CONTENTS

President Obama Honors Outstanding Mathematics and Science Teachers 3
A Startling Map of How Sea-Level Rise Will Affect NYC 5
Stephen Hawking Just Published a Mind-Bending Theory About Black Holes 8
'Wasteful' galaxies launch heavy elements into surrounding halos and deep space 10
Creating printable, programmable machines 13
Will Anyone Give Rome $550 Million for Historic Preservation? 19
Bubble-wrapped sponge creates steam using sunlight 21
The Bramble Cay Melomys Is the First Mammal Made Extinct by Climate Change 25
'Artificial atom' created in graphene 29
How Technology Hijacks People’s Minds — from a Magician and Google’s Design Ethicist 32
Modifying a living genome with genetic equivalent of 'search and replace' 53
What Should the 'Sharing Economy' Really Be Called? 55
Researchers discover oldest evidence of 'farming' — by insects 58
Scientists Found a Molecule in Space That Could Help Us Figure Out the Origins of Life 62
Paleontologists discover major T. rex fossil 63
Elizabeth Alexander on Writing, the Ethic of Love, Language as a Vehicle for the Self 66
Federal Help for Poor Families With Children Is Evaporating 72
Enabling the future of making 75
Monkeys protect against lethal Ebola Sudan infection four days after infection 79
Adam Phillips on How Our Internal Critics Enslave Us 82
On a World Stage, Architects Imagine Detroit as the City of the Future 90
New flexible material can make any window 'smart' 95
Phyotron facelift facilitates cutting-edge research on plants 98
It's Expensive to Get Your iPhone or iPad Fixed — And Apple Wants It That Way 100
Virginia Woolf on the Relationship Between Loneliness and Creativity 102
Hope for reversing stroke-induced long-term disability 106
This 'Airbnb for the Elderly' Could Curb Loneliness in Cities 110
Atmospheric scientists boldly go into the heart of a tornado  
After the heart attack: Injectable gels could prevent future heart failure  
China’s Attempt at the ‘Bilbao Effect’  
How Greek Drama Saved the City  
New device could help improve taste of foods low in fat, sugar and salt  
Strange Trees: An Illustrated Atlas of the World's Arboreal Wonders  
The Role of Cities in Preventing Crisis  
Is it your second cousin? Cotton swabs may tell you  
Analyzing how gun violence affects high-risk populations  
Stop the Misuse of Philanthropy!  
Young Barack Obama on What His Mother Taught Him About Love  
Sleep makes relearning faster and longer-lasting  
Nuclear Power Fights for a Spot in Illinois' Clean Energy Future  
Tackling intractable computing problems  
Edible food packaging made from milk proteins  
The Undermining of American Charity  
Pioneering Biochemist Erwin Chargaff on the Poetics of Curiosity  
Stopping scars before they form

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmospheric scientists boldly go into the heart of a tornado</td>
<td>112</td>
</tr>
<tr>
<td>After the heart attack: Injectable gels could prevent future heart failure</td>
<td>119</td>
</tr>
<tr>
<td>China’s Attempt at the ‘Bilbao Effect’</td>
<td>122</td>
</tr>
<tr>
<td>How Greek Drama Saved the City</td>
<td>126</td>
</tr>
<tr>
<td>New device could help improve taste of foods low in fat, sugar and salt</td>
<td>133</td>
</tr>
<tr>
<td>Strange Trees: An Illustrated Atlas of the World's Arboreal Wonders</td>
<td>136</td>
</tr>
<tr>
<td>The Role of Cities in Preventing Crisis</td>
<td>148</td>
</tr>
<tr>
<td>Is it your second cousin? Cotton swabs may tell you</td>
<td>155</td>
</tr>
<tr>
<td>Analyzing how gun violence affects high-risk populations</td>
<td>157</td>
</tr>
<tr>
<td>Stop the Misuse of Philanthropy!</td>
<td>160</td>
</tr>
<tr>
<td>Young Barack Obama on What His Mother Taught Him About Love</td>
<td>163</td>
</tr>
<tr>
<td>Sleep makes relearning faster and longer-lasting</td>
<td>168</td>
</tr>
<tr>
<td>Nuclear Power Fights for a Spot in Illinois' Clean Energy Future</td>
<td>171</td>
</tr>
<tr>
<td>Tackling intractable computing problems</td>
<td>176</td>
</tr>
<tr>
<td>Edible food packaging made from milk proteins</td>
<td>181</td>
</tr>
<tr>
<td>The Undermining of American Charity</td>
<td>184</td>
</tr>
<tr>
<td>Pioneering Biochemist Erwin Chargaff on the Poetics of Curiosity</td>
<td>191</td>
</tr>
<tr>
<td>Stopping scars before they form</td>
<td>200</td>
</tr>
</tbody>
</table>
President Obama Honors Outstanding Mathematics and Science Teachers

The 213 teachers honored today are from across the United States.

Credit and Larger Version

August 22, 2016

President Obama today named 213 mathematics and science teachers as recipients of the prestigious Presidential Award for Excellence in Mathematics and Science Teaching. These awardees represent all 50 states, the District of Columbia, Puerto Rico, U.S. Territories, and the Department of Defense Education Activity schools. The educators will receive their awards at a ceremony in Washington, DC on September 8.

The Presidential Award for Excellence in Mathematics and Science Teaching is awarded to outstanding K-12 science and mathematics teachers from across the country. The winners are selected by a panel of distinguished scientists, mathematicians, and educators following an initial selection process at the state level. Each nomination year of the award alternates between teachers in the kindergarten through 6th grade level, and those teaching 7th through 12th grades. The cohort of awardees named today represent two nomination years, one of teachers in kindergarten through 6th grade classrooms and the other in 7th through 12th grade classrooms.

Winners of this Presidential honor receive a $10,000 award from the National Science Foundation to be used at their discretion, and are invited to Washington, DC, for an awards ceremony, as well educational and celebratory events, and visits with members of the Administration.

"The recipients of this award are integral to ensuring our students are equipped with critical thinking and problem-solving skills that are vital to our Nation's success," President Obama said. "As the United States continues to lead the way in the innovation that is shaping our future, these excellent teachers are preparing students from all corners of the country with the science, technology, engineering, and mathematics skills that help keep us on the cutting-edge."
President Obama and his Administration have taken significant steps to strengthen education in science, technology, engineering, and math (STEM) fields in order to fully harness the promise of our Nation's students. The President's Educate to Innovate campaign, launched in November 2009, has resulted in more than $1 billion in private investment for improving K-12 STEM education. Additionally, in 2011, the President set an ambitious goal to put 100,000 additional excellent STEM teachers in America's classrooms by 2021. Thanks to the work of more than 280 organizations, 30,000 new STEM teachers have already been trained, and resources are in place to train an additional 70,000 STEM teachers by 2021. In parallel, the President has called for increasing the proficiency of America's existing STEM teachers with a Master Teacher Corps initiative, which would identify the most effective K-12 STEM teachers and support them in a program to propagate their best practices with their peers. You can read more about the President's commitment to science, technology, and innovation.

The recipients of the Presidential Award for Excellence in Mathematics and Science Teaching are listed below, by nomination cohort and then by state.

To learn more about these extraordinary teachers, please visit the PAEMST recognition website.

A Startling Map of How Sea-Level Rise Will Affect NYC

A 5-foot rise could affect nearly 300,000 people and 30 schools. Will the city adapt its infrastructure in time?

- TANVI MISRA

- @TanvimLow-lying, coastal cities are in hot water. As temperatures keep rising, so do sea levels, and that means that big chunks of major U.S. cities will be submerged in the centuries to come.

Miami, for one, has been spending millions of dollars dealing with recurring flooding. And researchers estimate that it will be submerged in the next few decades. New Orleans is in a similar position.

New York City is also facing a significant threat: According to a 2015 report, the city could experience up to a 6-foot rise in sea levels in the 21st century. A new interactive visualization by Landscape Metrics illustrates exactly what that means for the city’s residents and its infrastructure. Via the website*

Advancing Waters leverages data from the 2010 Census, the National Elevation Dataset, and the NYC Selected Facilities and Program Sites datasets to visualize the potential impacts of sea level rise on New York City. Previous sea level rise maps have shown the areas of cities that could be affected by sea level rise in the future. However, our visualization goes one step further by providing information on what occupies lower lying areas. Our tool tracks the number of people, schools, transportation facilities, and waste treatment facilities at elevations up to 9’ (NAVD88).

At an elevation of five feet, for example, sea-level rise could impact over 308,990 people...

Landscape Metrics

* the website
... around 34 schools...

Landscape Metrics

...around 80 transport (below, top), and 30 waste-management (below, bottom) facilities.*
Landscape Metrics

The website mentions some caveats to the above numbers:*

While elevation broadly correlates with inundation risk, these maps should not be interpreted as being one-to-one equivalent to sea level rise impacts, as they do not account for tides, local urban features such as canals or stormwater infrastructure, or elevation differences between NAVD88 and current mean sea level. Storm events are also not factored in. For example, for a rise in sea level of 5', features shown here at elevations greater than 5' could potentially be inundated during high tides or storm events.

These images paint a disheartening picture of the future of cities. But keep in mind the words of Michael Berkowitz, the president of the 100 Resilient Cities initiative, who recently told CityLab that, with respect to climate change, “cities are piloting different solutions to different problems all the time.” The hope now is that these city-driven solutions are readily accepted and implemented in time.

Stephen Hawking Just Published a Mind-Bending Theory About Black Holes

By Kelly Dickerson June 08, 2016

LIKE MIC ON FACEBOOK:

Legendary physicist Stephen Hawking just published a possible solution to one of the biggest paradoxes in physics. His theory explains how it might be possible to escape from a black hole — just like crying Matthew McConaughey in the film Interstellar.

Source: Giphy

The back story: Previously, we thought black holes just swallowed up and destroyed everything for good. If you fell into a black hole, there'd be no coming out. Then, in the 1970s, Hawking proposed that radiation can actually escape from a black hole. Basically this happens when a black hole swallows one of two entangled particles. The one that isn't swallowed escapes from the black hole in the form of radiation.

The problem is that this radiation wouldn't carry any record of information about the particle that fell into the black hole. That doesn't match up with one of the pillars of physics: Theoretically, if we were to reverse time, the universe would look the same whether it's going forward or backward. Here's Phys.org's explainer:

Quantum physics allows you to run the whole universe forwards and backwards, as long as you reverse everything in your math: charge, parity and time. Here's the important part. The big brains tell us information must live on, no matter what. Think about it like energy. You can't destroy energy, all you can do is transform it.

Thing is, that principle doesn't work if information in the universe gets erased by a black hole.

Thus the black hole information paradox was born.

It's remained unsolved ever since.

Source: Giphy

Stephen Hawking might have an explanation. Hawking and two colleagues, Malcolm Perry and Andrew Strominger, think they're getting close to a solution. In their paper, they argue black holes might be covered with "soft hair" — a layer of zero-energy particles that record information about any objects that fall in. A pattern of all the things a black hole has ever swallowed gets imprinted on the hair.

"That pattern, like the pixels on your iPhone or the wavy grooves in a vinyl record, contains information about what has passed through the horizon and disappeared," Dennis Overbye wrote for the New York Times.

It's a big step forward, but it doesn't solve the paradox yet.

"I think that it is an interesting idea, which might be part of [the paradox] resolution," physicist Juan Maldacena said in an email to Mic.
There are a few more questions to answer and details to flesh out before we know for sure that this theory solves the paradox.

Source: NASA

"It is important to note that this paper does not solve the black hole information problem," writes physicist Gary Horowitz in an accompanying commentary on Hawking's paper. "First, the analysis must be repeated for gravity, rather than just electromagnetic fields. The authors are currently pursuing this task, and their preliminary calculations indicate that the purely gravitational case will be similar. More importantly, the soft hair they introduce is probably not enough to capture all the information about what falls into a black hole."

Essentially, we still don't know if all the information about in-falling objects can be encoded in black hole hair. But it's a big step forward in solving the paradox.

There might be a way out of a black hole after all.

'Wasteful' galaxies launch heavy elements into surrounding halos and deep space

University of Colorado at Boulder

Summary:

Galaxies ‘waste’ large amounts of heavy elements generated by star formation by ejecting them up to a million light years away into their surrounding halos and deep space, according to a new study.

Share:

AddThis Sharing Buttons

FULL STORY

Spiral galaxies like the Milky Way are shown in the center, surrounded by the circumgalactic medium, which appears as black to our eyes. However, the circumgalactic medium contains very hot gas, shown in red, orange, and white that outweighs the central galaxies. The Cosmic Origins Spectrograph on the Hubble Space Telescope is an ultra-violet spectrograph that can probe these gaseous filaments and clumps.

Credit: Adrien Thob, LJMU

Galaxies "waste" large amounts of heavy elements generated by star formation by ejecting them up to a million light years away into their surrounding halos and deep space, according to a new study led by the University of Colorado Boulder.
The research, which was recently published online in the Monthly Notices of the Royal Astronomical Society, shows that more oxygen, carbon and iron atoms exist in the sprawling, gaseous halos outside of galaxies than exist within the galaxies themselves, leaving the galaxies deprived of raw materials needed to build stars and planets.

"Previously, we thought that these heavier elements would be recycled in to future generations of stars and contribute to building planetary systems," said Benjamin Oppenheimer, a research associate in the Center for Astrophysics & Space Astronomy (CASA) at CU-Boulder and lead author of the study. "As it turns out, galaxies aren't very good at recycling."

The near-invisible reservoir of gas that surrounds a galaxy, known as the circumgalactic medium (CGM), is thought to play a central role in cycling elements in and out of the galaxy, but the exact mechanisms of this relationship remain elusive. A typical galaxy ranges in size from 30,000 to 100,000 light years while the CGM can span up to a million light years.

The researchers used data from the Cosmic Origin Spectrograph (COS), a $70 million instrument designed at CU-Boulder and built by Boulder, Colorado-based Ball Aerospace Technology Corp., to study the composition of the CGM.

COS is installed on NASA's Hubble Space Telescope and uses ultraviolet spectroscopy to study the evolution of the universe.

Spiral galaxies like the Milky Way actively form stars and have a blueish color while elliptical galaxies have little star formation and appear red. Both types of galaxies contain tens to hundreds of billions of stars that create heavy elements.

After running a series of simulations, the researchers found that the CGMs in both types of galaxies contained more than half of a galaxy's heavier elements, suggesting that galaxies are not as efficient at retaining their raw materials as previously thought.

"The remarkable similarity of the galaxies in our simulations to those targeted by the COS team enables us to interpret the observations with greater confidence," said Robert Crain, a Royal Society University Research Fellow at Liverpool John Moores University and a co-author of the study.

The new simulations also explain the puzzling COS observation that there appears to be less oxygen around elliptical than spiral galaxies.

"The CGM of the elliptical galaxies is hotter," said Joop Schaye, a professor at Leiden University in the Netherlands and a co-author of the study. "The high temperatures, topping over one million degrees Kelvin, reduce the fraction of the oxygen that is five times ionized, which is the ion observed by COS."

By contrast, the temperature of the CGM gas in spiral galaxies is 300,000 degrees Kelvin, or around fifty times hotter than the surface of the Sun.

"It takes massive amounts of energy from exploding supernovae and supermassive black holes to launch all these heavy elements into the CGM," said Oppenheimer. "This is a violent and long-lasting process that can take over 10 billion years, which means that in a galaxy like the Milky Way, this highly ionized oxygen we're observing has been there since before the Sun was born."
Story Source:

The above post is reprinted from materials provided by University of Colorado at Boulder. Note: Materials may be edited for content and length.

Journal Reference:


https://www.sciencedaily.com/releases/2016/06/160606081706.htm
Creating printable, programmable machines

NSF-funded researchers from MIT, the University of Pennsylvania and Harvard work to create methods for rapid robot customization

The self-folding mobile prototype developed by researchers at MIT and Harvard. Credit and Larger Version

June 13, 2016

In the future, we may be able to design and print our own robots that we can control with a smartphone and … oh wait, we can do that today?

Daniela Rus, a MacArthur Fellow and head of the Computer Science and Artificial Intelligence Laboratory (CSAIL) at MIT, is pioneering the science of printable, foldable and DIY robotics with support from the National Science Foundation (NSF).

Working with researchers at the University of Pennsylvania and Harvard University, the project is building a future where 3-D robotic systems can be produced using 2-D desktop technology fabrication methods and programmed using simple natural language commands.

This would be a big departure from today’s typical robotics design process.
"A great challenge with today's robots is that it takes a long time to design and fabricate new designs," Rus said. "Many different types of robots are available today, but each of these robots took many years to produce. We need to speed up the creation of robots."

The new robot consists of two layers of structural material sandwiching a material that shrinks when heated. A pattern of slits in the outer layers determines how the robot will fold when the middle layer contracts.

Credit: Melanie Gonick/MIT

Fabricating new robots, however, is far beyond the scope of most individuals, requiring specialized knowledge in design, assembly, programming and more. Rus and her collaborators are developing a set of methods that would allow one to create custom robots at home, with limited knowledge and widely available tools, in a matter of hours.

From sketches, to design, to printing, fabrication and ultimately control, this new project would completely automate the process, leading to potential transformations in advanced manufacturing and more widespread robot customization and creative use.
Daniela Rus is the Andrew and Erna Viterbi Professor of Electrical Engineering and Computer Science at MIT.

Credit: Bryce Vickmark

Origami robotics

Though it sounds like science fiction, Rus and her team are already well along this path.

Part of the solution involved developing ideas and algorithms to design self-folding robots, where the machine is built flat but contains conditions within it to fold into a 3-D structure through the application of heat, electricity or some other means.

One type of 3-D prototype they have designed is composed of a three-layer structure. The top and bottom layers are structural and non-reactive, but the middle layer reacts to heat or electricity and shrinks, acting as a bending control layer and causing the material to take on a 3-D structure.

