 million in gold was recovered from the wooden-hulled, copper-sheathed, sidewheel steamship that sank off the Carolina coast in 1857, at the height of the Gold Rush. Next month, the S.S. Central America will receive its first visitors in more than two decades, when a group of shipwreck experts go down to try to recover any remaining treasure. Some estimates put the potential prize at close to \$100 million.

But rather than a triumphant story of adventure and riches, the S.S. Central America, considered by many the Titanic of the 19th century, has become a cautionary tale of ambition, costly legal battles, embittered friendships and repentant investors. Its lead discoverer is now a fugitive.

The Thrashing Atlantic

As the S.S. Central America pulled out of Panama for what would become its final voyage, its hold and the pockets of many of its roughly 580 passengers brimmed with gold ingots and freshly minted coins, recently gathered from California mines swarming with fortune seekers.

Shortly after a layover in Havana, the vessel sailed into the heart of a hurricane. The ship sprung a leak, moistening the coal and grinding the engines to a halt. Shortly before it sank, a small vessel came into view and was able to take the women and children of the S.S. Central America onboard. The men, and the gold, soon plunged to the bottom of the thrashing Atlantic.

At the time, New York banks were awaiting the gold shipment, and the ship's sinking, historians say, contributed to the Panic of 1857, which led to a brief but severe economic depression in the United States.



Bars, bricks, coins and nuggets of gold recovered from a sunken 19th century steamer, the SS Central America, which sank in a hurricane in September 1857. Henry Groskinsky/Time Life/Getty

Finders, Weepers?

For more than a century, the ship lay on the seabed, 7,200 feet below the surface, attracting starfish and the

occasional visit from a curious Greenland shark. Just how much gold it holds has been a mystery as well. The official tally of cargo was three tons. Passengers were said to be carrying as much again on their person, and there may also have been a secret army shipment of even more gold, according Gary Kinder, author of a book about the sinking, *Ship of Gold in the Deep Blue Sea*. The total may have been as high as 21 tons of gold.

It took an all-encompassing passion for shipwrecks, cutting-edge technology, boundless patience and millions of dollars to find the ship. Thomas G. Thompson had all but the last. A bespectacled research scientist from Defiance, Ohio, he spent much of the 1980s creating the necessary machinery to explore the deep ocean while working at Battelle Memorial Institute, a research and development company. During that time, he started mapping the seafloor in the area and wooing investors to finance the search and recovery. Wealthy Ohioans, including the Dispatch Printing Co., which owns [The Columbus Dispatch](#), poured more than \$10 million into Thompson's mission.

The wreck's location, approximately 160 miles off of South Carolina, was discovered in 1987. Shortly after, Nemo began bringing up ingots and coins, and along with them, a time capsule from the previous century. Daguerreotype photos, dueling pistols and rare marine species—including, coincidentally, gold coral—were discovered in the wreck.

Thompson became a celebrity. "As things moved ahead and Tom got a lot of kudos for being a good entrepreneur, things changed," says Milosh. "His personality changed, became a lot more reclusive."

The euphoria was short-lived. The first batch of gold had just come ashore when a group of American and British companies that had insured the steamship's cargo 135 years earlier claimed rights to the treasure and filed suit. In 1990, the Federal District Court in Norfolk, Va., ruled that the salvagers, Thompson and his company, Columbus-America

Discovery Group, were the owners of the treasure, according to the principle of finders keepers.

The insurance companies appealed. In 1992, a federal appeals court reversed the trial court's decision, ruling that Columbus-America had not shown that the insurers abandoned the treasure. A second trial was held in 1993, in which the court held that Columbus-America was entitled to 100 percent of the uninsured gold and 90 percent of the insured gold. Columbus-America and the insurers agreed to split the treasure, with the former receiving approximately 92.5 percent of the recovered treasure.

In the meantime, Thompson had been accruing debt to continue financing his exploration project. When he sold the gold he had pulled up from the S.S. Central America in 2000 to California Gold Marketing Group, none of the profit made it to investors' pockets. "One hundred percent of every dime that came in from the sale of the treasure to California Gold was used to settle the lawsuits," says Gilman Kirk, an investor and a close friend of Thompson's.