By cutting gaps in the top and bottom layers, Rus and her team are able to control the bending angle of the material, enabling a range of robot types that can self-fold and then walk, swim, manipulate objects and even self-recycle.
In 2015, the team demonstrated a centimeter-long robot made of conductive materials that, when exposed to electrically charged water, can swim and perform actions in an environment. They even built designs out of acetone that are able to decompose.

From sketches, to design, to printing, fabrication and ultimately control, this new project would completely automate the process, leading to potential transformations in advanced manufacturing and more widespread robot customization and creative use.

Credit: Daniela Rus, Harvard University

In June 2016, they debuted a new version of their origami robot that can be ingested and that can travel through the body to collect and dispose of a swallowed battery -- a function that could prevent thousands of injuries each year.

"It's really exciting to see our small origami robots doing something with potential important applications to health care," Rus said, who also directs CSAIL.

Designing a robot compiler
Rus and her team take this vision of powerful, simple self-folding robots even further and imagine a day when it's possible not only to design small origami robots but to specify a task that you want the robot to do and to have a robot compiler automatically compute a design, a fabrication plan and a programming environment that brings it into being.

A compiler is a computer program or set of programs that transform code written in one programming language into another computer language.

"Many tasks big and small could be automated by rapid design and fabrication of many different types of robots using such a robot compiler," she explains.

In one example posed by Rus and her team, the input, she says, could be as simple as:

$ emacs myrobot.rbt

"I want a robot to play chess with me"

$ make myrobot

Parsing specification … done.

Determining behaviors … done.

Generating mechanisms … done.

Assembling components … done.

Printing … done.

Success!

To achieve this, Rus and her team are creating a database of robot design and control algorithms that are modular and that can be combined to create new robots with a range of abilities.

For instance, a user can specify an ant robot and define its behaviors. The system then computes the modular elements required to bring it into being. This includes physical, printed elements -- the body, legs and joints -- as well as controls that would allow one to manipulate the robot through a smart phone or other device.

They have designed a series of prototypes -- a snake-like robot with pincers, a six-legged walking robot that can follow a line painted on the ground -- that show the feasibility of this approach. It represents one further step towards a future with pervasive, customizable robots.

The project is supported by multiple NSF grants, including an Expeditions in Computing award, which provides $10 million over five years to interdisciplinary, multi-investigator research teams to support transformative computing and information technology research.
"Our work brings robotics together with design, fabrication and programming languages," Rus said. "The team has computer science researchers in programming languages, algorithms, and computer graphics, and a core of roboticists."

The Expeditions projects constitute the largest single investments in computer and information science research NSF makes, and Rus' project is representative of the type of far-reaching thinking and creative approaches that enable brand new fields to emerge.

"We're in a world where computing has become pervasive. It's everywhere like oxygen, and I believe we're at the tip of an explosion," Rus said. "I imagine that in the future, computation and robots will make even more of an impact on our lives."

Her big dream, she says, is to have pervasive robots just as we have pervasive computing and to move from the democratization of computational tasks to the democratization of physical tasks.

"And along the way, we will continue to rethink computing to make it different, better, more powerful, and use it to solve humanity's greatest challenges."

NSF's long-term investments in fundamental science and engineering research such as these projects have led to novel machines that safely partner with people in nearly every environment. Visit NSF.gov/robotics for more stories about the emerging robot generation.

-NSF-

Will Anyone Give Rome $550 Million for Historic Preservation?

The city says it’s going to need private donors to step in, but its reputation for corruption and dysfunction may be a deterrent.

- FEARGUS O’SULLIVAN
- @FeargusOSull

Rome’s Trevi Fountain was restored thanks to a donation from Italian brand Fendi. (Alessandro Bianchi/Reuters Picture)

Rome is broke. Italy’s capital may be one of the world’s great storehouses for architecture and antiquities, but it is also up to its ears in a stiffening quicksand of debt. Altogether, the city is in arrears by as much as €14 billion ($15.6 billion), according to some estimates. The inevitable upshot of this situation is that there’s precious little cash available to preserve and maintain Rome’s world-famous monuments. And so it came to pass that the city announced this week that it is looking for €500 million ($557 million) from private investors for historic preservation efforts.
Of that figure, €178 million alone is needed just to keep Rome’s monuments in tolerable condition, with the remainder set aside for improvements. Rome’s current caretaker mayor, Francesco Paolo Tronca, has laid out a few more details: To restore and enhance the city’s 80 most beautiful fountains, it needs around €10.4 million. Should anyone want only to bankroll restoration of the aqueduct feeding the Trevi Fountain, that would cost €600,000. And there are plenty of smaller projects looking for funding, too. With €300, for example, you would apparently contribute enough to have the ground around Trajan’s Column weeded.

They’ve asked for help, but will anybody bite? Rome has certainly had some success in the past in getting businesses on board to patch up its beauty. Last year, the jeweler Bulgari paid out €1.5 million to restore the city’s Spanish Steps, shoe company Tod has contributed towards conservation at the Coliseum, and Fendi chipped in €2 million to help spruce up the Trevi Fountain. The city has ruled out offering direct sponsorships, but these earlier contributions were so widely reported that they must already have earned the money back in publicity.

For companies without such obvious, promotable roots in Italian culture, however, Rome’s appeal for funds may be a harder sell. One reason why the city is so hard-up (beyond the still-towering effects of the 2008 financial crisis) is that its administration is almost as dilapidated as the monuments of which it is custodian. Steered by a mix of sclerotic incompetence and outright corruption, the city’s mismanagement has long earned it the sobriquet “Mafia Capital.” More recently it received another nickname, Affitopolis or “Rentopolis,” after it emerged that numerous city properties were being rented out for mere pennies. This isn’t the best publicity campaign for a city seeking outside funding. Any potential donor might be tempted to wonder how much of their contribution would actually make it to its final source.

There were some attempts at improving this situation from previous mayor Ignazio Marino, who nonetheless presided over a period when Rome’s dysfunction only grew worse. Marino’s own profile as a clean pair of hands was rather spoiled when he himself had to step down following an expenses scandal last October. Now, there’s a new political force on the block vowing to change things. Italy’s populist, anti-corruption Five Star Movement looks on course to win municipal elections on June 5. If it does, it will also provide Rome with its first female mayor in the form of city councilor and comedian Virginia Raggi. It’s too early to predict if political change will be enough to kick Rome out of its torpor. In the short term, the city’s poor public image—coming at a time when much of Italy needs restoration funds—may well hinder its efforts to get corporations to dig deep.

http://www.citylab.com/politics/2016/05/will-anyone-give-rome-550-million-for-historic-preservation/484520/?utm_source=nl__link1_052716
Bubble-wrapped sponge creates steam using sunlight

Bubble-wrapped structure requires no mirrors or lenses to focus the sun's heat

Massachusetts Institute of Technology

Summary:

How do you boil water? Eschewing the traditional kettle and flame, engineers have invented a bubble-wrapped, sponge-like device that soaks up natural sunlight and heats water to boiling temperatures, generating steam through its pores. The design, which the researchers call a 'solar vapor generator,' requires no expensive mirrors or lenses to concentrate the sunlight, but instead relies on a combination of relatively low-tech materials to capture ambient sunlight and concentrate it as heat.

MIT graduate student George Ni holds a bubble-wrapped, sponge-like device that soaks up natural sunlight and heats water to boiling temperatures, generating steam through its pores.
How do you boil water? Eschewing the traditional kettle and flame, MIT engineers have invented a bubble-wrapped, sponge-like device that soaks up natural sunlight and heats water to boiling temperatures, generating steam through its pores.

The design, which the researchers call a "solar vapor generator," requires no expensive mirrors or lenses to concentrate the sunlight, but instead relies on a combination of relatively low-tech materials to capture ambient sunlight and concentrate it as heat. The heat is then directed toward the pores of the sponge, which draw water up and release it as steam.

From their experiments -- including one in which they simply placed the solar sponge on the roof of MIT’s Building 3 -- the researchers found the structure heated water to its boiling temperature of 100 degrees Celsius, even on relatively cool, overcast days. The sponge also converted 20 percent of the incoming sunlight to steam.

The low-tech design may provide inexpensive alternatives for applications ranging from desalination and residential water heating, to wastewater treatment and medical tool sterilization.

The team has published its results today in the journal Nature Energy. The research was led by George Ni, an MIT graduate student; and Gang Chen, the Carl Richard Soderberg Professor in Power Engineering and the head of the Department of Mechanical Engineering; in collaboration with TieJun Zhang and his group members Hongxia Li and Weilin Yang from the Department of Mechanical and Materials Engineering at the Masdar Institute of Science and Technology, in the United Arab Emirates.

Building up the sun

The researchers’ current design builds on a solar-absorbing structure they developed in 2014 -- a similar floating, sponge-like material made of graphite and carbon foam, that was able to boil water to 100 C and convert 85 percent of the incoming sunlight to steam.

To generate steam at such efficient levels, the researchers had to expose the structure to simulated sunlight that was 10 times the intensity of sunlight in normal, ambient conditions.

"It was relatively low optical concentration," Chen says. "But I kept asking myself, ‘Can we basically boil water on a rooftop, in normal conditions, without optically concentrating the sunlight? That was the basic premise.’"

In ambient sunlight, the researchers found that, while the black graphite structure absorbed sunlight well, it also tended to radiate heat back out into the environment. To minimize the amount of heat lost, the team looked for materials that would better trap solar energy.

A bubbly solution

In their new design, the researchers settled on a spectrally-selective absorber -- a thin, blue, metallic-like film that is commonly used in solar water heaters and possesses unique absorptive properties. The material absorbs radiation in the visible range of the electromagnetic spectrum, but it does not radiate in the infrared range, meaning that it both absorbs sunlight and traps heat, minimizing heat loss.
The researchers obtained a thin sheet of copper, chosen for its heat-conducting abilities and coated with the spectrally-selective absorber. They then mounted the structure on a thermally-insulating piece of floating foam. However, they found that even though the structure did not radiate much heat back out to the environment, heat was still escaping through convection, in which moving air molecules such as wind would naturally cool the surface.

A solution to this problem came from an unlikely source: Chen's 16-year-old daughter, who at the time was working on a science fair project in which she constructed a makeshift greenhouse from simple materials, including bubble wrap.

"She was able to heat it to 160 degrees Fahrenheit, in winter!" Chen says. "It was very effective."

Chen proposed the packing material to Ni, as a cost-effective way to prevent heat loss by convection. This approach would let sunlight in through the material's transparent wrapping, while trapping air in its insulating bubbles.

"I was very skeptical of the idea at first," Ni recalls. "I thought it was not a high-performance material. But we tried the clearer bubble wrap with bigger bubbles for more air trapping effect, and it turns out, it works. Now because of this bubble wrap, we don't need mirrors to concentrate the sun."

The bubble wrap, combined with the selective absorber, kept heat from escaping the surface of the sponge. Once the heat was trapped, the copper layer conducted the heat toward a single hole, or channel, that the researchers had drilled through the structure. When they placed the sponge in water, they found that water crept up the channel, where it was heated to 100 C, then turned to steam.

Chen and Ni say that solar absorbers based on this general design could be used as large sheets to desalinate small bodies of water, or to treat wastewater. Ni says other solar-based technologies that rely on optical-concentrating technologies typically are designed to last 10 to 20 years, though they require expensive parts and maintenance. This new, low-tech design, he says, could operate for one to two years before needing to be replaced.

"Even so, the cost is pretty competitive," Ni says. "It's kind of a different approach, where before, people were doing high-tech and long-term [solar absorbers]. We're doing low-tech and short-term."

"What fascinates us is the innovative idea behind this inexpensive device, where we have creatively designed this device based on basic understanding of capillarity and solar thermal radiation. Meanwhile, we are excited to continue probing the complicated physics of solar vapor generation and to discover new knowledge for the scientific community," Zhang says.

This research was funded, in part, by a cooperative agreement between the Masdar Institute of Science and Technology; and by the Solid-State Solar Thermal Energy Conversion Center, an Energy Frontier Research Center funded by U.S. Department of Energy.

Story Source:

The above post is reprinted from materials provided by Massachusetts Institute of Technology. The original item was written by Jennifer Chu. Note: Content may be edited for style and length.
Journal Reference:


https://www.sciencedaily.com/releases/2016/08/160822124924.htm
The Bramble Cay Melomys Is the First Mammal Made Extinct by Climate Change

By Kelly Dickerson June 15, 2016

LIKE MIC ON FACEBOOK:

Man-made climate change appears to have taken out the only mammal native to Australia's Great Barrier Reef region.

The Bramble Cay melomys is a tiny rodent that once existed on the island of Bramble Cay in the Torres Strait between Papua New Guinea and Australia. Now scientists are calling it the first mammal driven extinct by man-made climate change.

The Bramble Cay melomys is just the first name on a long list if climate change continues to accelerate, experts warn.

Bramble Cay melomys. Source: Queensland Government

Sailors first discovered the rodent on the island in 1845. There were once several hundred Bramble Cay melomys on the island, but no one has seen one since 2009. After a thorough search of the island in 2014 came up empty-handed, a scientific report concluded the species is extinct.

Why climate change is the culprit

In the report, scientists write that sea-level rise likely flooded the island several times over the last few years, drowning the rodents and destroying their habitat. In fact, they estimate sea level rise destroyed 97% of the rodents’ habitat between 2004 to 2014.

And it’s clear that the destruction is tied to human-caused climate change.

"For low-lying islands like Bramble Cay, the destructive effects of extreme water levels resulting from severe meteorological events are compounded by the impacts from anthropogenic climate change-driven sea-level rise," the authors wrote in their report.

This likely won't be the only species that we see claimed by climate change. Scientists have long warned that we’re teetering on the edge of a sixth mass extinction. A 2015 report estimated that about one-sixth of the world's species could go extinct thanks to climate change.

What can an undergrad learn from a robot?

Researchers work to incorporate mobile robots into computer science coursework

One of the Rochester Institute of Technology's educational co-robots roams the hallways. Credit and Larger Version

June 13, 2016

Robots are becoming increasingly common in introductory college and university computer science classrooms, but they're not exactly R2-D2. Often, they consist of tabletop machines, such as arms with gripper claws or simple Lego creations.

A number of factors -- from cost to programming complexity -- make those basic robots logical choices for introductory courses. But that doesn't make them engaging, says Zack Butler, a computer science professor at Rochester Institute of Technology (RIT).

"There's a challenge in what one might call the drier portions of computer science," Butler says. "Those robots don't really have a practical use outside of teaching programming."

Funded through the National Robotics Initiative, a multi-agency effort led by the National Science Foundation (NSF), Butler and a team of RIT researchers are now reconceptualizing what undergraduate computer science
looks like by incorporating inexpensive mobile robots into coursework that students can program, manage and test. Instead of having the capability to traverse a table, these robots can roam the halls of research buildings and interact with people inside.

Four of the Rochester Institute of Technology's educational co-robots charge their batteries in their "garage."

Credit: Zack Butler, RIT

"We've named different locations around our building," Butler says. You can say 'robot, go do this.'"

Except, of course, if you're a computer science student assigned to program the robot to get some candy, you would have to tell it something like this:

```python
pos = robot.get_pos()
p = robot.nav_to("Vending").wait()
robot.request_confirm("Buy me M&Ms please").wait()
robot.nav_to_xy(pos).wait()
```

The machines that Butler and his team have developed still won't be mistaken for something out of Star Wars -- they resemble laptops mounted on robotic vacuum cleaners -- but for as little as $1,000 each, they hit a critical sweet spot of low price combined with high adaptability. Unlike basic mobile robots that programmers can essentially provide with directions (the equivalent of "Go 10 feet; then take a right.") these have mounted cameras and are capable of receiving programming for more autonomous tasks, such as judging whether a moving object is approaching or retreating, then deciding how to get around it.
That means they can be used to teach a wider variety of lessons in robotics than their tabletop cousins or more expensive mobile models intended for teaching robotics. The team has made its designs open-source and public, so others can build their own for classroom use.

But the researchers face an even tougher challenge than building robots: finding ways to effectively integrate them into the student experience. So far, the researchers have used the machines in a database course and found students were receptive. Butler says they found the idea of building a database for a robot more interesting than for, say, a website.

"They're very excited about it," he says.

From an education standpoint, however, translating that interest into learning experiences can face one basic issue: programming for mobile robots, even basic ones, is a complex process. Students at the introductory level may enter what seem to be simple programs sending the robots on errands, but then find themselves overwhelmed by debugging in a hardware context.

Currently, the team has found the robots more useful in individual student projects, and the researchers are collecting data from those with the goal of further classroom integration. Those projects have also demonstrated another benefit of the robots' adaptability. They offer students at different course levels to collaborate on projects.

Butler says that for one RIT robotics project, an undergraduate is handling simple movement and direction while a master's student is tackling the more complicated issue of programming the robot to "see" and differentiate mobile from immobile obstacles and avoid them appropriately.

Another master’s student is working on an augmented reality debugging system for mobility programming that would allow users to "see" through the robot’s camera eyes, with programming defects and problems popping up along the machine’s journey. That, in turn, could result in an interface that provides undergrads a more understandable way to approach more complex debugging work.

"These students actually work together across different areas of computer science," Butler says. "That's something we haven't been able to do to this extent before."

Butler says that kind of collaboration could be critical to ensure robots become an even more familiar sight in university classrooms -- and buzzing around their hallways.

-- Rob Margetta, (703) 292-2663 rmargett@nsf.gov

Investigators
Zack Butler
Minseok Kwon
Rajendra Raj

Related Institutions/Organizations
Rochester Institute of Tech

'Artificial atom' created in graphene

Scientists have created tiny quantum dots in graphene

Vienna University of Technology

Summary:

When they are confined to a small space, the behavior of electrons can only be explained by quantum physics. Much like electrons in an atom, they are forced into discrete quantum states. These states can be used for quantum information technologies.

Share:

FULL STORY

The charged tip of a scanning tunneling microscope and an additional magnetic field lead to localized stable electron states in graphene.

Credit: Nils Freitag, RWTH Aachen
In a tiny quantum prison, electrons behave quite differently as compared to their counterparts in free space. They can only occupy discrete energy levels, much like the electrons in an atom -- for this reason, such electron prisons are often called "artificial atoms." Artificial atoms may also feature properties beyond those of conventional ones, with the potential for many applications for example in quantum computing. Such additional properties have now been shown for artificial atoms in the carbon material graphene. The results have been published in the journal *Nano Letters*, the project was a collaboration of scientists from TU Wien (Vienna, Austria), RWTH Aachen (Germany) and the University of Manchester (GB).

Building Artificial Atoms

"Artificial atoms open up new, exciting possibilities, because we can directly tune their properties," says Professor Joachim Burgdörfer (TU Wien, Vienna). In semiconductor materials such as gallium arsenide, trapping electrons in tiny confinements has already been shown to be possible. These structures are often referred to as "quantum dots." Just like in an atom, where the electrons can only circle the nucleus on certain orbits, electrons in these quantum dots are forced into discrete quantum states.

Even more interesting possibilities are opened up by using graphene, a material consisting of a single layer of carbon atoms, which has attracted a lot of attention in the last few years. "In most materials, electrons may occupy two different quantum states at a given energy. The high symmetry of the graphene lattice allows for four different quantum states. This opens up new pathways for quantum information processing and storage" explains Florian Libisch from TU Wien. However, creating well-controlled artificial atoms in graphene turned out to be extremely challenging.

Cutting edge is not enough

There are different ways of creating artificial atoms: The simplest one is putting electrons into tiny flakes, cut out of a thin layer of the material. While this works for graphene, the symmetry of the material is broken by the edges of the flake which can never be perfectly smooth. Consequently, the special four-fold multiplicity of states in graphene is reduced to the conventional two-fold one.

Therefore, different ways had to be found: It is not necessary to use small graphene flakes to capture electrons. Using clever combinations of electrical and magnetic fields is a much better option. With the tip of a scanning tunnelling microscope, an electric field can be applied locally. That way, a tiny region is created within the graphene surface, in which low energy electrons can be trapped. At the same time, the electrons are forced into tiny circular orbits by applying a magnetic field. "If we would only use an electric field, quantum effects allow the electrons to quickly leave the trap" explains Libisch.

The artificial atoms were measured at the RWTH Aachen by Nils Freitag and Peter Nemes-Incze in the group of Professor Markus Morgenstern. Simulations and theoretical models were developed at TU Wien (Vienna) by Larisa Chizhova, Florian Libisch and Joachim Burgdörfer. The exceptionally clean graphene sample came from the team around Andre Geim and Kostya Novoselov from Manchester (GB) -- these two researchers were awarded the Nobel Prize in 2010 for creating graphene sheets for the first time.

The new artificial atoms now open up new possibilities for many quantum technological experiments: "Four localized electron states with the same energy allow for switching between different quantum states to store information," says Joachim Burgdörfer. The electrons can preserve arbitrary superpositions for a long time, ideal properties for quantum computers. In addition, the new method has the big advantage of scalability: it should be possible to fit many such artificial atoms on a small chip in order to use them for quantum information applications.
Story Source:

The above post is reprinted from materials provided by Vienna University of Technology. Note: Content may be edited for style and length.

Journal Reference:


https://www.sciencedaily.com/releases/2016/08/160822100705.htm
How Technology Hijacks People’s Minds— from a Magician and Google’s Design Ethicist

Estimated reading time: 12 minutes.

I’m an expert on how technology hijacks our psychological vulnerabilities. That’s why I spent the last three years as a Design Ethicist at Google caring about how to design things in a way that defends a billion people’s minds from getting hijacked.

When using technology, we often focus optimistically on all the things it does for us. But I want to show you where it might do the opposite.

Where does technology exploit our minds’ weaknesses?

I learned to think this way when I was a magician. Magicians start by looking for blind spots, edges, vulnerabilities and limits of people’s perception, so they can influence what people do without them even realizing it. Once you know how to push people’s buttons, you can play them like a piano.

That’s me performing sleight of hand magic at my mother’s birthday party
And this is exactly what product designers do to your mind. They play your psychological vulnerabilities (consciously and unconsciously) against you in the race to grab your attention.

I want to show you how they do it.

Hijack #1: If You Control the Menu, You Control the Choices

Western Culture is built around ideals of individual choice and freedom. Millions of us fiercely defend our right to make “free” choices, while we ignore how those choices are manipulated upstream by menus we didn’t choose in the first place.

This is exactly what magicians do. They give people the illusion of free choice while architecting the menu so that they win, no matter what you choose. I can’t emphasize enough how deep this insight is.

When people are given a menu of choices, they rarely ask:
• “what’s not on the menu?”
• “why am I being given these options and not others?”
• “do I know the menu provider’s goals?”
• “is this menu empowering for my original need, or are the choices actually a distraction?” (e.g. an overwhelmingly array of toothpastes)

How empowering is this menu of choices for the need, “I ran out of toothpaste”?

For example, imagine you’re out with friends on a Tuesday night and want to keep the conversation going. You open Yelp to find nearby recommendations and see a list of bars. The group turns into a huddle of faces staring down at their phones comparing bars. They scrutinize the photos of each, comparing cocktail drinks. Is this menu still relevant to the original desire of the group?

It’s not that bars aren’t a good choice, it’s that Yelp substituted the group’s original question (“where can we go to keep talking?”) with a different question (“what’s a bar with good photos of cocktails?”) all by shaping the menu.
Moreover, the group falls for the illusion that Yelp’s menu represents a complete set of choices for where to go. While looking down at their phones, they don’t see the park across the street with a band playing live music. They miss the pop-up gallery on the other side of the street serving crepes and coffee. Neither of those show up on Yelp’s menu.

Yelp subtly reframes the group’s need “where can we go to keep talking?” in terms of photos of cocktails served.

The more choices technology gives us in nearly every domain of our lives (information, events, places to go, friends, dating, jobs)—the more we assume that our phone is always the most empowering and useful menu to pick from. Is it?

The “most empowering” menu is different than the menu that has the most choices. But when we blindly surrender to the menus we’re given, it’s easy to lose track of the difference:

- “Who’s free tonight to hang out?” becomes a menu of most recent people who texted us (who we could ping).
• “What’s happening in the world?” becomes a menu of news feed stories.

• “Who’s single to go on a date?” becomes a menu of faces to swipe on Tinder (instead of local events with friends, or urban adventures nearby).

• “I have to respond to this email.” becomes a menu of keys to type a response (instead of empowering ways to communicate with a person).

All user interfaces are menus. What if your email client gave you empowering choices of ways to respond, instead of “what message do you want to type back?” (Design by Tristan Harris)

When we wake up in the morning and turn our phone over to see a list of notifications—it frames the experience of “waking up in the morning” around a menu of “all the things I’ve missed since yesterday.” (for more examples, see Joe Edelman’s Empowering Design talk)
Instagram  17:39
seancombinator liked your photo

Instagram  14:18
Leah Dockstader (leahjdock) accepted your follow request

Any.DO  1d ago
Take a moment to plan your day

Meetup  1d ago
lahosken and 3 others commented in Presentation and conversation with Spark of...

Snapchat  11d ago
Daniel Hoffer added you as a friend!

Radiolab  6d ago
New podcast! After a tragedy, tension between the people who experienced it and the official narrative.

Tinder  25d ago
Jessica sent you a new message
A list of notifications when we wake up in the morning—how empowering is this menu of choices when we wake up? Does it reflect what we care about? (from Joe Edelman’s Empowering Design Talk)

By shaping the menus we pick from, technology hijacks the way we perceive our choices and replaces them with new ones. But the closer we pay attention to the options we’re given, the more we’ll notice when they don’t actually align with our true needs.

Hijack #2: Put a Slot Machine In a Billion Pockets

If you’re an app, how do you keep people hooked? Turn yourself into a slot machine.

The average person checks their phone 150 times a day. Why do we do this? Are we making 150 conscious choices?

How often do you check your email per day?

One major reason why is the #1 psychological ingredient in slot machines: intermittent variable rewards.
If you want to maximize addictiveness, all tech designers need to do is link a user’s action (like pulling a lever) with a variable reward. You pull a lever and immediately receive either an enticing reward (a match, a prize!) or nothing. Addictiveness is maximized when the rate of reward is most variable.

Does this effect really work on people? Yes. Slot machines make more money in the United States than baseball, movies, and theme parks combined. Relative to other kinds of gambling, people get ‘problematically involved’ with slot machines 3–4x faster according to NYU professor Natasha Dow Schull, author of Addiction by Design.

But here’s the unfortunate truth—several billion people have a slot machine their pocket:

- When we pull our phone out of our pocket, we’re playing a slot machine to see what notifications we got.
- When we pull to refresh our email, we’re playing a slot machine to see what new email we got.
- When we swipe down our finger to scroll the Instagram feed, we’re playing a slot machine to see what photo comes next.
- When we swipe faces left/right on dating apps like Tinder, we’re playing a slot machine to see if we got a match.
- When we tap the # of red notifications, we’re playing a slot machine to what’s underneath.

Apps and websites sprinkle intermittent variable rewards all over their products because it’s good for business.
But in other cases, slot machines emerge by accident. For example, there is no malicious corporation behind all of email who consciously chose to make it a slot machine. No one profits when millions check their email and nothing’s there. Neither did Apple and Google’s designers want phones to work like slot machines. It emerged by accident.

But now companies like Apple and Google have a responsibility to reduce these effects by converting intermittent variable rewards into less addictive, more predictable ones with better design. For example, they could empower people to set predictable times during the day or week for when they want to check “slot machine” apps, and correspondingly adjust when new messages are delivered to align with those times.

Hijack #3: Fear of Missing Something Important (FOMSI)

Another way apps and websites hijack people’s minds is by inducing a “1% chance you could be missing something important.”

If I convince you that I’m a channel for important information, messages, friendships, or potential sexual opportunities—it will be hard for you to turn me off, unsubscribe, or remove your account—because (aha, I win) you might miss something important:

- This keeps us subscribed to newsletters even after they haven’t delivered recent benefits (“what if I miss a future announcement?”)
- This keeps us “friended” to people with whom we haven’t spoke in ages (“what if I miss something important from them?”)
- This keeps us swiping faces on dating apps, even when we haven’t even met up with anyone in a while (“what if I miss that one hot match who likes me?”)
- This keeps us using social media (“what if I miss that important news story or fall behind what my friends are talking about?”)

But if we zoom into that fear, we’ll discover that it’s unbounded: we’ll always miss something important at any point when we stop using something.

- There are magic moments on Facebook we’ll miss by not using it for the 6th hour (e.g. an old friend who’s visiting town right now).
- There are magic moments we’ll miss on Tinder (e.g. our dream romantic partner) by not swiping our 700th match.
- There are emergency phone calls we’ll miss if we’re not connected 24/7.

But living moment to moment with the fear of missing something isn’t how we’re built to live.
And it’s amazing how quickly, once we let go of that fear, we wake up from the illusion. When we unplug for more than a day, unsubscribe from those notifications, or go to Camp Grounded—the concerns we thought we’d have don’t actually happen.

We don’t miss what we don’t see.

The thought, “what if I miss something important?” is generated in advance of unplugging, unsubscribing, or turning off—not after. Imagine if tech companies recognized that, and helped us proactively tune our relationships with friends and businesses in terms of what we define as “time well spent” for our lives, instead of in terms of what we might miss.

Hijack #4: Social Approval

Easily one of the most persuasive things a human being can receive.

We’re all vulnerable to social approval. The need to belong, to be approved or appreciated by our peers is among the highest human motivations. But now our social approval is in the hands of tech companies.

When I get tagged by my friend Marc, I imagine him making a conscious choice to tag me. But I don’t see how a company like Facebook orchestrated his doing that in the first place.

Facebook, Instagram or SnapChat can manipulate how often people get tagged in photos by automatically suggesting all the faces people should tag (e.g. by showing a box with a 1-click confirmation, “Tag Tristan in this photo?”).

So when Marc tags me, he’s actually responding to Facebook’s suggestion, not making an independent choice. But through design choices like this, Facebook controls the multiplier for how often millions of people experience their social approval on the line.
The same happens when we change our main profile photo—Facebook knows that’s a moment when we’re vulnerable to social approval: “what do my friends think of my new pic?” Facebook can rank this higher in the news feed, so it sticks around for longer and more friends will like or comment on it. Each time they like or comment on it, we’ll get pulled right back.

Everyone innately responds to social approval, but some demographics (teenagers) are more vulnerable to it than others. That’s why it’s so important to recognize how powerful designers are when they exploit this vulnerability.

Hijack #5: Social Reciprocity (Tit-for-tat)

- You do me a favor—I owe you one next time.
- You say, “thank you”—I have to say “you’re welcome.”
- You send me an email—it’s rude not to get back to you.
- You follow me—it’s rude not to follow you back. (especially for teenagers)

We are vulnerable to needing to reciprocate others’ gestures. But as with Social Approval, tech companies now manipulate how often we experience it.
In some cases, it’s by accident. Email, texting and messaging apps are social reciprocity factories. But in other cases, companies exploit this vulnerability on purpose.

LinkedIn is the most obvious offender. LinkedIn wants as many people creating social obligations for each other as possible, because each time they reciprocate (by accepting a connection, responding to a message, or endorsing someone back for a skill) they have to come back to linkedin.com where they can get people to spend more time.

Like Facebook, LinkedIn exploits an asymmetry in perception. When you receive an invitation from someone to connect, you imagine that person making a conscious choice to invite you, when in reality, they likely unconsciously responded to LinkedIn’s list of suggested contacts. In other words, LinkedIn turns your unconscious impulses (to “add” a person) into new social obligations that millions of people feel obligated to repay. All while they profit from the time people spend doing it.
Imagine millions of people getting interrupted like this throughout their day, running around like chickens with their heads cut off, reciprocating each other—all designed by companies who profit from it.

Welcome to social media.

After accepting an endorsement, LinkedIn takes advantage of your bias to reciprocate by offering *four* additional people for you to endorse in return.

Facebook uses automatic suggestions like this to get people to tag more people, creating more social externalities and interruptions.
Imagine if technology companies had a responsibility to minimize social reciprocity. Or if there was an independent organization that represented the public’s interests—an industry consortium or an FDA for tech—that monitored when technology companies abused these biases?

“LinkedIn has finally paid off—it got me two new followers on Twitter.”

Hijack #6: Bottomless bowls, Infinite Feeds, and Autoplay
YouTube autoplays the next video after a countdown

Another way to hijack people is to keep them consuming things, even when they aren’t hungry anymore.

How? Easy. Take an experience that was bounded and finite, and turn it into a bottomless flow that keeps going.

Cornell professor Brian Wansink demonstrated this in his study showing you can trick people into keep eating soup by giving them a bottomless bowl that automatically refills as they eat. With bottomless bowls, people eat 73% more calories than those with normal bowls and underestimate how many calories they ate by 140 calories.

Tech companies exploit the same principle. News feeds are purposely designed to auto-refill with reasons to keep you scrolling, and purposely eliminate any reason for you to pause, reconsider or leave.

It’s also why video and social media sites like Netflix, YouTube or Facebook autoplays the next video after a countdown instead of waiting for you to make a conscious choice (in case you won’t). A huge portion of traffic on these websites is driven by autoplaysing the next thing.
Facebook deliberately autoplays the next video after a countdown
Tech companies often claim that “we’re just making it easier for users to see the video they want to watch” when they are actually serving their business interests. And you can’t blame them, because increasing “time spent” is the currency they compete for.

Instead, imagine if technology companies empowered you to consciously bound your experience to align with what would be “time well spent” for you. Not just bounding the quantity of time you spend, but the qualities of what would be “time well spent.”

Hijack #7: Instant Interruption vs. “Respectful” Delivery

Companies know that messages that interrupt people immediately are more persuasive at getting people to respond than messages delivered asynchronously (like email or any deferred inbox).

Given the choice, Facebook Messenger (or WhatsApp, WeChat or SnapChat for that matter) would prefer to design their messaging system to interrupt recipients immediately (and show a chat box) instead of helping users respect each other’s attention.

In other words, interruption is good for business.

It’s also in their interest to heighten the feeling of urgency and social reciprocity. For example, Facebook automatically tells the sender when you “saw” their message, instead of letting you avoid disclosing whether you read it (“now that you know I’ve seen the message, I feel even more obligated to respond.”)

By contrast, Apple more respectfully lets users toggle “Read Receipts” on or off.
The problem is, maximizing interruptions in the name of business creates a tragedy of the commons, ruining global attention spans and causing billions of unnecessary interruptions each day. This is a huge problem we need to fix with shared design standards (potentially, as part of Time Well Spent).

Hijack #8: Bundling Your Reasons with Their Reasons

Another way apps hijack you is by taking your reasons for visiting the app (to perform a task) and make them inseparable from the app’s business reasons (maximizing how much we consume once we’re there).

For example, in the physical world of grocery stores, the #1 and #2 most popular reasons to visit are pharmacy refills and buying milk. But grocery stores want to maximize how much people buy, so they put the pharmacy and the milk at the back of the store.

In other words, they make the thing customers want (milk, pharmacy) inseparable from what the business wants. If stores were truly organized to support people, they would put the most popular items in the front.

Tech companies design their websites the same way. For example, when you want to look up a Facebook event happening tonight (your reason) the Facebook app doesn’t allow you to access it without first landing on the news feed (their reasons), and that’s on purpose. Facebook wants to convert every reason you have for using Facebook, into their reason which is to maximize the time you spend consuming things.

Instead, imagine if …

- Facebook gave a separate way to look up or host Facebook Events, without being forced to use their news feed.
- Facebook gave you a separate way to use Facebook Connect as a passport for creating accounts on new apps and websites, without being forced to use Facebook’s entire app, news feed and notifications.
- Email gave you a separate way to look up and reply to a specific message, without being forced to see all new unread messages.

In an ideal world, there is always a direct way to get what you want separately from what businesses want.