Whereabouts Unknown

Investors sued Thompson in 2005, and the case is ongoing. In 2012, after he failed to show up for a hearing related to the case, a federal judge issued an arrest warrant. Avonte Campinha-Bacote, an attorney who used to represent Thompson, said he withdrew as Thompson's counsel in November after not hearing from his client, and he was not aware of any other lawyer representing him.

According to [The Columbus Dispatch](#), Thompson had been living in a rented mansion in Vero Beach, Fla., before he fled. His current whereabouts are unknown.

"I had a lot of respect for Tommy Thompson, and I believed he was a straight shooter and was really motivated by the scientific challenges as much as the potential for wealth," says Mike Williamson, a plaintiff in one of the

lawsuits against Thompson. "He seems to have somewhere along the line changed his ethics and outlook on the world."

Even those who came to know Thompson well are puzzled by the outcome of his mission. "There are four things I know for sure," says Kinder. "I know that they were successful in finding the gold. I know that the gold was worth a lot of money. I know that the investors never got paid anything. And I know that Tommy is honest. But those things don't work, they don't go together."

Still, Thompson retains a group of staunch defenders. "What they've done to him is criminal. They've run him out of town. They call him a crook. He's not. He's a scientist," says Donald Garlikov, an investor who has remained loyal to Thompson despite admitting that he's never received any percentage of the treasure's profit.

Earlier this month, Odyssey Marine Exploration, a publicly traded, Florida-based company that specializes in deep-ocean shipwreck exploration, announced that it had been awarded an exclusive contract to recover the remaining gold from the S.S. Central America.

Odyssey, which was chosen by a court-appointed receiver representing the companies that Thompson created to finance the S.S. Central America project, says it plans to begin exploring the wreck site next month. Odyssey will receive 80 percent of recovery proceeds up to a fixed fee and 45 percent thereafter.

The wealth to be had could be substantial. A gold coin that was recovered was **red** for \$11,750 by Heritage Auctions last year. The Eureka bar, at approximately 80 pounds and believed to be the "largest and heaviest gold numismatic item known to exist," according to Monaco Rare Coins, was **red** for \$8 million in 2001.

Experts hired by the court-appointed receiver estimate that the ship still holds anywhere from \$343,000 to \$1.4

million of gold, in 1857 value. According to some estimates, that could be as much as \$97 million on today's prices.

For some, the upcoming exploration is as much about the potential wealth as it is about completing a personal, lifelong mission. Bob Evans, the chief scientist of the initial mission says he is thrilled to go back to the S.S. Central America after 23 years. "We are going to explore much more of the shipwreck this time, with much more modern equipment, he said. "We expect new, wonderful things to show up."

Correction: An earlier version of this story mistakenly said the experts who estimated the value of the gold were hired by Odyssey Marine. They were hired by the court-appointed receiver representing the companies that Thompson created to finance the S.S. Central America project.



Linda Ny Lind/Eyevine/Redux

HERE COMES HELEN

**AN EXHILARATINGLY AMBITIOUS YOUNG WRITER
REFUSES TO BE BOUND BY RACE OR NATIONHOOD**

By Alexander Nazaryan

Helen Oyeyemi thinks reading Stendhal "goes really well with a background of R&B music." Boyz II Men, to be precise, crooning "4 Seasons of Loneliness" as she reads *Love*. This isn't the only thing you should know about Oyeyemi, the 29-year-old Anglo-Nigerian novelist who is among the youngest members of the august club that is *Granta* magazine's decennial "Best of Young British Novelists" list. But it's a telling revelation: Can you imagine

Jonathan Franzen admitting he listens to Weezer while poring over Schopenhauer? Yeah, neither can I.