Imagine a digital “bill of rights” outlining design standards that forced the products used by billions of people to support empowering ways for them to navigate toward their goals.

Hijack #9: Inconvenient Choices

We’re told that it’s enough for businesses to “make choices available.”

- “If you don’t like it you can always use a different product.”
• “If you don’t like it, you can always unsubscribe.”

• “If you’re addicted to our app, you can always uninstall it from your phone.”

Businesses naturally want to make the choices they want you to make easier, and the choices they don’t want you to make harder. Magicians do the same thing. You make it easier for a spectator to pick the thing you want them to pick, and harder to pick the thing you don’t.

For example, NYTimes.com lets you “make a free choice” to cancel your digital subscription. But instead of just doing it when you hit “Cancel Subscription,” they send you an email with information on how to cancel your account by calling a phone number that’s only open at certain times.

Dear Tristan Harris,

Thank you for contacting The Times. We’re sorry you’ve requested to cancel your digital subscription. To process your request, an Account Management Specialist will need to speak with you. You may call Customer Care at 1-877-698-5635 from 7:30 a.m. to 9 p.m. Monday-Friday and 7:30 a.m. to 5 p.m. Saturday & Sunday (ET). Please reference this email when speaking with our Account Management team.

If you prefer, we can call you. Please email us at unsubscribe@nytimes.com and provide your phone number and the best time to call you (including time zone). An Account Management team member will contact you to validate and process your request.

Sincerely,

Connor Leighton
Online Customer Care
The New York Times

NYTimes claims it’s giving a free choice to cancel your account

Instead of viewing the world in terms of availability of choices, we should view the world in terms of friction required to enact choices. Imagine a world where choices were labeled with how difficult they were to fulfill (like coefficients of friction) and there was an independent entity—an industry consortium or non-profit—that labeled these difficulties and set standards for how easy navigation should be.
Hijack #10: Forecasting Errors, “Foot in the Door” strategies

Facebook promises an easy choice to “See Photo.” Would we still click if it gave the true price tag?

Lastly, apps can exploit people’s inability to forecast the consequences of a click.

People don’t intuitively forecast the true cost of a click when it’s presented to them. Sales people use “foot in the door” techniques by asking for a small innocuous request to begin with (“just one click to see which tweet got retweeted”) and escalate from there (“why don’t you stay awhile?”). Virtually all engagement websites use this trick.

Imagine if web browsers and smartphones, the gateways through which people make these choices, were truly watching out for people and helped them forecast the consequences of clicks (based on real data about what benefits and costs it actually had?).

That’s why I add “Estimated reading time” to the top of my posts. When you put the “true cost” of a choice in front of people, you’re treating your users or audience with dignity and respect. In a Time Well Spent internet, choices could be framed in terms of projected cost and benefit, so people were empowered to make informed choices by default, not by doing extra work.
TripAdvisor uses a “foot in the door” technique by asking for a single click review (“How many stars?”) while hiding the three page survey of questions behind the click.

Summary And How We Can Fix This

Are you upset that technology hijacks your agency? I am too. I’ve listed a few techniques but there are literally thousands. Imagine whole bookshelves, seminars, workshops and trainings that teach aspiring tech entrepreneurs techniques like these. Imagine hundreds of engineers whose job every day is to invent new ways to keep you hooked.

The ultimate freedom is a free mind, and we need technology that’s on our team to help us live, feel, think and act freely.

We need our smartphones, notifications screens and web browsers to be exoskeletons for our minds and interpersonal relationships that put our values, not our impulses, first. People’s time is valuable. And we should protect it with the same rigor as privacy and other digital rights.

Tristan Harris was a Product Philosopher at Google until 2016 where he studied how technology affects a billion people’s attention, wellbeing and behavior. For more resources on Time Well Spent, see http://timewellspent.io.

UPDATE: The first version of this post lacked acknowledgements to those who inspired my thinking over many years including Joe Edelman, Aza Raskin, Raph D’Amico, Jonathan Harris and Damon Horowitz.

My thinking on menus and choicemaking are deeply rooted in Joe Edelman’s work on Human Values and Choicemaking.

https://medium.com/swlh/how-technology-hijacks-peoples-minds-from-a-magician-and-google-s-design-ethicist-56d62ef5edf3#y4t1354r5
Modifying a living genome with genetic equivalent of 'search and replace'

American Association for the Advancement of Science

Summary:

Researchers have made further progress on the path to fully rewriting the genome of living bacteria. Such a recoded organism, once available, could feature functionality not seen in nature. It could also make the bacteria cultivated in pharmaceutical and other industries immune to viruses, saving billions of dollars of losses due to viral contamination.

Share:

FULL STORY

Escherichia coli is shown.

Credit: Chris Bickel / Science (2016)

Researchers including George Church have made further progress on the path to fully rewriting the genome of living bacteria. Such a recoded organism, once available, could feature functionality not seen in nature. It could also make the bacteria cultivated in pharmaceutical and other industries immune to viruses, saving billions of dollars of losses due to viral contamination.
Finally, the altered genetic information in such an organism wouldn't be able to contaminate natural cells because of the code's limitations outside the lab, researchers say, so its creation could stop laboratory engineered organisms from genetically contaminating wildlife. In the DNA of living organisms, the same amino acid can be encoded by multiple codons -- DNA "words" of three nucleotide letters.

Here, building on previous work that demonstrated it was possible to use the genetic equivalent of "search and replace" in Escherichia coli to substitute a single codon with an alternative, Nili Ostrov, Church and colleagues explored the feasibility of replacing multiple codons, genome-wide.

The researchers attempted to reduce the number of codons in the E. colicode from 64 to 57 by exploring how to eradicate more than 60,000 instances of seven different codons. They systematically replaced all 62,214 instances of these seven codons with alternatives. In the recoded E.coli segments that the researchers assembled and tested, 63% of all instances of the seven codons were replaced, the researchers say, and most of the genes impacted by underlying amino acid changes were expressed normally.

Though they did not achieve a fully operational 57-codon E. coli, "a functionally altered genome of this scale has not yet been explored," the authors write. Their results provide critical insights into the next step in the genome rewriting arena -- creating a fully recoded organism.

Story Source:

The above post is reprinted from materials provided by American Association for the Advancement of Science. Note: Content may be edited for style and length.

Journal Reference:


https://www.sciencedaily.com/releases/2016/08/160818145954.htm
What Should the 'Sharing Economy' Really Be Called?

Many people aren’t familiar with the term that encompasses businesses like Uber and Airbnb, while others argue that the phrase may be deceptive.

- ADAM CHANDLER
- @allmychandler

Among the surprises in last week’s Pew Research Center survey on the new digital economy was the revelation that the phrase “the sharing economy”—the collective and most broadly accepted term for some of the on-demand apps and platforms that have seemingly seized the world of commerce—is overwhelmingly unknown to most Americans. In other words, while Airbnb may have Super Bowl commercials and Uber may have graduated to being used as a verb, 73 percent of Americans are unfamiliar with the banner under which they operate.

RELATED STORY
This ‘Airbnb for the Elderly’ Could Curb Loneliness in Cities

The Freebird Club hopes to form new networks among isolated older residents.

More curiously, those who had heard of “the sharing economy” (or at least claimed to have) frequently defined it as an altruistic endeavor. “The most common description of the sharing economy emphasizes the ‘sharing’ component of the phrase while ignoring the ‘economy’ aspect,” Pew analysts wrote, noting that 40 percent of Americans polled expressed this view.

So how has a ballyhooed economic trend managed to elude mainstream detection? One possibility is that the trend might not be nearly as big as headlines make it out to be, but it could also be a problem with the trend’s name itself. “It may be a consequence of the fact that the label is being used to describe a pretty broad range of things that don’t necessarily all look like each other,” said Arun Sundararajan, a professor at New York University and the author of the forthcoming book The Sharing Economy. Airbnb, for example, is an online apartment-rental platform, Uber is an on-demand car service, and TaskRabbit is an online labor marketplace. “The sharing economy” often also includes peer-to-peer lending platforms and crowdfunding sites with varying profit models.

Conceding that the term “sharing economy” has stuck best (hence his book title), Sundararajan also points to the relative newness of these platforms. “My guess is that the fraction of people who are familiar with these services that we put under the label of the ‘sharing economy’ is probably greater than the fraction of people who have heard the term ‘sharing economy.’ In a sense there’s still an education going on,” he says. He points
to the early days of Facebook and Twitter and LinkedIn, prior to when they were lumped into the catch-all of “social media”—a term that has its own shortcomings, given the varying degrees of social distance between users across these platforms.

Not everyone feels the term “sharing economy” fails. “It is a kind of awkward label, but it does get the idea across: building a new or sub-economy around sharing under-utilized assets,” Michael Cusumano, a professor at MIT’s Sloan School of Management, wrote in an email. “The sum of many of such ‘platforms’ is what creates the sub-economy.”

But the question of what these business models should be called is not some philosophical thought exercise. For some, the idea that the industry is motivated by compassion or goodwill is objectionable; Uber has inspired transcontinental protests and even been likened to ISIS, while Airbnb has been targeted by legislators in dozens of states. “Obviously ‘the sharing economy’ is a misnomer, which the industry no doubt likes a lot,” said Dean Baker, an economist and the co-director of the Center for Economic and Policy Research. “It’s got nothing to do with sharing. They’re profit-making companies.”

Baker argues that many of the new businesses use a halo of positive branding to avoid the discussion of what regulatory structures need to be modernized to deal with these platforms. One example is the ongoing debate over whether a driver for Uber or Lyft should qualify as an employee of the company with a right to protections and benefits or should simply be considered an independent contractor.

As these businesses remain in their early stages, it’s important to consider how the label affixed to them affects their public perception. So, if the term “the sharing economy” is inaccurate at best and pernicious at worst, what would be a better name? In his book, Sundararajan suggests “crowd-based capitalism.”

“To me, what these sharing economy platforms represent is early examples of a different way of organizing economic activity, which sits somewhere between the 20th-century organization and even the 18th-century one-person shop selling to an individual market,” he said. “It’s not a pure sort of marketplace... It’s not a traditional organization like a hotel or a train company, but it’s somewhere in between.”

The think tank JPMorgan Chase Institute has settled on a different term. Its researchers have been referring to these businesses as being part of “the platform economy”—a term that is useful because it allows for neat distinctions between “labor platforms” (like Uber) and “capital platforms” (like Airbnb).


In the short run, it matters which term journalists, economists, and academics settle on, because it clearly can shape consumers’ perceptions of these businesses as they take shape. “But after a point they become labels for something that is well understood,” Sundararajan says, “They become part of the cultural dialogue.” For better or worse.

This post originally appeared on The Atlantic.

http://www.citylab.com/tech/2016/05/what-should-the-sharing-economy-really-be-called/484679/?utm_source=nl__link2_052716
Researchers discover oldest evidence of 'farming' -- by insects

Oldest fossil evidence of agriculture, but not by humans

A 25 million-year-old termite nest with the remains of a "fungus garden" preserved inside. 
Credit and Larger Version

June 22, 2016

Scientists have discovered the oldest fossil evidence of agriculture -- not by humans, but by insects.

The team, led by Eric Roberts of James Cook University along with researchers from Ohio University, discovered the oldest known examples of "fungus gardens" in 25 million-year-old fossil termite nests in East Africa.

The results are published today in the journal PLOS ONE.

Some termite species cultivate fungi in "gardens" in subterranean nests or chambers, helping to convert plant material into a more easily digestible termite food source.

Scientists had previously used DNA from modern termites to estimate that termite fungus farming began 25 to 30 million years ago. The fossil evidence from Tanzania confirmed that date, allowing researchers to more
accurately characterize the timing and evolution of the symbiotic relationship between termites and fungi. The relationship likely significantly modified the environment, scientists say.

"The origin of this behavior likely had a profound effect on how nutrients were concentrated across the landscape, influencing the evolution of Africa's biota," said study co-author Nancy Stevens of Ohio University.

"Since some 90 percent of the wood in the dry environment studied is digested by termites, understanding the development of this symbiotic relationship is important to our knowledge of the history of carbon cycling in this region," said Paul Filmer, program director in the National Science Foundation (NSF) Directorate for Geosciences, which funded the research.

The transition to fungus agriculture increased the range of possible habitats for both the fungus-growing termites and their domesticated fungi. It's a process similar to what happened tens of millions of years later with humans and domesticated crops and livestock, said study co-author Duur Aanen of Wageningen University in the Netherlands.
"This study emphasizes the need for integrating perspectives from the fossil record with modern approaches in comparative biology -- it's a holistic approach to evolutionary biology and increases our understanding of environmental change in 'deep time,'" said scientist Patrick O'Connor of Ohio University, also a study co-author.

Map of the Great Rift Valley in East Africa with the Rukwa Rift study area highlighted.

Credit: Eric Roberts, James Cook University

The African rain forest may have served as the cradle of termite agriculture. The transition to fungiculture helped termites disperse to less hospitable dry savannas, and eventually to migrate out of Africa and into Asia.

"The phenomenon might have been triggered by the development of the Great Rift Valley and the transformation of the landscape around that time," Roberts said.

The study is part of an ongoing research project on the evolution of the Rukwa Rift Basin in Tanzania.

The research was also funded by James Cook University, Ohio University, the National Geographic Society, the Portuguese Foundation for Science and Fellowship, and a Marie Curie Fellowship.
A view of the Great Rift Valley, Rukwa Rift, in southwestern Tanzania.
Credit: Eric Roberts, James Cook University

The researchers' field camp in the Rukwa Rift Basin in southwestern Tanzania.
Credit: Patrick O'Connor, Ohio University

-NSF-

Scientists Found a Molecule in Space That Could Help Us Figure Out the Origins of Life

By Kelly Dickerson June 15, 2016

LIKE MIC ON FACEBOOK:

Scientists just found something in space that could explain how the molecules that gave rise to life on Earth first formed.

What they spotted is called a chiral molecule, and it's the first one ever found in space.

Chiral molecules are molecules that come in two different flavors that are chemically the same but structurally are mirror images of each other. Scientists refer to these molecules as being left-handed or right-handed.

Chiral molecules are mirror images of each other. Source: Science Magazine/YouTube

Often we find the chiral molecules on Earth have evolved to be mostly right-handed or left-handed. This is called homochirality, according to Science Magazine. For example, all the amino acids in living organisms on Earth are left-handed. Some scientists think this may have happened because left-handed amino acids were the first to incorporate themselves into the first life forms. So right-handed molecules became essentially useless. But the bottom line is we don't know how homochirality came to be on Earth.

Why it matters that we found a chiral molecule in space: Astronomers found a molecule called propylene oxide inside a distant gas cloud 28,000 light-years away. On Earth, propylene oxide is an ingredient in a type of plastic.

We can't tell yet whether the propylene oxide in the cloud is left-handed or right-handed, but with future studies, we might be able to tell if there are more right-handed than left-handed molecules in the cloud. That could help scientists figure out why homochirality exists on Earth. We'll be able to determine whether molecules get skewed in one direction while they're first forming in space, or later on when life starts to arise.

Paleontologists discover major T. rex fossil

Source:
University of Washington

Summary:
Paleontologists have discovered a Tyrannosaurus rex, including a very complete skull. The find, which paleontologists estimate to be about 20 percent of the animal, includes vertebrae, ribs, hips and lower jaw bones.

Share:
FULL STORY

Paleontologists prepare to remove a Tyrannosaurus rex skull from a fossil dig site in northern Montana and transport it to the Burke Museum at the University of Washington.

Credit: Dave DeMar/Burke Museum/University of Washington

Paleontologists with the Burke Museum of Natural History and Culture and the University of Washington have discovered a Tyrannosaurus rex, including a very complete skull. The find, which paleontologists estimate to be about 20 percent of the animal, includes vertebrae, ribs, hips and lower jaw bones.
The team, led by Burke Museum Adjunct Curator of Vertebrate Paleontology and UW biology professor Gregory P. Wilson, discovered the T. rex during an expedition to the Hell Creek Formation in northern Montana -- an area that is world-famous for its fossil dinosaur sites. Two Burke Museum paleontology volunteers, Jason Love and Luke Tufts, initially discovered pieces of fossilized bone protruding from a rocky hillside. The bones' large size and honeycomb-like structure indicated they belonged to a carnivorous dinosaur. Upon further excavation, the team discovered the T. rex skull along with ribs, vertebrae, and parts of the jaw and pelvis.

T. rex was one of the largest meat-eating dinosaurs to ever roam Earth. Measuring an average of 40-feet long and 15 to 20-feet tall, T. rex was a fierce predator with serrated teeth and large jaws. Fossil evidence shows it ate other dinosaurs like Edmontosaurus and Triceratops, with crushed bones from the animals even showing up in its fossilized poop. T. rex lived about 66-68 million years ago in forested river valleys in western North America during the late Cretaceous Period.

The T. rex found by the Burke/UW team is nicknamed the "Tufts-Love Rex" in honor of the two volunteers who discovered it. The skull is about 4 feet long weighs about 2,500 pounds in its protective plaster jacket. Excavation in the field revealed the right side of the skull from base to snout, including teeth. Burke paleontologists believe it is very probable the other side of the skull is present, but will need to carefully remove the rock surrounding the fossil before they can determine its completeness.

"We think the Tufts-Love Rex is going to be an iconic specimen for the Burke Museum and the state of Washington and will be a must-see for dinosaur researchers as well," said Wilson.

Based on the size of its skull, Burke paleontologists estimate this dinosaur is about 85 percent the size of the largest T. rex found to date. At the hips, the T. rex would have been nearly as tall as a city bus, and as long as a bus from tail to head.

The Tufts-Love Rex is 66.3 million years old. T. rex lived at the end of the Cretaceous Period, 145-66 million years ago, and became extinct during the Cretaceous-Paleogene mass extinction 66 million years ago. Burke paleontologists could determine that the Tufts-Love Rex lived at the very end of the Cretaceous because it was found at the bottom of a hill; a rock layer at the top of that hill marks the Cretaceous-Paleogene mass extinction. Based on the size of the skull -- a good indicator of T. rex age -- the team estimates the dinosaur was about 15 years old when it died. Adult T. rex lived up to 25-30 years.

Although arguably the most iconic and well-known dinosaur, T. rex fossils are rare. This remarkable find is one of only about 25 of this level of completeness. The skull is the 15th reasonably complete T. rex skull known to exist in the world. Next summer, Burke paleontologists will search for additional parts of the dinosaur at the site.

More than 45 people helped excavate the T. rex over the course of a month this summer. The team was collecting fossils in the area for the Hell Creek Project, a multi-disciplinary project examining vertebrates, invertebrates, plants and geology of the area to learn more about the final 2 million years of the dinosaur era, the mass-extinction event that killed off the dinosaurs, and the first 1.5 million years post-extinction that gave rise to the age of mammals. The project, currently led by Wilson, was founded by Jack Horner and Nathan Myhrvold. Burke paleontologists, volunteers, undergraduate and graduate students from the UW and other universities and K-12 educators participating in the Burke's DIG Field School contribute to the project.

"This is really great news. The Hell Creek Project is responsible for finding the most T. rex specimens in the world, with 11 to date," said Myhrvold, Intellectual Ventures CEO and Paleontologist. "The T. rex has always
been my favorite dinosaur and I'm really pleased that this one is going to make its home at the Burke Museum."

"Having seen the 'Tufts-Love Rex' during its excavation I can attest to the fact that it is definitely one of the most significant specimens yet found, and because of its size, is sure to yield important information about the growth and possible eating habits of these magnificent animals," said Horner, former curator of paleontology at the Museum of the Rockies and current Burke Museum research associate.

The T. rex skull and other bones are currently covered in a plaster jacket -- similar to a cast used to cover a broken bone -- in order to protect the skull during transport. The public can see the plaster-covered T. rex skull, along with other T. rex fossils and paleontology field tools, in a lobby display at the Burke Museum from August 20 to October 2. Special T. rex-themed activities will take place over Labor Day Weekend and on Sunday, September 25.

After removing the fossil from display, the Burke's paleontology team will begin preparing the fossil by removing the rock surrounding the bone, which may take a year or more. The museum plans to display the T. rex skull in the New Burke Museum when it opens in 2019.

---

Story Source:

The above post is reprinted from materials provided by University of Washington. The original item was written by Andrea Godinez. Note: Content may be edited for style and length.

https://www.sciencedaily.com/releases/2016/08/160818165931.htm
Elizabeth Alexander on Writing, the Ethic of Love, Language as a Vehicle for the Self, and the Inherent Poetry of Personhood

“You have to tell your own story simultaneously as you hear and respond to the stories of others.”

BY MARIA POPOVA

“You’ve got to tell the world how to treat you,” James Baldwin observed in his terrific forgotten conversation with Margaret Mead. “If the world tells you how you are going to be treated, you are in trouble.” A generation later, the great poet (both in the literal and in the Baldwian sense), essayist, playwright, memoirist, and beloved professor Elizabeth Alexander explores the trying, triumphant art of that telling in Power and Possibility: Essays, Reviews, and Interviews (public library) — a slim, towering treasure of a book.

Weaving together history, literature, politics, and personal experience, Alexander — who became the fourth poet in history to read at a U.S. presidential inauguration when she welcomed Barack Obama to the presidency with her poem “Praise Song for the Day” — examines the rewards and challenges of being a black
woman, a poet, an academic figure of authority and, above all, of inhabiting a culture in which the Venn diagram of these psychographic particulars is still lamentably improbable.

Radiating from these essays and interviews is incisive and generous insight into writing, the creative process, and the complexity of the self.

Echoing Audre Lorde’s abiding wisdom on the responsibility, to ourselves and others, of breaking our silences and Adrienne Rich’s insistence that an education is something you claim rather than something you get, Alexander considers the reactions and resistances she frequently encounters in those “feeling displaced in a room where the first-person voices of black women are primary”:

I want to inject them with a serum that makes them believe what I now: that speaking is crucial, that you have to tell your own story simultaneously as you hear and respond to the stories of others, that education is not something you passively consume.
And yet the necessity of speaking and the authority of visibility come with a personal cost, which Alexander articulates with a vulnerable self-awareness tremendously inspiring amid our culture of invulnerable facades:

I have been in public discussions where my own paralysis had made me quiet or less articulate than I can be and kept me, perhaps, from being the role model a young woman needed at that moment. I now choose my battles and deal with the same beleagueredness that perhaps my teachers those years ago felt. I have learned that you can’t always be who others need you to be at any moment.

Alexander revisits this question in another interview:

I try to remember that you can get really distracted by the demands people make on you. Demands that are real are one thing, demands that come from a real community in need, or a real person in need. We’re asked all the time to be of service. But demands that are about posturing — you may have to deal with them, but I’m trying to figure out a way not to let them worm their way in too much.

Asserting that this obligation to the truth of one’s story must be “lived in our day-to-day lives, in the way we conduct the business of our lives, in the way we spend our money and raise our children and make a multitude of decisions every day,” Alexander considers the role of writing in inhabiting one’s visibility:

Great writing can make you face the truth around you and within yourself.

In another interview from the collection, Alexander turns to the transmutation of personal truth into writing:

A lot of my poetry comes from “personal” or autobiographical material. What is the transformation that has to happen in order for those details and that realm of personal to work within a poem? I can’t really say that I could anatomize it, but I know that there’s a transformation that has to take place.

Citing Sterling Brown’s pronouncement that “every I is a dramatic I” — a quote she wove into her beautiful poem “Ars Poetica #100: I Believe” — Alexander adds:

Regardless of whether or not you’re working in an autobiographical or personal mode, if there is a persona in the poem, you have certain charges to make it work dramatically in the poem itself. So, fulfilling those demands in the poem as such puts a nice set of parameters around the question of working within the infinite personal, because it’s quite infinite… The day-to-day me “I” [is] one level removed, or alchemized.

Echoing Kierkegaard’s assertion that “the more a person limits himself, the more resourceful he becomes,” Alexander cautions:

For any poem to succeed, whatever its rules, there are strict rules, or else the whole thing falls apart.

She recounts what the inimitable Derek Walcott, her only poetry teacher, taught her about writing and about the loaded interplay between personal identity and creative integrity:

He would always say never try to charm in your poems, never try to charm with your identity, it’s not enough that you’re a cute, black girl.

That was very useful advice, though I was already averse to exploiting “identity.” I think the point is, he’s saying, none of us as persona is ever enough. Whatever your identity, your set of particulars, there is going to
be someone out there who thinks it’s fascinating unto itself. But that unto itself doesn’t make for a fine poem you could stand with. So he was also saying, don’t be swayed and don’t let praise go to your head. And don’t let it get into your writing, and don’t let it get into your quest.

But Alexander notes that there is a universe of difference between not being swayed by praise and being wholly impermeable, severing one’s connection to the world — a connection carried out through the authenticity of the word:

We live in the word. And the word is precious, and the word must be precise, and the word is one of the ways we have to reach across to each other, and … it has to be tended with that degree of respect… I believe that life itself is profoundly poetic, in all sorts of … guises and unexpected places.

Being open to those poetic surprises, Alexander argues, also requires a certain openness to the audience and to the range of possible receptions:

To be presumptuous about any kind of audience is not a good thing. I’ve had too many wonderful surprises… I’ve had many surprises with people who read poetry who I wouldn’t have imagined read poetry, that it has a place in their lives. You just really never know. You just can’t let that imagining get into the creative process because it would twist it and distort it and shut it down… Some people talk about the ideal reader, and I don’t really have an ideal reader… I just trust that when it goes out there, it will be found by whoever can make use of it… The beautiful thing about poetry is that you never now who will find it, and you never know what will be found in it.

In another interview from the same volume, she considers the origin of the creative impulse. In a sentiment that calls to mind Hannah Arendt’s notion that unanswered questions are the wellspring of our spiritual and intellectual vitality, Alexander offers:

Spiritual and ethical situations and conundrums are occasions for poems — though I am rarely aware of the conundrum as such when I embark upon the poem — and the writing of the poem is a way of working through those conundrums and accepting their frequent open-endedness. Besides making and raising children, the mystery of making art is the most spiritual zone of my life.

Among those conundrums is the way we relate to one another, or what Adrienne Rich called the alchemy of possibility between us. Alexander observes:

No matter how devoted we are to the culture and to each other, we have a lot to overcome, imagining ourselves, or imagining each other. And in receiving each other.

Language, Alexander argues, is the locus of reception — the medium in which we imagine ourselves and each other — something she captures beautifully in the piercing final line of a poem: “...and are we not of interest to each other?” She revisits the complexity of personal identity and considers how the self lives in language:

It’s all well and good to have an idea, to say, I want to write about such-and-such and such-and-such. But I think the idea has to be rooted in language. It has to live in language.

[...]

That’s what catches the imagination of somebody else, a listener or a reader. Even the way that we express ourselves as non-poet “civilians,” if you will, is what makes us interesting to other people… Who is the self in
language? And what is the revelatory and unguarded and surprising self in language? That’s what makes somebody else pay attention. When you start turning that into art, that’s what making poems is about.

But this unguarded self in language, she argues, isn’t about “superseding the social identity, but it is about protecting the full dimension of the self.” And yet social identity and the poetics of personhood can never be fully disentwined from one another, nor unmoored from the wider cultural context. Alexander writes:

Being an empowered and intelligent black person and even more so being an empowered and intelligent and self-respecting black woman is profoundly destabilizing to most status quo. You’ve got to remember that in a way that’s not disabling.

Turning to some of her creative and cultural heroes — Audre Lorde, Lucille Clifton, Melvin Dixon — she echoes Bertrand Russell’s assertion that construction is both more difficult and more satisfying than destruction, and adds:

Those [are] examples of brilliant, courageous, beautiful, engaged lives full of rampant loving, loving of the world. Loving of the work. Loving of each other. Moving toward what we love and not just toward the destruction of enemies… And that’s what I feel like it’s important to do upon rising each day.

Half a century after Dr. King’s beautiful case for an ethic of love inspired by the Greek notion of agape, Alexander reflects:

When I was younger I used to think that love as an ethic was … obviously a good thing, but a little corny. I am certainly an optimist but not a fool. In academic environments, we are taught a skepticism that can lead us to discount the power and force of love. But the older I get, the more I think of all the possible permutations and possibilities of a love ethic. To love someone or something is not just to agree with them or affirm them. To bother to engage with problematic culture, and problematic people within that culture, is an act of love. So what does it mean in a complex and dead-serious way to come from that place of love?

When asked about the mental habits and practicalities of her creative process in writing poetry, Alexander offers:

I try to grab things when I can, to keep notes of things as I internally hear them so that when I do have writing time I have something to begin with.

[…]

Paper first, then the screen, for I feel bollixed up if I don’t attend to my internal soundtrack, so there is a personal satisfaction that comes from attending to it in writing. Also, at this point, twenty years into my life as a poet, I feel clearer about having something to say and people who benefit from hearing it.

A generation after Susan Sontag urged aspiring writers to “love words, agonize over sentences, and pay attention to the world,” Alexander offers her advice to the young:

I always tell student poets to read and listen as much and as variously as they can to build up a rolodex of possibilities in their minds when they sit down to write a poem. You always need to have many more possibilities of approaching a poem than you end up using… It’s about tuning your internal ear and listening to what the poem at hand is trying to do and be.
This internal process, Alexander enjoins, should be the primary focus of creative work:

Submit to it, tend it, nurture it, honor it. Too many young writers get distracted by thinking about career before process; without process, there is no real work and thus, no career. Every day is another blank page to be filled from your own particular landscape. Process it all.

*Power and Possibility* is an illuminating read in its totality and a fine addition to this evolving collection of writers’ advice on the craft. Complement it with Alexander’s stirring memoir of love and loss, one of the best books of 2015, then revisit her wonderful *On Beingconversation* with Krista Tippett:

https://www.brainpickings.org/2016/05/24/elizabeth-alexander-power-and-possibility-writing/?mc_cid=5e19106c81&mc_eid=d1c16ac662
Federal Help for Poor Families With Children Is Evaporating

The deepening affordability crisis is hitting the most vulnerable the hardest: very poor families with children.

- KRISTON CAPPSS
- @kristoncapps

The plight of families is deepening with the affordability crisis. For the most vulnerable families in the U.S., however, help is getting even harder to find. The past decade has seen federal support for very low-income families with children slide, even as their ranks have skyrocketed.

A new report from the Center on Budget and Policy Priorities finds that housing aid for families with children is at its lowest point in a decade. Even as the number of families with children with worst-case housing needs—meaning families living in substandard housing conditions or paying more than half their household income toward rent—grew sharply over the Great Recession, the federal rental assistance these families received stayed flat.

And while the number of families with children facing worst-case housing needs has fallen slightly, to a total of about 3 million very low-income families in 2013, the federal rental assistance they receive has fallen, too. All in all, what little gains households are making in the U.S. in terms of federal rental aid are going to
homeless veterans, people with disabilities, and the elderly. Families with children are meanwhile falling behind.

From 2004 to 2015, the share of federal housing assistance going to families with children declined. While 58 percent of households receiving aid were families with children in 2004, this share had fallen to 46 percent by 2015. According to the report, this shift primarily reflects changes in the way that Housing Choice Vouchers are distributed.

Over roughly the same span, overall spending on housing assistance has evaporated. The federal government spent $2.9 billion less in 2015 than in 2004, meaning 350,000 fewer vouchers for families. Between 2003 and 2013, the number of very low-income families with children grew by 53 percent.
Those families are falling through the cracks. Data from the U.S. Department of Education show that nearly 1.4 million school-aged children are homeless. The plight of very low-income families with children is extreme. From the Center on Budget and Policy Priorities report:

For the 20 percent of renters with annual incomes below $15,000, rents must be under $400/month to be affordable. Yet between 2003 and 2013, the number of such low-cost units rose by just 10 percent, while the number of such households rose by 40 percent. In addition, the net gain in moderately priced units, with rents of $400-$799/month, was less than half the growth in renter households that could afford these units. This indicates that while building more housing would take some pressure off rents in most markets, private market units generally will remain too costly for families with low incomes.

The private market is completely incapable of providing for very low-income families with children. A report for the Joint Center for Housing Studies at Harvard University on the implosion of homeownership and explosion in the rental market finds that filtering was responsible for most of the growth in the supply of truly affordable rental housing over the last decade. (Filtering describes the process by which the rents fall for higher-cost units, yielding lower-cost units). Between 2003 and 2013, the number of units renting for less than $400 grew by 11 percent as a result of filtering. Other factors adding to the supply of affordable units include new construction (5 percent) and conversions (about 2 percent).

Yet nearly as many truly affordable units added over the past decade were permanently lost (-11 percent). The supply of truly affordable units ($400 or less) added between 2003 and 2013, then, was just 10 percent—even as need has skyrocketed.

The market will not take care of these families and their children. Neither will the federal government. Even President Barack Obama’s proposed budget for fiscal year 2017, which would dedicate $11 billion over 10 years toward 160,000 housing vouchers, would not approach 2004 levels for rental housing assistance. And that budget has a snowball’s chance of passing. The most vulnerable families in America are simply on their own.

http://www.citylab.com/housing/2016/05/rental-housing-assistance-for-very-low-income-families-with-children-is-evaporating/484430/?utm_source=nl__link3_052716
Enabling the future of making

Five new interdisciplinary, early-concept grants investigate new approaches in learning and innovation

A mobile maker center will investigate the developmental origins of making in children’s play.

Credit and Larger Version

June 22, 2016

During the 2016 Week of Making, the National Science Foundation (NSF) has awarded five, new, early-concept grants to enable the future of do-it-yourself technological innovation known as making, and to catalyze new approaches in STEM learning.

NSF’s strategic research investments have already enabled many of the innovations underlying 3-D printing, computer-aided design, geometric modeling and computer-integrated systems. NSF has funded the systematic discovery of new knowledge about learning through making in diverse formal and informal settings including fab lab classrooms, television and interactive web media, undergraduate engineering, and at the first-ever World Maker Faire.

The five, new, early-concept awards, each for $300,000 over two years, are intended to take radically different approaches, apply new expertise, or engage novel disciplinary or interdisciplinary perspectives to the future of making.

The origins of making: A data science approach to investigating cognitive and affective basis of learning through constructing

Researchers at Rutgers University Newark will investigate the developmental origins of making in children’s play through the development of a Mobile Maker Center that can be brought to local science museums, parks, play centers, zoos or libraries to study children’s interactions with specially designed physical objects and computer-designed simulations.
The project combines the expertise of researchers in cognitive development, emotional development, and data science and advances the theoretical understanding of STEM learning in informal settings while creating a rich repository of shared data for the broader developmental science community.

Image from wearable still image camera shows a youth's perspective: what she sees and encounters during testing of code that makes an LED light up when changes are detected by a light sensor.

Credit: Victor Lee, Utah State University

“An idea at the heart of cognitive development is that children ‘construct’ knowledge by active exploration,” said Elizabeth Bonawitz, assistant faculty in the psychology department at Rutgers University Newark and a principal investigator on the new grant. “A core tenet of the maker movement is that experiences involving active exploration of ideas through concrete experiences of construction elicit enjoyment and foster lasting learning. We suggest not only that children’s play behavior is like making, but that making is possible because of childhood.”

Tracking youth interest and engagement in makerspace learning activities using wearable technology

This project seeks to explore, in a naturalistic way, what aspects of making are more or less engaging for youth with a variety of interests. By understanding the different forms of interest that develop from making, the researchers intend to better-position youth from a broad range of backgrounds and design maker programs that can sustain long-term youth engagement. The project enables students to create wearable technologies to gather and inspect data about familiar activities and experiences and consider them in new ways.
A proof-of-concept model for a bioMAKERlab shows a low-cost and portable wetlab, which is designed to conduct starter activities for synthetic biology in high school classes and workshops. Research for a more advanced version of the machine is at biorealize.com.