Oyeyemi has also dragonballed. The woman who has been compared to Edgar Allan Poe enjoys the Japanese schoolgirl practice of staging photographs from the anime series Dragon Ball Z, in which one person appears to have hit several others with a fireball. I am not saying Oyeyemi is inordinately involved in dragonballing to the detriment of her craft. Not at all. I am just saying that Helen Oyeyemi is very much alive.

Now you know pretty much everything there is to know about one of the most promising young novelists working in the English language today.

Okay, I know that you know that I am being flippant and that the young woman who grew up in a working-class section of London and scored a rumored advance of more than \$500,000 for her first novel, *The Icarus Girl*, while still in high school (she would go on to Cambridge) is more than the sum of her idiosyncrasies. It's just that Oyeyemi offers a much-needed contrapositive to all those pedigreed purveyors of literary fiction, which is what we call books that are predictably sophisticated and have absolutely nothing new to say.

Oyeyemi has just published her fifth novel, *Boy, Snow, Bird*, a retelling of the Snow White story set in midcentury America. As in previous works, Oyeyemi injects her bountiful imagination into an old tale, in what is more an act of revitalization than reimagination. The Washington Post critic Ron Charles praises the "bewitching" novel, noting that "Oyeyemi captures that unresolvable strangeness in the original fairy tales" while also dealing with race.

Race may be one of the themes in Oyeyemi's latest novel, but she refuses to be occupied by questions of identity. Raised in London, she decided to leave the city after an amorous aggressor advanced on her as she was reading Norman Mailer's *The Executioner's Song* in Green Park.

"Then the man asked if he could lay his head down on my lap. I said no. He laid his head on my lap anyway," Oyeyemi wrote back in 2011 in *The Guardian*. She moved from city to city before settling on Prague, where she happily lives today, not quite an expat, not quite an exile. Just someone who knows there is more to the literary world than London, New York and Iowa City.

Much has been made recently of the rise of the "Afropolitan," a term introduced in 2005 by the novelist Taiye Selasi in an essay titled "Bye-Bye Barbar." She described the Afropolitans as "the newest generation of African emigrants... You'll know us by our funny blend of London fashion, New York jargon, African ethics, and academic successes." In literature, the Afropolitan trend encompasses youthful talents like NoViolet Bulawayo, Chimamanda Ngozi Adichie and Teju Cole.

Not Oyeyemi, who rejected the notion as soon as I introduced it. "That has nothing to do with me," she said. "I hate to talk about countries; it really doesn't matter to me." Some may want Oyeyemi to more fully engage in racial thinking, to mine the experience of the African diaspora as explicitly, and forcefully, as Toni Morrison has (and, for that matter, as have novelists like Saul Bellow and Jhumpa Lahiri with their own ethnic diasporas). But asking "ethnic" writers to hew to ethnic themes turns their novels into battle flags of identity politics instead of genuine works of art. Oyeyemi has not ignored race, but she is not obsessed with it.

If Oyeyemi does belong to any nation, it is that of postmodern wizards like Haruki Murakami, the ones who toy with everything literary and take nothing for granted. What she calls her "desire to disrupt stories" has led Oyeyemi to reimagine the standard coming-of-age novel via Nigerian myth (*The Icarus Girl*), flirt with ghosts (*White Is for Witching*) and douse the Bluebeard myth in rich heapings of metafiction (*Mr. Fox*).

Mr. Fox, published in 2011, was the novel that made Oyeyemi more than just a publishing-world darling. Ambitious and complex, it is a work that suggested an intellect willing to stray far beyond the usual bounds of the 20-something's domain. "I had so much fun writing that book," Oyeyemi says, "it was almost as if I didn't understand that people were going to read it."

Not all that long ago, convention could have been her fate. In 2007, she enrolled in a creative writing graduate program at Columbia University, which would have likely led to a pat novel about the Anglo-Nigerian experience, perhaps a premature memoir of the sort pumped out by so many writers with nothing but their own slightly-deviated-from-the-average stories. But she found New York a "confrontational city" that distracted her from writing. And the workshop model of teaching proved "stressful," presenting her with the unwelcome task of having to edit the stories of classmates even when "there was nothing to say or do."

After one semester, Oyeyemi left New York and, with it, the confines of its literary culture. Now, she is in Prague. Tomorrow, she may be in Lima. Some novelists spend an entire career mining a single place (Philip Roth/Newark) or a single idea (Cormac McCarthy/alienation). Not Helen Oyeyemi. She has to get going.



Larry W. Smith/EPA

DON'T TWEET WHERE YOU EAT

**SXSW HAS MORPHED INTO A FESTIVAL WHERE
EVERYONE IS WIRED AND NOBODY CONNECTS**

By Gogo Lidz

On Monday, outside an exhibition hall at the 2014 South by Southwest (SXSW) festival in Austin, Texas, I witnessed a young tech exec quarreling with someone on her smartphone. Wired—literally, figuratively—she tripped over a cane strapped to the wrist of an old man. Making a quick recovery, the exec nattered on while shaking her fists at the

guy with the cane. To her great annoyance, he kept walking, oblivious. He was, after all, blind.

Irony of ironies: SXSW is a communications gathering that eloquently expresses the failure of expression and communication. As Samuel Beckett once put it, "There is nothing to express, nothing with which to express, nothing from which to express, no power to express, no desire to express—together with the obligation to express."

Since its modest beginnings in 1987 as a local music hoedown, the fest has mutated into SXSW Interactive (tech and digital presentations, trade shows, lounges, panels), SXSW Comedy, SXSW Gaming Expo, SXSW Film and, this year, the TV-centric SXSW Film: Episodic. (Highlights: a speech by Lena Dunham of HBO's *Girls*, and the world premieres of *Penny Dreadful*, Showtime's psychological thriller, and *Deadbeat*, a supernatural sitcom on Hulu—not a Lifetime exposé of dads who don't pay child support.)

This year's sprawling iteration drew an estimated 30,000 nerds and embraced Mashable Meme bashes, trucks that dispensed prints of Instagram selfies, a Google Hangout with NSA whistle-blower Edward Snowden and a Skype-athon with alleged "sex-by-surprise" enthusiast Julian Assange. After The New York Times marveled at SXSW's transformation from music festival to hashtag, I asked director Richard Linklater if Austin had changed much since he filmed the 1993 eight-track epic *Dazed and Confused* there. "Not at all!" he said, flashing a smile that glowed brighter than the lights on the Moon Towers.

Everywhere festival-goers went, they were encouraged to over-share and surrender their privacy. Snowden's assertion that the NSA is "setting fire to the future of the Internet" was borne out in SXSW's fixation on digital smoke and Google Glass mirrors.

Everywhere people were asked to scan their badge, tweet, tag themselves or download apps, which pulsed and swirled in demonstration booths, on sidewalks and in cafes.

R.J. Reynolds set up vapor-smoking lounges and tents. One rep described the "VUSE Nicotine Delivery Device" to me as the "smartphone" of cigarettes: Unlike Stone Age e-cigs, it tracks your puffs and number of inhales. Still, he wasn't sure if VUSE's NDD could cause digital lung cancer.

An app could get you a free conference call or a free lunch from a food truck on Trinity Street. If you were more amped than apped, you could check in at the Nest Lounge, a way station to recharge your cell, rehydrate your body and relieve your headache (free Advil). A Nest fire truck was rigged with panic buttons like the one Zach Galifianakis has on "Between Two Ferns." Punch it and steam issued from a vent while Siri's sister alerted you to a Smoke Situation. All this was for the benefit of Nest Protect, a Wi-Fi-connected smoke alarm that won't wail like a Foghat tribute band every time you burn a bagel.

When it came to new features on old apps, few garnered as much buzz as Highlight, once touted as the pioneer of SoMoLo (social, mobile, local) and "ambient reality."

According to the company website, "As you go about your day, Highlight runs quietly in the background, surfacing information about the people around you. If your friends are nearby, it will notify you. If someone interesting crosses your path, it will tell you more about them. Highlight gives you a sixth sense about the world around you, showing you hidden connections and making your day more fun."