Credit: Orkan Telhan, University of Pennsylvania Photographer: Peter Murray

“Making offers a great deal of potential for empowering kids and enabling just-in-time learning in STEM,” said Victor Lee, associate professor of Instructional Technology and Learning Sciences at Utah State University. “If we can make sure learning experiences that involve making are made truly accessible to youth of all backgrounds and that maker learning activities are thoughtfully designed and informed by good educational research, we will be really well-positioned as a nation to positively impact an entire generation of learners.”

Making opportunities for Baltimore inner city youth in a 3-D print shop

Many youth learn about making in after-school programs. Unfortunately, not all youth are able to participate in these programs due to financial pressures and may instead take jobs in non-technical fields, limiting their exposure and expertise in maker activities.

Amy Hurst of the University of Maryland, Baltimore County and Shawn Grimes from the Digital Harbor Foundation are creating a living laboratory "print shop" in Baltimore to study the impact of maker employment on inner city youth. Research will focus on how students’ experiences in the print shop maintain their engagement with STEM. Hurst and Grimes hope the research will generate a new model to keep underserved youth on pathways toward STEM careers.
“Making reinforces creativity, problem solving and ownership of one's own learning,” Hurst said. “All of these skills are not only valuable in the existing job opportunities -- they provide the agility for employees to adapt and respond to new career paths that don't even exist currently.” added Grimes.

An ethnography of maker and hacker spaces achieving diverse participation

This project will examine how diverse maker spaces welcome groups traditionally underrepresented in STEM, and how these practices can inform the design and operation of campus and community maker or hacker spaces that presently struggle to achieve diversity.

“We have observed that diverse maker spaces have been built from the ground up, with full participation of diverse groups in their conception and development and in their day-to-day operation and leadership,” said Donna Riley of Virginia Tech, who is a co-principal investigator on the award with Lisa McNair. “Our study will give a rich description of the practices and artifacts employed to establish and maintain environments that are diverse, inclusive, and liberatory.”

The researchers plan to work with leaders of diverse maker spaces to glean emergent best practices and propagate these in the design or transformation of existing and new maker spaces on campuses and in communities.

bioMAKERlab: A wetlab and starter activities for promoting synthetic biology in high school classes and workshops

In a bioMAKERlab at the University of Pennsylvania, researchers Yasmin Kafai and Orkan Telhan will encourage high school students to broaden their understanding of synthetic biology.

“With bioMAKERlab, high school students and teachers will be able to learn and discuss not only critical ideas about synthetic biology but also test what it means to design and build your own organisms using DNA,” Telhan said. “This will give students the critical and creative understanding of technology and the sciences needed for jobs in the future.”

The design of bioMAKERlab will generate an educational version of an existing professional-grade lab for synthetic biology to promote safe production, accessibility and affordability for high schools and community colleges interested in integrating such wetlab activities into their curriculum.

This project will first develop and implement bioMAKERlab, an innovative wetlab starter kit and activities that will enable high school students and teachers to engage in synthetic biology by building genetic circuits that enable microorganisms to change color, smell and shape. In synthetic biology, participants make their own DNA -- gene by gene -- and then grow their designs into real applications by inserting them into microorganisms to develop different traits and characteristics determined by the genes. The project will then involve students from a Philadelphia public high school and young people participating in weekend workshops at The Franklin Institute, a Philadelphia-based science museum.

These projects are a part of NSF's Maker Dear Colleague Letter portfolio (NSF 15-086), a collaborative investment of Directorates for Computer & Information Science & Engineering, Education and Human Resources, and Engineering.

Monkeys protect against lethal Ebola Sudan infection four days after infection

Source:
University of Texas Medical Branch at Galveston

Summary:
Researchers have protected nonhuman primates against Ebola Sudan four days following exposure to the virus.

Share:

FULL STORY

Author Thomas Geisbert.

Credit: The University of Texas Medical Branch at Galveston

Researchers at The University of Texas Medical Branch at Galveston, in collaboration with Arbutus Biopharma Corporation, have protected nonhuman primates against Ebola Sudan four days following exposure to the virus.
The study results, which were recently published in Nature Microbiology, demonstrated that the treatment was effective at a point when animals have detectable levels of the virus in their system and were at an advanced stage of disease.

"This is a key step in our efforts to protect people from this terrible, lethal disease," said Thomas Geisbert, UTMB professor of microbiology and immunology. "The Ebola virus has five different species and will continue to impact people throughout the African continent, unfortunately with a high mortality rate."

Geisbert noted that significant progress has been made in developing therapeutics against Ebola Zaire, the species responsible for the 2014-15 outbreak in West Africa. However those drugs may not be effective against Ebola Sudan.

"That's why this latest study could be instrumental in reducing Ebola outbreaks," Geisbert said.

Since 2010, Ebola Sudan has been responsible for three outbreaks and until 2014, caused the largest outbreak of Ebola hemorrhagic fever on record, with 425 confirmed cases in Uganda in 2000.

"We were able to protect all of our nonhuman primates against a lethal Ebola Sudan infection when treatment began four days following infection," Geisbert said. "At this point, those infected showed signs of disease and had detectable levels of the virus in their blood."

Although all infected animals showed evidence of serious disease, those receiving the treatment survived and recovered. The untreated controls succumbed to the disease 8-10 days after exposure and had a disease course similar to that reported for Ebola Sudan-infected patients during outbreaks.

The treatment uses a specific short strand of RNA, known as siRNA, designed to target and interfere with the Ebola Sudan virus, rendering it harmless. One of the advantages of this approach is the ability to modify it to different viral species or strains. The siRNAs are delicate, so the researchers encapsulated them using a proprietary lipid nanoparticle (LNP) delivery technology platform developed by Arbutus Biopharma to protect the siRNAs in the bloodstream and allow efficient delivery and cellular uptake by the target cells. This clinically validated technology has been used successfully to protect non-human primates against Ebola Zaire and Marburg virus infection.

"Demonstrating protection in this uniformly lethal model of Ebola Sudan sets a high bar for determining effectiveness, as subjects were infected with a high viral dose that mimics the worst-case scenario of a needle-stick injury with concentrated viral material," said Geisbert. "The survival benefit and rapid control of viral replication with this treatment illustrate the strong potential of this evolving technology platform in combatting lethal viral infections."

__________

Story Source:

The above post is reprinted from materials provided by University of Texas Medical Branch at Galveston. Note: Content may be edited for style and length.
Journal Reference:


Against Self-Criticism: Adam Phillips on How Our Internal Critics Enslave Us, the Stockholm Syndrome of the Superego, and the Power of Multiple Interpretations

“In broaching the possibility of being, in some way, against self-criticism, we have to imagine a world in which celebration is less suspect than criticism.”

BY MARIA POPOVA

I have thought and continued to think a great deal about the relationship between critical thinking and cynicism — what is the tipping point past which critical thinking, that centerpiece of reason so vital to human progress and intellectual life, stops mobilizing our constructive impulses and topples over into the destructiveness of impotent complaint and embittered resignation, begetting cynicism? In giving a commencement address on the subject, I found myself contemplating anew this fine but firm line between critical thinking and cynical complaint. To cross it is to exile ourselves from the land of active reason and enter a limbo of resigned inaction.
But cross it we do, perhaps nowhere more readily than in our capacity for merciless self-criticism. We tend to go far beyond the self-corrective lucidity necessary for improving our shortcomings, instead berating and belittling ourselves for our foibles with a special kind of masochism.

The undergirding psychology of that impulse is what the English psychoanalytical writer Adam Phillips explores in his magnificent essay “Against Self-Criticism”, found in his altogether terrific collection Unforbidden Pleasures (public library).

One of Salvador Dalí’s illustrations for the essays of Montaigne
Phillips — who has written with beguiling nuance about such variousness of our psychic experience as the importance of “fertile solitude,” the value of missing out, and the rewards of being out of balance — examines how “our virulent, predatory self-criticism [has] become one of our greatest pleasures,” reaching across the space-time of culture to both revolt against and pay homage to Susan Sontag’s masterwork Against Interpretation. He writes:

In broaching the possibility of being, in some way, against self-criticism, we have to imagine a world in which celebration is less suspect than criticism; in which the alternatives of celebration and criticism are seen as a determined narrowing of the repertoire; and in which we praise whatever we can.

Our masochistic impulse for self-criticism, he argues, arises from the fact that ambivalence is the basic condition of our lives. In a passage that builds on his memorable prior reflections on the paradox of why frustration is necessary for satisfaction in romance, Phillips considers Freud’s ideological legacy:

In Freud’s vision of things we are, above all, ambivalent animals: wherever we hate, we love; wherever we love, we hate. If someone can satisfy us, they can also frustrate us; and if someone can frustrate us, we always believe that they can satisfy us. We criticize when we are frustrated — or when we are trying to describe our frustration, however obliquely — and praise when we are more satisfied, and vice versa. Ambivalence does not, in the Freudian story, mean mixed feelings, it means opposing feelings.

[...]

Love and hate — a too simple, or too familiar, vocabulary, and so never quite the right names for what we might want to say — are the common source, the elemental feelings with which we apprehend the world; and they are interdependent in the sense that you can’t have one without the other, and that they mutually inform each other. The way we hate people depends on the way we love them, and vice versa. And given that these contradictory feelings are our ‘common source’ they enter into everything we do. They are the medium in which we do everything. We are ambivalent, in Freud’s view, about anything and everything that matters to us; indeed, ambivalence is the way we recognize that someone or something has become significant to us… Where there is devotion there is always protest… where there is trust there is suspicion.

[...]

We may not be able to imagine a life in which we don’t spend a large amount of our time criticizing ourselves and others; but we should keep in mind the self-love that is always in play.

But we have become so indoctrinated in this conscience of self-criticism, both collectively and individually, that we’ve grown reflexively suspicious of that alternative possibility. (Kafka, the great patron-martyr of self-criticism, captured this pathology perfectly: “There’s only one thing certain. That is one’s own inadequacy.”) Phillips writes:

Self-criticism, and the self as critical, are essential to our sense, our picture, of our so-called selves.

[...]

Nothing makes us more critical, more confounded — more suspicious, or appalled, or even mildly amused — than the suggestion that we should drop all this relentless criticism; that we should be less impressed by it. Or at least that self-criticism should cease to have the hold over us that it does.
But this self-critical part of ourselves, Phillips points out, is “strikingly unimaginative” — a relentless complainer whose repertoire of tirades is so redundant as to become, to any objective observer, risible and tragic at the same time:

Were we to meet this figure socially, as it were, this accusatory character, this internal critic, we would think there was something wrong with him. He would just be boring and cruel. We might think that something terrible had happened to him. That he was living in the aftermath, in the fallout of some catastrophe. And we would be right.

Freud termed this droll internal critic superego, and Phillips suggests that we suffer from a kind of Stockholm syndrome of the superego:
We are continually, if unconsciously, mutilating and deforming our own character. Indeed, so unrelenting is this internal violence that we have no idea what we are like without it. We know virtually nothing about
ourselves because we judge ourselves before we have a chance to see ourselves (as though in panic). Or, to put it differently, we can judge only what we recognize ourselves as able to judge. What can’t be judged can’t be seen. What happens to everything that is not subject to approval or disapproval, to everything that we have not been taught how to judge? … The judged self can only be judged but not known. [We] think that it is complicitous not to stand up to, not to contest, this internal tyranny by what is only one part — a small but loud part — of the self.

The tyranny of the superego, Phillips argues, lies in its tendency to reduce the complexity of our conscience to a single, limiting interpretation, and to convincingly sell us on that interpretation as an accurate and complete representation of reality:

Self-criticism is nothing if it is not the defining, and usually the overdefining, of the limits of being. But, ironically, if that’s the right word, the limits of being are announced and enforced before so-called being has had much of a chance to speak for itself.

[…]

We consent to the superego’s interpretation; we believe our self-reproaches are true; we are overimpressed without noticing that that is what we are being.

With an eye to Freud’s legacy and the familiar texture of the human experience, Phillips makes his central point:

You can only understand anything that matters — dreams, neurotic symptoms, literature — by overinterpreting it; by seeing it from different aspects as the product of multiple impulses. Overinterpretation here means not settling for one interpretation, however apparently compelling it is. Indeed, the implication is — and here is Freud’s ongoing suspicion, or ambivalence, about psychoanalysis — that the more persuasive, the more compelling, the more authoritative, the interpretation is, the less credible it is, or should be. The interpretation might be the violent attempt to presume to set a limit where no limit can be set.

Here, the ideological wink at Sontag becomes apparent. Indeed, the Sontag classic would’ve been better titled “Against an Interpretation,” for the essence of her argument is precisely that a single interpretation invariably warps and flattens any text, any experience, any cultural artifact. (How tragicomical to see, then, that a reviewer who complains that Phillips’s writing is too open to interpretation both misses his point and, in doing so, makes it.)

What Phillips is advocating isn’t the wholesale relinquishing of interpretation but the psychological hygiene of inviting multiple interpretations as a way of countering the artificial authority of the superego and loosening its tyrannical grip on our experience of ourselves:

Authority wants to replace the world with itself. Overinterpretation means not being stopped in your tracks by what you are most persuaded by; it means assuming that to believe one interpretation is to radically misunderstand the object one is interpreting, and indeed interpretation itself.

Cuing in Shakespeare’s Hamlet, that “genius of self-reproach,” Phillips considers the cowardice of self-criticism:

Tragic heroes always underinterpret, are always emperors of one idea.
The first quarto of Hamlet has, “Thus conscience does make cowards of us all,” while the second quarto has, “Thus conscience does make cowards.” If conscience makes cowards of us all, then we are all in the same boat; this is just the way it is. If conscience simply makes cowards we can more easily wonder what else it might be able to make. Either way, and they are clearly different, conscience makes something of us; it is a maker, if not of selves, then of something about selves. It is an internal artist, of a kind… The superego … casts us as certain kinds of character; it, as it were, tells us who we really are. It is an essentialist: it claims to know us in a way that no one else, including ourselves, can ever do. And, like a mad god, it is omniscient: it behaves as if it can predict the future by claiming to know the consequences of our actions (when we know, in a more imaginative part of ourselves, that most actions are morally equivocal, and change over time in our estimation; no apparently self-destructive act is ever only self-destructive; no good is purely and simply that).

Half a century after Eleanor Roosevelt’s memorable admonition that “when you adopt the standards and the values of someone else … you surrender your own integrity [and] become, to the extent of your surrender, less of a human being,” Phillips urges us to question the superego’s despotic standards:

The superego is the sovereign interpreter… [It] tells us what we take to be the truth about ourselves. Self-criticism, that is to say, is an unforbidden pleasure. We seem to relish the way it makes us suffer [and] take it for granted that each day will bring its necessary quotient of self-discipline. That every day we will fail to be as good as we should be; but without our being given the resources, the language, to wonder who or what is setting the pace; or where these rather punishing standards come from.

Under this docile surrender to self-criticism, Phillips cautions, our conscience slips into cowardice:

Conscience … it is the part of our mind that makes us lose our minds; the moralist that prevents us from evolving a personal, more complex and subtle morality; that prevents us from finding, by experiment, what may be the limits of our being. So when Richard III says, in the final act of his own play, “O coward conscience, how dost thou afflict me!”, a radical alternative is being proposed. That conscience makes cowards of us all because it is itself cowardly. We believe in, we identify with, this starkly condemnatory and punitively forbidding part of ourselves; and yet this supposedly authoritative part of ourselves is itself a coward.

The most virulent and culturally contagious form of this cowardice, I would argue, is the resignation of cynicism — a resignation Phillips traces to the punitive system at the root of our culture’s moral framework, in which good behavior is incentivized largely through fear of punishment for bad behavior. This effort to foster the constructive by the destructive, he suggests, ends up turning us on ourselves as our fear of punishment metastasizes into self-criticism. (The cynic bypasses the constructiveness — that is, refuses to do anything about changing a situation for the better — and rushes straight to inflicting punishment, be it by insult or condemnation or that most cowardly and passive-aggressive fusion of the two, the eyeroll.)

Phillips returns to the central paradox, arguing for the importance of overinterpreting our self-critical conscience:

How has it come about that we are so bewitched by our self-hatred, so impressed and credulous in the face of our self-criticism, as unimaginative as it usually is? And why is it akin to a judgement without a jury? A jury, after all, represents some kind of consensus as an alternative to autocracy… We need to be able to tell the difference between useful forms of responsibility taken for acts committed, and the evasions of self-contempt… This doesn’t mean that no one is ever culpable; it means that culpability will always be more complicated than it looks: guilt is always underinterpreted… Self-criticism, when it isn’t useful in the way
any self-correcting approach can be, is self-hypnosis. It is judgement as spell, or curse, not as conversation; it is an order, not a negotiation; it is dogma, not overinterpretation.

Our self-criticism, to be sure, couldn’t be entirely eradicated — nor should it, for it is our most essential route-recalculating tool for navigating life. But by nurturing our capacity for multiple interpretations, Phillips suggests, self-criticism can become “less jaded and jading, more imaginative and less spiteful.”

Unforbidden Pleasures is a magnificent read in its entirety, exploring such strands of our psychic complexity as desire, disappointment, indifference, and idealism. Complement this particular portion with Albert Camus on happiness, unhappiness, and our self-imposed prisons, then revisit Phillips on why our capacity for boredom is essential for a full life.

https://www.brainpickings.org/2016/05/23/against-self-criticism-adam-phillips-unforbidden-pleasures/?mc_cid=5e19106c81&mc_eid=d1c16ac662
On a World Stage, Architects Imagine Detroit as the City of the Future

At this year’s Venice Architecture Biennale, 12 designs envision how “the capital of urban ruins” can move forward from crisis.

- LINDA POON
- @linpoonsays

Architect Greg Lynn’s city design includes corporate research centers and movable collaboration spaces. (Courtesy of Greg Lynn/FORM)

This week at the Venice Architecture Biennale, Detroit will represent the United States as a city of the future—one that could provide inspiration to cities around the globe.