Just like in the M. Night Shyamalan movie, this sixth sense comes at a cost: Many of the techies who downloaded the latest version at SXSW wound up shutting it down or uninstalling it. Highlight reportedly saps iPhone batteries faster than a college frat drains a keg. Perhaps to offset this failing, Highlighters cruised Austin in an ice cream truck and handed out GoodPops, a locally made treat that comes in Girls-friendly hibiscus mint, chocolate milk and watermelon agave.

Hackers who subsist solely on Oreos tended to congregate at the Oreo Trending Vending Lounge, where 3-D printers cranked out cookies based on Twitter trends. Sadly, Oscar Mayer was not on hand to offer demos of its sizzling, new "Wake Up & Smell the Bacon" gizmo, which plugs into the headset jack in an iPhone and syncs with an iPhone app. The bacon-scented alarm is said to be the brainchild of the wiener outfit's Institute for the Advancement of Bacon. (To my knowledge, Anthony Weiner is not yet promoting a men's underwear-scented app.)

The online-privacy panel met not far from the Cottonelle Toilet Tissue Lounge, where conventioners literally got the bum rush. For tweeting the hashtag #LetsTalkBums, you were entitled to free makeovers, massages, hair touch-ups and wet cloths that gave new meaning to the term "screen wipe." On paper this may have sounded like a good idea. In practice, Cottonelle's attempt to make a festival splash was a bit strained. Come on guys - your tent had no bathroom!

A Cottonelle brochure invited visitors to name an OS after the brand. Would it be too impertinent to suggest the Crap App?



Jennifer Stewart/Getty

FROM ONE OF THE MOST POWERFUL MEN IN COLLEGE FOOTBALL TO PRISON?

**JOHN JUNKER HAS GONE FROM BEING ONE OF THE
MOST POWERFUL MEN IN COLLEGE FOOTBALL TO
WORKING IN A SOUP-KITCHEN**

By John Walters

Update March 14, 2014: John Junker was sentenced to eight months in federal prison for his role in a campaign contribution scheme

Gone is the familiar canary yellow blazer, his plumage as the Chief Executive Officer of the Fiesta Bowl. In its stead John Junker sports a royal blue apron as he scurries from table to table at the Society of St. Vincent de Paul charitable dining room in central Phoenix.

It is the breakfast hour, 7 a.m. In his hands Junker, now the operations manager at St. Vincent de Paul, totes a red broom and dust bucket as he sweeps in and around the room's 23 circular tables. He is clad in a crisp white shirt and a patterned tie, charcoal gray slacks and Nike running shoes. Occasionally Junker stops to accept handshakes and well-wishes from volunteers, middle-aged men predominantly, who still regard him as a Valley of the Sun colossus, the community pillar whom Sports Illustrated in 2003 dubbed "the seventh most powerful person in college football."

John Junker, 58, was once the highest-paid college football bowl official in the country, drawing a salary of more than \$600,000. He now earns \$47,000 annually while helping to feed the homeless. He is still in the hospitality business.

"Saint John," a few of his former Fiesta Bowl associates refer to their defrocked boss disparagingly, wondering if his current humble station is part of an act. On March 13, 2012, Junker, who had been the sultan of the Fiesta Bowl since 1990, first as its Executive Director and later as its CEO, pleaded guilty in U.S. District Court to a single federal felony conspiracy charge for his role in an illegal campaign-finance scheme.

On Thursday, exactly two years to the day and after several sentencing delays, U.S. District Judge David Campbell will sentence Junker to anywhere from probation to 2 ½ years in prison in accordance with a plea deal. The U.S. Attorney's Office has recommended one year in federal

prison. One week later, on March 20, Maricopa County Judge Joe Welty will sentence him on a related state felony charge that also has a ceiling of 2 ½ years, a sentence that would run concurrently with the first one.

Junker and his attorney, Stephen Dichter, have produced 116 letters written by family, friends, former associates and even community leaders such as Jerry Colangelo, the former owner of the Phoenix Suns who is now director of USA Basketball. Almost every epistle pleads for leniency (i.e., no jail time) for Junker, describing a man whose transformation mirrors that of St. Paul's on the road to Damascus.

"I interacted with Mr. Junker in the 2004-2006 time period when I was Maricopa County Manager and Mr. Junker headed the Fiesta Bowl," writes David Smith, who has since become the Chief Operating Officer at St. Vincent de Paul. "The negotiations...were not pleasant, and I came away with a very negative opinion of Mr. Junker... Mr. Junker is now a direct report to me. Recently I gave [him] our highest rating in our evaluation system. I have done personnel evaluations for 43 years. All I can say is that Mr. Junker is a changed person from the 'full of himself' person in 2006."

Legally, Junker is guilty of coercing 11 employees at the Fiesta Bowl to donate money to various political campaigns and then reimbursing them via Fiesta Bowl coffers.

Symbolically, Junker, who used the eight-figure endowment of the Fiesta Bowl, technically a non-profit, as a means to belong to four private golf clubs in three different states and a non-salaried allowance of approximately \$1,300 per day for a period of approximately 10 years (and that's just the tip of the perks iceberg), became the face of hubris and corruption that sports media and the public had long suspected was rampant in the stacked-deck ecosystem of the Bowl Championship Series (BCS).

"John Junker?" says Dan Wetzel, who along with Josh Peter and Jeff Passan wrote *Death To The BCS: The*

Definitive Case Against the Bowl Championship Series. "When we printed our updated edition, we dedicated the second book to Junker for proving the first book correct."

In March of 2011, a Special Committee formed by the Fiesta Bowl debriefed 52 individuals and ultimately produced a scathing 276-page report detailing Junker's myriad abuses of power as Fiesta Bowl kingpin. The list is far too long to enumerate here, but some of the more profligate abuses include a \$95,000 expenditure for a round of golf with Jack Nicklaus (Junker did not play); \$33,000 for Junker's 50th birthday gala in Pebble Beach, Calif.; \$65,000 to fly state legislators and their families to a Boston College-Virginia Tech game in 2008; \$13,000 for airfare and other considerations for the wedding of his executive assistant, Kelly Keogh; and \$1,241 for a visit to Bourbon Street Circus, a high-end Phoenix strip club, in 2008.

"We are in the business where big, strong athletes are known to attend these types of establishments," Junker famously told investigators. "It was important for us to visit and we certainly conducted business."

A Desert Fiefdom

The choirboy/Caligula dichotomy has long been an integral aspect of the John Junker enigma. The fifth of eight children, Junker, who declined to be interviewed for this story, is a 1973 graduate of Gerard Catholic High School in Phoenix. In his youth, he played the organ during Sunday mass at the Arizona State Hospital for the mentally impaired. Upon graduating Arizona State University in 1977, Junker worked in the school's sports information office before leaving to work for the Fiesta Bowl in 1980.

One day Junker's mother was driving past the Fiesta Bowl's then-modest headquarters in a small office complex on Thomas Road in Phoenix. There, out front, was her son scaling a ladder in order to plant a Fiesta Bowl flag atop the

building. "We sent that boy to ASU to learn how to climb ladders?" Junker's mother asked her husband.

Over the next three decades Junker, the Fiesta Bowl, which had launched in 1971, and the Phoenix metropolitan area would all scale unforeseen heights on the national sports landscape. The Fiesta Bowl, once a sleepy Christmas Day afterthought played at a one-tiered stadium in Tempe, hosted its first de facto national championship on January 2, 1987 (the Miami-Penn State classic). It has since hosted six more national championship games -and is now based at state-of-the-art University of Phoenix Stadium. It became one of the four bowls in the BCS rotation, nosing out the more established Cotton Bowl. No single person was more responsible for usurping the Cotton Bowl's prestige than the charming, self-effacing and extroverted Junker.

In 1960, when Junker was four years old, Phoenix was not amongst the top 20 largest metropolitan areas in the United States and was home to no major sports teams. Today, it ranks sixth in size, with four major professional sports franchises, literally half of Major League Baseball's 30 teams making it their spring training base, and the Fiesta Bowl.