At first, the beleaguered city may seem like an odd choice. “Detroit has a very strong image throughout the world as the capital of urban ruins,” says Robert Fishman, an urban historian at the University of Michigan’s Taubman College of Architecture and Urban Planning. “It’s a kind of symbol of what went wrong with the United States during the years of the urban crisis.”

Indeed, a mention of the city that once stood as the heart of America’s lucrative auto industry now evokes bleak images of deteriorating buildings, vacant schools, and destitute neighborhoods. But associating Detroit
solely with urban decay is like thinking in the “past tense,” says Maurice Cox, the city’s director of planning and development.

The Biennale, Cox adds, allows urban planners and designers to pivot the conversation toward how architecture can help the city can move forward. And it puts that conversation on a world stage.

The U.S. Pavilion at the Biennale, which runs through November 27, will showcase visions for the city by 12 architects from across the country working with the University of Michigan to transform underused spaces in ways that could help the city bounce back. The exhibit, titled “Architectural Imagination” and curated by architects Monica Ponce de Leon and Cynthia Davidson, focuses on four specific Detroit sites: the culturally rich Mexicantown; an old post office near the riverfront; the abandoned Packard Automotive Plant; and Eastern Market, a popular place to buy locally grown produce.

Stan Allen Architect reimagines the Packard Automotive Plant with an observation tower and conservatory, part of a larger vertical botanical garden. (Courtesy Stan Allen Architect)

In one design, the Packard Plant gets reimagined as a vertical botanical garden by the firm Stan Allen Architect. In another, architect V. Mitch McEwen turns an old industrial yard in Mexicantown into a futuristic neighborhood with housing built to purify the air around and in it.

If the projects look and sound fantastical, that’s because the architects were given the green light to think imaginatively. This has drawn concern that the designs are disconnected with the realities facing Detroit,
including the basic infrastructure failures plaguing lower-income residents, the city’s shrinking population, and its deep racial divide.

**Detroit Resist**, a group made up of local artists, community activists, and architects, is also in Venice this week presenting what member Bryce Detroit, a musician and community activist, says is an “alternative approach to reactivating space and co-designing community in the most culturally and socially astute way possible.”

Fellow member Andrew Herscher, an architectural historian at the University of Michigan, says the group is concerned that the exhibit’s entries aren’t inclusive enough, and might gloss over architecture's political and social significance in excluding underserved communities. “Architecture is not only a profession or discipline, but also a practice carried out whenever a community makes space for itself,” Herscher tells CityLab. “This means architecture [should] not only imagine itself as making spaces for community, but also co-creating spaces with the community.”

The two will stage a “digital occupation” of the U.S. Pavilion, showing projects of “resilience and resistance” from Detroit communities. These include a fence built by community groups to protect a woman from eviction on the city’s east side, as well as a project in which an artist painted “Free the Water” on a water tower to protest massive water shut-offs.

V. Mitch McEwen reimagines an industrial site as a residential area. (Courtesy of A(n) Office)

Cox, who is on the advisory board of the Architectural Imagination exhibit, argues that while the individual projects are conceptual, the architects were instructed to address real issues. “One of the things I was looking forward to was a desire to solve real problems and not simply showcase the brilliance of the architects,” he says. “If we could introduce them to real people and real programs, that wouldn’t make their works any less visionary, but it would ground it in the sense of who they were designing for.”
So Cox arranged for the architects to meet with community leaders before they went to the drawing board. For McEwen, that meant understanding that she was designing for residents who may soon be displaced by a bridge-expansion project between the U.S. and Canada. Part of that expansion includes building a customs plaza in Delray, a Detroit neighborhood of about 250 families.

McEwen and her team focused on turning an unused maintenance yard near a heavily used highway into a residential area. There was just one problem: “Part of the major issue in the area is environmental quality in terms of air,” she tells CityLab. “This area has the highest asthma rates in the state.”

Her design may look very sci-fi, with tubes running through the site and apartment buildings filled with holes, but each feature serves a purpose. The tubes, she says, are pneumatic and can transport goods in and out of the area while reducing the number of diesel trucks on the nearby highways. And the holes are actually a built-in air purification system. “We looked at this as an opportunity for remediation, not just in terms of the environment but actually remediating a whole neighborhood,” she says.

In Detroit-native Andrew Zago’s project, which reimagines a site near Eastern Market, twisty buildings recall something out of a Dr. Seuss book. But the two issues he’s designing to address are far from whimsical: depopulation and mass migration.

“When we were working on the project last fall, it was about the same time that the Obama administration announced that it was going to increase the number refugees allowed into the U.S. in light of the Syrian refugee crisis,” says Zago. “We realized that Detroit’s metropolitan area has the largest Arab-American community in the U.S., with a huge amount of social services [necessary] to deal with incoming people.”
So they designed the space as a temporary shelter for incoming refugees to get settled in their new country, and wrote an open letter to Secretary of State John Kerry asking him to consider accepting more refugees—68,000 over the next five years—and directing them to Detroit, a city that’s gone from a population of 2 million in the 1950s to just 689,000 today. The space would feature a large, federally funded building where refugees could learn job skills, as well as dual live-work spaces.

“You would do this as a one-time humanitarian-aid effort and as a special project of urban renewal,” Zago adds. “We know where refugee communities resettle, and they end up within a few years making a positive economic impact.”

“No one would say architecture is the solution” to all of Detroit’s problems, Fishman says. “We’re all very much aware that the rebuilding process [requires] transformation in basic infrastructure and investment in the city.”

He adds: “But I think because these are speculative projects—they’re not limited by difficult facts on the ground—they can really open up possibilities that would not otherwise be visible.”

http://www.citylab.com/design/2016/05/on-a-world-stage-architects-imagine-detroit-as-the-city-of-the-future/484154/?utm_source=nl__link4_052716
New flexible material can make any window 'smart'

University of Texas at Austin

Summary:

Scientists have developed a new low-temperature process for coating a new smart material on plastic. At the heart of the team’s study is their rare insight into the atomic-scale structure of the amorphous materials.

Share:

FULL STORY

This is a darkened electrochromic film on plastic prepared by chemical condensation.

Credit: Cockrell School of Engineering

Researchers in the Cockrell School of Engineering at The University of Texas at Austin have invented a new flexible smart window material that, when incorporated into windows, sunroofs, or even curved glass surfaces, will have the ability to control both heat and light from the sun. Their article about the new material will be published in the September issue of Nature Materials.
Delia Milliron, an associate professor in the McKetta Department of Chemical Engineering, and her team's advancement is a new low-temperature process for coating the new smart material on plastic, which makes it easier and cheaper to apply than conventional coatings made directly on the glass itself. The team demonstrated a flexible electrochromic device, which means a small electric charge (about 4 volts) can lighten or darken the material and control the transmission of heat-producing, near-infrared radiation. Such smart windows are aimed at saving on cooling and heating bills for homes and businesses.

The research team is an international collaboration, including scientists at the European Synchrotron Radiation Facility and CNRS in France, and Ikerbasque in Spain. Researchers at UT Austin's College of Natural Sciences provided key theoretical work.

Milliron and her team's low-temperature process generates a material with a unique nanostructure, which doubles the efficiency of the coloration process compared with a coating produced by a conventional high-temperature process. It can switch between clear and tinted more quickly, using less power.

The new electrochromic material, like its high-temperature processed counterpart, has an amorphous structure, meaning the atoms lack any long-range organization as would be found in a crystal. However, the new process yields a unique local arrangement of the atoms in a linear, chain-like structure. Whereas conventional amorphous materials produced at high temperature have a denser three-dimensionally bonded structure, the researchers' new linearly structured material, made of chemically condensed niobium oxide, allows ions to flow in and out more freely. As a result, it is twice as energy efficient as the conventionally processed smart window material.

At the heart of the team's study is their rare insight into the atomic-scale structure of the amorphous materials, whose disordered structures are difficult to characterize. Because there are few techniques for characterizing the atomic-scale structure sufficiently enough to understand properties, it has been difficult to engineer amorphous materials to enhance their performance.

"There's relatively little insight into amorphous materials and how their properties are impacted by local structure," Milliron said. "But, we were able to characterize with enough specificity what the local arrangement of the atoms is, so that it sheds light on the differences in properties in a rational way."

Graeme Henkelman, a co-author on the paper and chemistry professor in UT Austin's College of Natural Sciences, explains that determining the atomic structure for amorphous materials is far more difficult than for crystalline materials, which have an ordered structure. In this case, the researchers were able to use a combination of techniques and measurements to determine an atomic structure that is consistent in both experiment and theory.

"Such collaborative efforts that combine complementary techniques are, in my view, the key to the rational design of new materials," Henkelman said.

Milliron believes the knowledge gained here could inspire deliberate engineering of amorphous materials for other applications such as supercapacitors that store and release electrical energy rapidly and efficiently.

The Milliron lab's next challenge is to develop a flexible material using their low-temperature process that meets or exceeds the best performance of electrochromic materials made by conventional high-temperature processing.
"We want to see if we can marry the best performance with this new low-temperature processing strategy," she said.

Story Source:

The above post is reprinted from materials provided by University of Texas at Austin. Note: Content may be edited for style and length.

Journal Reference:


https://www.sciencedaily.com/releases/2016/08/160822124921.htm
Phytotron facelift facilitates cutting-edge research on plants

NC State Phytotron ready to tackle 21st century challenges of food and energy security

A systematic overview of more than 100 studies comparing organic and conventional farming finds that the crop yields of organic agriculture are higher than previously thought. The study, conducted by researchers at the University of California, Berkeley, also found that certain practices could further shrink the productivity gap between organic crops and conventional farming. The study tackles the lingering perception that organic farming, while offering an environmentally sustainable alternative to chemically intensive agriculture, cannot produce enough food to satisfy the world's appetite. Hear more in this Discovery Files podcast.

Credit: NSF/Karson Productions

The laboratory is a control freak's dream come true! Welcome to the North Carolina State University (NCSU) Phytotron, a singular facility for growing plants under various combinations of strictly controlled environmental conditions. Scientists are able to conduct all types of plant research here, from studies of disease-resistant crops to drought-proof grasses to new biofuels.

The NCSU Phytotron was built in the 1960s with support from the National Science Foundation (NSF), and was used a decade later to help prevent a collapse in the U.S. corn crop from fungal disease. Now, after more than a generation of such research breakthroughs, the Phytotron has received additional support from NSF for a 21st century makeover. The renovations include a new Biosafety Level 3 (BSL-3) lab with a greenhouse that houses high security research, such as experiments with viral and bacterial pathogens.
The research in this episode was supported by NSF award #0962962, Renovation of the NCSU Phytotron for Improved Environmental Control and BSL-3 Containment. This Academic Research Infrastructure program award was funded through the American Recovery and Reinvestment Act of 2009.

The research also was supported by award #1444503, An Integrated Genomic and Functional Analysis of the Plant Hypersensitive Response.

Miles O’Brien, Science Nation Correspondent
Ann Kellan, Science Nation Producer

It's Expensive to Get Your iPhone or iPad Fixed — And Apple Wants It That Way

By Melanie Ehrenkranz  June 21, 2016

LIKE MIC ON FACEBOOK:

If you drop your iPhone into a body of water, it's probably toast. And if it's not bricked, it could cost you from $269 to $329 in repairs because liquid damage is not covered in an Apple warranty. Good thing you can go to a third-party repair shop that can repair your device for cheaper, right?

Apple just helped to squash those dreams.

New York legislators introduced the Fair Repair Act, which would require manufacturers like Apple to provide information and parts needed to repair a device. Apple, IBM, Xerox and Cisco all lobbied against it, and the legislation failed to get a vote, the Huffington Post reported.

While taking the iPhone to a third-party repair shop isn't illegal, these shops don't have access to repair instructions or the necessary parts to most efficiently fix your device.

Apple's take: Apple might not want such a bill to pass because of the risk of someone reverse-engineering an iDevice and creating counterfeit ones, the Huffington Post reported, or because these outside repair shops might damage the "integrity" of a phone.

The Repair Association, a group that campaigned for the pass of the Fair Repair Act, writes on its website that worrying about damage to "brand image," or concerns that a third-party repair shop might not properly fix an iDevice, is irrelevant.

"Owners of equipment have no obligation to the manufacturer post purchase related to supporting brand image," the group writes. "It is also disingenuous to withhold the means to make competent repairs and then demand a monopoly on the basis of competence."

Nearly 15,000 letters were sent to New York's senators and representatives via the Repair Association's website in support of the bill.

Broken iPhoneSource: Shutterstock

Environmental impact: Making Apple's (and other device manufacturers) repair instructions and parts publicly accessible isn't just economically beneficial to iPhone consumers with a habit of dropping their device in the toilet, it's environmentally beneficial.

A study from September 2014 found that of the 1.8 billion new mobile phones "likely" purchased that year, 44% end up in a drawer, 4% end up in landfills and 3% are recycled.
The average age for a kid to get their first smartphone is 10.3 years old, and the average American gets a new one every 1.5 to 2.5 years. That's more than five phones that could end up in a drawer or landfill before you're old enough to buy a beer.

The Fair Repair Act could have extended the life expectancy of one phone by expanding the pool of professional repairers. And someone doesn't even have to keep their phone forever — it could be fixed for another consumer, encouraging the purchase of a used working phone rather than the current cycle of planned obsolescence.

Apple's iPhone-recycling robot, LiamSource: YouTube

"The manufacturing impact of the electronic sector is huge," Kyle Wiens, a repair advocate and founder of iFixit, a free repair manual on just about anything, told the Washington Post. "If you're going to go to all the effort and environmental impact to make a phone, let's make it last for seven or 10 years. And it's OK if it's not necessarily used by the first owner for all that long, but let's make it so that somebody can use it."

Apple has made an effort to wrangle back some of its now unused devices; the company has a robot named Liam, and its purpose is to disassemble iPhones and sorts parts to be recycled. But as cute as Liam might be, it still isn't a surefire way to recycle all of the unused iPhones out there. In fact, at this point it can only take apart the iPhone 6s.

According to Reuters, with Liam's rate of taking apart an iPhone in 11 seconds, even if uninterrupted, it "likely can handle no more than a few million phones per year, a small fraction of the more than 231 million phones Apple sold in 2015."

Mic reached out to Apple for comment and will update with a response.

https://mic.com/articles/146677/it-s-expensive-to-get-your-i-phone-or-i-pad-fixed-and-apple-wants-it-that-way?utm_source=newletter&utm_medium=miccheck#LQWaAtUQc
Virginia Woolf on the Relationship Between Loneliness and Creativity

“If I could catch the feeling, I would; the feeling of the singing of the real world, as one is driven by loneliness and silence from the habitable world.”

BY MARIA POPOVA

There is a kind of loneliness that lodges itself in the psyche and never fully leaves, a loneliness most anguishing not in solitude but in companionship and amid the crowd. If solitude fertilizes the imagination, loneliness vacuums it of vitality and sands the baseboards of the spirit with the scratchy restlessness of longing — for connection, for communion, for escape. And yet it is out of this restlessness that so many great works of art are born.

“We have all known the long loneliness,” Dorothy Day wrote, but some — artists, perhaps — know it more intimately than others and few artists have articulated this knowledge with more stunning and stirring lucidity than Virginia Woolf (January 25, 1882–March 28, 1941). Loneliness permeates A Writer’s Diary (public
that abiding source of Woolf’s wisdom on such varied dimensions of existence as the paradoxes of aging, the elasticity of time, the key to lasting relationships, and the creative benefits of keeping a diary. In fact, it is precisely the transmutation of loneliness into connection with the universal human experience that lends Woolf’s writing its timeless penetrative power.

In the late summer of 1928, a month before the publication of Orlando subverted stereotypes and revolutionized culture, 44-year-old Woolf found herself grappling once more with the yin-yang of loneliness and creation. In a diary entry penned at Monk’s House — the countryside cottage she and her husband had bought in Sussex a decade earlier, where she crafted some of her most beloved works — she writes:

Often down here I have entered into a sanctuary … of great agony once; and always some terror; so afraid one is of loneliness; of seeing to the bottom of the vessel. That is one of the experiences I have had here in some Augusts; and got then to a consciousness of what I call “reality”: a thing I see before me: something abstract;
but residing in the downs or sky; beside which nothing matters; in which I shall rest and continue to exist. Reality I call it. And I fancy sometimes this is the most necessary thing to me: that which I seek. But who knows — once one takes a pen and writes? How difficult not to go making “reality” this and that, whereas it is one thing. Now perhaps this is my gift: this perhaps is what distinguishes me from other people: I think it may be rare to have so acute a sense of something like that — but again, who knows? I would like to express it too.

Art by Nina Cosford from the illustrated biography of Virginia Woolf

The following fall, thirteen days before the publication of A Room of One’s Own — that ultimate paean to the relationship between loneliness and creative vitality — Woolf revisits the subject in her diary, contemplating the strange ways in which we deny or confer validity upon our loneliness. Loneliness, after all, is an interior chill independent of externalities and often thrives precisely when our circumstances appear most enviable to the outside world — a warping of reality that is itself intensely, almost unbearably real. Woolf writes:

These October days are to me a little strained and surrounded with silence. What I mean by this last word I don’t quite know, since I have never stopped “seeing” people… No, it’s not physical silence; it’s some inner loneliness.