In 1980 Junker, then 24, joined the Fiesta Bowl staff and quickly learned the art of socializing with players, coaches and media who found the Valley's climate and social life a gridiron Brigadoon. He can be seen in one photo, drink in hand, schmoozing with collegians John Elway and Jim McMahon.

Three decades later, Junker was earning north of \$600,000 per year and the Fiesta Bowl, with dozens of staffers and hundreds of year-round volunteers, was its own fiefdom. At some point along the way, as the 276-page report suggests, Junker stopped working for the Fiesta Bowl and the Fiesta Bowl started working for him.

"John Junker was earning \$600,000 a year," says Wetzel, "and yet he had a \$2,500-per-month automobile allowance. What was he driving: a Manhattan townhouse?"

In November of 2009 Craig Harris, a business reporter at The Arizona Republic, was investigating a story on Fiesta Bowl largesse. Harris was reviewing the bowl's 990 tax forms, the financial statements non-profits are required to submit to the IRS, and noticed some peculiarities.

He returned to his desk one day to see the red light on his phone flashing. He had a message. "I work for the Fiesta Bowl. We wrote personal checks for political campaigns. You should look into it." Click.

Harris located one independent source to verify the claim, then another. He spent weeks putting together spread sheets, matching campaign donations made to Arizona politicians over the previous decade with Fiesta Bowl employees past and present. An executive assistant, for instance, who had made a \$1,000 donation to a local legislator.

"I don't know what kind of money you earn," says Harris, "but I don't donate \$1,000 to political campaigns and I doubt a secretary at the Fiesta Bowl could afford to, either."

On December 18, 2009, Harris' story, "Fiesta Bowl employees say bowl repaid political contributions," ran above the fold. Junker categorically denied all allegations. At the time the Fiesta Bowl was searching for a new head of media relations. Shawn Schoeffler, who had long held that position and was considered by many to be Junker's right-hand man, had been sacked (Schoeffler ultimately was one of six Fiesta Bowl employees who would plead guilty for his role in the campaign finance conspiracy; he would serve one year of probation and pay a \$4,600 fine).

On February 14, 2011 -Arizona's 99th anniversary of statehood-Junker was placed on administrative leave. Six

weeks later, after the 276-page report was released, he was fired.

Junker has paid \$62,500 in restitution to the Fiesta Bowl, but his hubris and dishonesty has left a debt that may be impossible to repay in a lifetime. While Junker was steadily giving himself and other executives profligate raises -his chief operating officer, Natalie Wisnieski, earned \$270,000 annually, despite not even having an MBA-and enjoying lavish perks of the job, the Fiesta Bowl was requiring volunteers to ante up \$20 fees to cover the cost of outfitting them.

"Why would John Junker even risk his career to donate sums to local politicians?" asks Wetzel. "What legislator in Phoenix is anti-Fiesta Bowl?"

Why Junker has never been indicted for his numerous documented misuses of Fiesta Bowl funds is a stickier question. "That's the million-dollar question," says Harris, who along with others suggests that the state of Arizona may not be prepared to grapple with all the cockroaches that would scurry out once that floorboard was lifted.

Bullet-Proof Windows

In 2011, Junker went to work at the Society of St. Vincent de Paul, an organization where he had been a volunteer the previous decade. In his first year there, according to his attorney, Stephen Dichter, he put in 1,500 to 2,000 hours, exclusively on a volunteer basis. In 2012 Junker was put on full-time staff and his wife, Susan, was also put on paid staff as a development officer.

"John has turned down several raises since he started working there," says Dichter. "We felt that it was important to do that, with him serving his... penance."

The John Junker who feeds the homeless avoids eye contact with people he once called friends, and is the epitome of the humble servant. He looks like a changed and contrite man.

Among the reams of letters written on Junker's behalf, one sentence, written by high school friend Robert F. Boyle, stands out: "Anything John did was for the good of the Fiesta Bowl."

Newsweek