And yet for Woolf, this lonely silence is inseparable from the creative impulse. Half a century before Adrienne Rich asserted that “the impulse to create begins — often terribly and fearfully — in a tunnel of silence.” Woolf illustrates this nuanced feeling with a lived example:

I was walking up Bedford Place is it — the straight street with all the boarding houses this afternoon — and I said to myself spontaneously, something like this. How I suffer. And no one knows how I suffer, walking up this street, engaged with my anguish, as I was after Thoby [Woolf’s brother] died — alone: fighting something alone. But then I had the devil to fight, and now nothing. And when I come indoors it is all so silent — I am not carrying a great rush of wheels in my head — yet I am writing… And it is autumn; and the lights are going up… and this celebrity business is quite chronic — and I am richer than I have ever been — and bought a pair of earrings today — and for all this, there is vacancy and silence somewhere in the machine.
On the whole, I do not much mind; because what I like is to flash and dash from side to side, goaded on by what I call reality. If I never felt these extraordinarily pervasive strains — of unrest or rest or happiness or discomfort — I should float down into acquiescence. Here is something to fight; and when I wake early I say to myself Fight, fight. If I could catch the feeling, I would; the feeling of the singing of the real world, as one is driven by loneliness and silence from the habitable world… Anything is possible. And this curious steed, life, is genuine. Does any of this convey what I want to say? But I have not really laid hands on the emptiness after all.

A Writer’s Diary remains one of the most psychologically insightful and beautifully crafted packets of human thought and feeling ever bound between two covers. Complement this particular portion with Sara Maitland on how to be alone without being lonely and David Whyte on the transfiguration of aloneness, then revisit Woolf on why the most fertile mind is the androgynous mind and her electrifying account of the epiphany that taught her what it means to be an artist.

https://www.brainpickings.org/2016/06/16/virginia-woolf-loneliness/?mc_cid=f6eda9a29b&mc_eid=d1c16ac662
Hope for reversing stroke-induced long-term disability

A human protein combined with stem cell therapy has been found to repair stroke damage to the brain, according to a new USC-led study on mice

Source: University of Southern California

Summary: Permanent brain damage from a stroke may be reversible thanks to a developing therapeutic technique, a study has found. The novel approach combines transplanted human stem cells with a special protein that the US Food and Drug Administration already approved for clinical studies in new stroke patients. The researchers say they are the first to use 3K3A-APC to produce neurons from human stem cells grafted into the stroke-damaged mouse brain.

Share: FULL STORY

Scientists hope to pursue a new Phase II clinical trial to test whether their combination therapy that stimulated the growth of neurons in mice can be replicated in human stroke patients.
Permanent brain damage from a stroke may be reversible thanks to a developing therapeutic technique, a USC-led study has found.

The novel approach combines transplanted human stem cells with a special protein that the U.S. Food and Drug Administration already approved for clinical studies in new stroke patients.

"This USC-led animal study could pave the way for a potential breakthrough in how we treat people who have experienced a stroke," said Jim Koenig, a program director at the National Institute of Neurological Disorders and Stroke, which funded the research. "If the therapy works in humans, it could markedly accelerate the recovery of these patients."

Berislav Zlokovic, senior author of the Aug. 22 Nature Medicine study, and his colleagues identified a protein that spurs neural stem cells to become functional neurons: 3K3A-APC, a variant of the human protein "activated protein C."

The created compound is being tested as a neuroprotectant. Researchers in a National Institutes of Health-funded Phase II clinical trial administer 3K3A-APC to patients who have very recently (within a few hours) suffered from an ischemic stroke, when a clot blocks blood from reaching the brain. About 87 percent of all strokes are ischemic, according to the Centers for Disease Control and Prevention.

However, Zlokovic, director of the Zilkha Neurogenetic Institute at the Keck School of Medicine of USC, said he and his colleagues are the first to use 3K3A-APC to produce neurons from human stem cells grafted into the stroke-damaged mouse brain.

"We showed that 3K3A-APC helps the grafted stem cells convert into neurons and make structural and functional connections with the host's nervous system," said Zlokovic, a scientific founder of ZZ Biotech, a company devoted to developing therapeutics using variants of activated protein C. "No one in the stroke field has ever shown this, so I believe this is going to be the gold standard for future studies."

Although other researchers have experimented with grafting stem cells into injured brain areas, they have met with limited success -- partially because transplanted stem cells diminish with time. The therapeutic compound stops that from happening.

Every year more than 795,000 people in the United States have a stroke, according to the CDC. These debilitating seizures reduce mobility in more than half of stroke survivors age 65 and older.

More than 70 percent of stroke survivors live with substantial neurological symptoms such as muscle weakness or paralysis, according to Yaoming Wang, co-lead author of the study and a senior research associate at the Zilkha Neurogenetic Institute at the Keck School.

"The need for an efficacious, practical and late treatment of stroke remains unmet," Wang said. "Regenerative medicine with stem cells holds great promise for the treatment of stroke."

How combination therapy works
A week -- the equivalent of several months in humans -- after scientists induced a stroke in mice, the researchers placed human neural stem cells next to damaged brain tissue. Then they administered the immunosuppressant cyclosporine and four doses of 3K3A-APC or a placebo solution over a span of seven days.

The transplanted stem cells matured into neurons and other brain cells. Mice treated with the special compound had 16 times more human stem cell-derived neurons than those who were treated with the placebo.

"Functional deficit after five weeks of stroke were minimized, and the mice were almost back to normal in terms of motor and sensorimotor functions," Zlokovic said. "Synapses formed between transplanted cells and host cells, so there is functional activation and cooperation of transplanted cells in the host circuitry."

To test whether the injected stem cells caused the observed motor and sensorimotor improvements, USC researchers used an assassin toxin to exterminate neurons that developed from human stem cells. They found that these mice lost improvements in motor or sensory tests, suggesting the neurons that grew from implanted stem cells were necessary for recovery from stroke-induced disability.

The motor and sensory tests

Researchers tested motor functions by having mice walk forward on a rotating rod without falling off. They tested sensory and motor function by placing tape on the mouse's forepaw and observed how long it took the mice to remove the adhesive.

Rodents given human stem cells and treated with 3K3A-APC performed much better on these performance tests, said Zhen Zhao, co-lead author and an assistant professor of research physiology and biophysics at the Zilkha Neurogenetic Institute.

Functional integration

To test the brain's circuitry after the stroke, researchers labeled stem cells with an indicator of neuronal activity and then stimulated the paws of the mice with a mechanical vibration. They noted the injured area in 3K3A-APC-treated mice was activated much more than in mice treated with the placebo. Moreover, the response time was much closer to that of uninjured mice.

These results suggest that neurons which grew from the stem cells are functionally integrated into the host's brain circuitry.

The future of stem cell therapy

In June, Stanford University researchers drilled a hole into the skulls of people whose motor and sensory abilities had been compromised because of stroke. Then they injected stem cells harvested from the bone marrow of adult donors. Although the study involved only 18 patients, researchers noted meaningful recovery, such as the ability to walk again. Stanford researchers said the stem cells seemed to trigger a biochemical process that enhanced the brain's ability to regenerate neurons. The transplanted stem cells themselves did not become neurons.

In contrast, researchers in the USC-led study were able to stimulate transplanted stem cells to becoming neurons in a mouse study.
Zlokovic and his team now hope to pursue a new Phase II clinical trial to test whether their combination therapy that stimulated the growth of neurons in mice can be replicated in human stroke patients. If the trial succeeds, they plan to extend the neural stem cell grafts and 3K3A-APC treatment to other neurological conditions, such as spinal cord injuries.

Story Source:

The above post is reprinted from materials provided by University of Southern California. The original item was written by Zen Vuong. Note: Content may be edited for style and length.

Journal Reference:

1. Yaoming Wang, Zhen Zhao, Sanket V Rege, Min Wang, Gabriel Si, Yi Zhou, Su Wang, John H Griffin, Steven A Goldman, Berislav V Zlokovic. 3K3A–activated protein C stimulates postischemic neuronal repair by human neural stem cells in mice. Nature Medicine, 2016; DOI: 10.1038/nm.4154

https://www.sciencedaily.com/releases/2016/08/160822124919.htm
This 'Airbnb for the Elderly' Could Curb Loneliness in Cities

The Freebird Club hopes to form new networks among isolated older residents.

- ARIA BENDIX
- @ariabendix

The sharing economy largely caters to the needs of young, mobile residents. But in crowded cities, where older residents often feel isolated and lonely, there may be an even greater need to accommodate the elderly.

The soon-to-launch Freebird Club offers a room-sharing service for those over 50. The service closely resembles Airbnb: members rent out their spare rooms for a fixed nightly rate. The goal, according to the company’s founder Peter Mangan, is to form new networks among middle-aged and elderly folks and encourage their continued mobility.

Inspiration for the club came from Mangan’s father, who helped Mangan rent out his countryside home in county Kerry*. At the time, Mangan’s father was a widower living alone, and instantly connected with the older residents who came to stay at his son’s place. These positive interactions, combined with the existing research on loneliness among older populations, spurred Mangan to develop an initial design. In November, The Freebird Club was one of three concepts to win the European Social Innovation Competition. With a
prize of just over $55,000 in tow, the service is set to launch this June in Ireland and the U.K., with hopes to expand to other locations worldwide.

As of now, The Freebird Club is a member-only service, and plans to charge a small, one-time fee to make older adults feel more secure about the process. As an added safety measure, Mangan is working with a cybersecurity expert to vet members and verify their identity. He is also toying with the idea of a buddy system, which would grant family members access to a club member’s profile.

Although some older citizens may be reticent to partake in such an intimate service, there’s reason to believe that demand for an “Airbnb for the elderly” will only increase with time. A January report from the Global Coalition on Aging and the McGraw Hill Financial Global Institute finds that nearly one billion people aged 65 and over will be living in developing cities by 2050.

These older folks are far from a burden to urban vitality. “There’s a perception that older people are a bit more vulnerable,” says Mangan. “[But] a lot of older people that I know are quite maverick and adventurous … At this stage in your life, you now have a freedom that you haven’t had in years.”

In fact, a 2015 study from PricewaterhouseCoopers found that nearly a quarter of U.S. residents age 55 and older consider themselves “providers” in the sharing economy. What they need now is for the sharing economy to start providing for them.

http://www.citylab.com/navigator/2016/05/airbnb-for-the-elderly-loneliness-the-freebird-club/484373/?utm_source=nl__link5_052716
Atmospheric scientists boldly go into the heart of a tornado

TWIRL project researchers plant instruments directly in tornado's path

Atmospheric scientists on the TWIRL tornado project set up for an oncoming twister.
Credit and Larger Version

June 24, 2016

This is part 18 in a series on NSF's geosciences risk and resilience interest area. Please see parts one two three four five six seven eight nine 10 11 12 13 14 15 16 and 17.

It was the afternoon of May 9, dead center in Tornado Alley: Oklahoma. Severe thunderstorms were forecast for the southern part of the state.

That was the "go" call for atmospheric scientists Josh Wurman and Karen Kosiba of the Center for Severe Weather Research (CSWR) in Boulder, Colorado. Wurman and Kosiba were at the start of a project called TWIRL: Tornadic Winds: In-situ and Radar observations at Low levels, funded by the National Science Foundation (NSF).

TWIRL’s field season ran from May 1 through June 15. That's the time of year when two ingredients required for tornadoes -- very unstable air and strong vertical wind shear -- are most common.
The TWIRL scientists are developing 3-D maps of the strongest tornado winds near the ground, and studying how these winds cause damage to buildings, power lines, trees -- and anything else in their way.

The Doppler-on-Wheels number 7 (DOW7) is chased by menacing thunderstorm clouds.

Credit: Center for Severe Weather Research/Robin Lorenson

"TWIRL researchers are focusing on low-level winds flowing into the cores of tornadoes," said Ed Bensman, program director in NSF’s Division of Atmospheric and Geospace Sciences, which funds TWIRL. "They’re using a combination of surface weather sensors placed ahead of developing storms, and Doppler-on-Wheels [DOW] mobile weather radars. From TWIRL, we will gain a better understanding of the role low-level winds play in the development of tornadoes, and why some tornadoes become the most violent."

To peer into the heart of a tornado, TWIRL researchers -- nomads of science -- traveled more than 16,000 miles this spring across the Great Plains, from Texas to the Dakotas, Montana to the Mississippi River, chasing thunderstorms that produce tornadoes.

"It’s an ideal location due to warm, humid air flowing northward from the Gulf of Mexico at low levels, and cold, dry air coming down from Canada at upper levels, producing very unstable air," said Roger Wakimoto, NSF assistant director for Geosciences.
Tornado on the way

On May 9, TWIRL’s fleet of instrument-laden DOW trucks was split between two towns in Oklahoma, Sulphur and Wynnewood. The DOWs sought out vantage points ahead of a developing storm. Deployed less than a mile from a rapidly forming tornado, they scanned every seven seconds and measured details of the storm as low as 30 feet above the ground.

A DOW looks more like the dish of a radio telescope mounted on the back of a flat-bed truck than a sophisticated weather instrument. With a DOW onboard, the truck becomes an odd configuration of generator, equipment and operator cabin.

Ungainly as it may appear, Wurman says, it’s ideally suited to providing detailed information on the inner workings of tornadoes and other storms such as hurricanes and blizzards.

Wurman should know. He and colleagues developed the first DOW, now one of several, in 1995. The DOW uses Doppler radar to collect velocity data about objects (such as tornadoes and other severe storms) at a distance.

TWIRL researchers Josh Wurman and Karen Kosiba at work inside a deployed Doppler-on-Wheels.

Credit: Center for Severe Weather Research/Robin Lorenson

The stories a DOW could tell. Like the time one measured a world-record wind speed of 301 miles per hour just above ground level in an Oklahoma tornado. Or when a DOW was the only "scientific team" to successfully brave Hurricane Ike's knock-down winds in Galveston, Texas.
DOWs may hold the key to more accurate forecasts of tornadoes, hurricanes, snowstorms -- whatever severe weather Earth's atmosphere produces.

Scrambling into position

Tornadoes usually occur in association with particular types of severe storms, such as supercells and squall lines. But not all such storms form tornadoes. Tornadogenesis, as the formation of tornadoes is called, remains the "holy grail" of tornado research, Wakimoto said. "TWIRL will improve our understanding of tornadogenesis and tornado evolution."

On May 9, the TWIRL DOWs and tornado pod vehicles suddenly scrambled to get as close as possible -- safely -- to a supercell thunderstorm. A tornado had formed in nearby Katie, Oklahoma.

The DOWs and Pods were placed directly in the tornado's path, but the storm fizzled out. The TWIRL team, however, was far from done for the day.

Another, still larger, tornado had formed near Joy, Oklahoma. The TWIRL researchers again worked to get out in front.

"The second tornado was huge," Wurman said. "It created a damage swath more than a mile wide." Getting ahead of it meant driving through the core of the supercell thunderstorm, watching warily with the DOWs for any deviation in the tornado’s path.
TWIRL researchers get a tornado pod set-to-go; a tornado is about to pass by.

Credit: Center for Severe Weather Research/Robin Lorenson

After minutes that seemed like hours of pummeling by wind-driven hail, the TWIRL researchers and vehicles were safely east of the huge, wedge-shaped vortex. One crew quickly dropped a pod in the path of the tornado, then dashed to safety. Pods, says Wurman, “get run over by tornadoes. Their job is to measure winds three feet above the ground.”

Into a tornado’s heart

DOW7 was parked just north of the tornado's predicted path, while its crew coordinated the deployment of the other DOWs.

TWIRL tornado pod in Oklahoma on May 9, 2016; the pods are designed to be "run over" by tornadoes.

Credit: Center for Severe Weather Research/Robin Lorenson

Data from DOW7 revealed winds of more than 224 miles per hour and a dangerous multiple-vortex structure. A pod recorded winds of 100 miles per hour at the edge of the tornado; one of its anemometers was destroyed by airborne debris. The TWIRL scientists could see buildings flying apart.
The crew in SCOUT-3, a customized pickup truck, drove south in front of the tornado, sampling an intense downdraft with winds at 100 miles per hour. "Power lines, trees and weaker structures were all destroyed," Kosiba says.

The TWIRL team checks skies before settling on a storm-tracking location.

Credit: Center for Severe Weather Research/Robin Lorenson

On days like May 9, Wurman and Kosiba constantly balance a desire for instrument deployments that will collect new and important data from inside tornadoes, with the critical requirement to keep the TWIRL research team safe.

The goal?

"We hope to discover new information about which storms are most likely to have violent tornadoes," Wurman says. "Our ultimate aim is to protect not only TWIRL teams, but everything and everyone in these tornadoes' paths."

-- Cheryl Dybas, NSF (703) 292-7734 cdybas@nsf.gov
Investigators
Karen Kosiba
Joshua Wurman
Curtis Alexander

Related Institutions/Organizations
The Center for Severe Weather Research

After the heart attack: Injectable gels could prevent future heart failure

American Chemical Society

Summary:

During a heart attack, clots or narrowed arteries block blood flow, harming or killing cells within the tissue. But the damage doesn't end after the crushing pain subsides. Instead, the heart's walls thin out, the organ becomes enlarged, and scar tissue forms. If nothing is done, the patient can eventually experience heart failure. Scientists now report they have developed injectable gels to prevent this damage.

Share:

FULL STORY

Compared to other types of hydrogels being developed (left), a new hydrogel (right) can form crosslinks after injection into the heart, making the material stiffer and longer-lasting.

Credit: American Chemical Society
failure. But scientists now report they have developed gels that, in animal tests, can be injected into the heart to shore up weakened areas and prevent heart failure.

The researchers will present their work today at the 252nd National Meeting & Exposition of the American Chemical Society (ACS).

Heart attacks strike 750,000 people each year in the U.S., according to the American Heart Association. And more than 5 million U.S. residents are living with heart failure, with symptoms that progress from fatigue and shortness of breath to eventual death. "Heart failure is a huge problem, and few therapies are available for these patients," says Jason A. Burdick, Ph.D., leader of the study.

Treatments include lifestyle changes, medication, implants or heart transplants. Burdick, who is at the University of Pennsylvania (Penn), explains that these options often don't work well or, in the case of transplants, are hard to come by. So scientists are pursuing other treatment methods. For instance, researchers at other institutions have done animal studies in which they injected cells into the damaged section of the heart to try to repair damage. To prevent the cells from leaking out, those researchers embedded them in biodegradable "hydrogels" -- water-swollen networks of polymer chains with a consistency similar to Jell-O. But the scientists noticed something odd when they ran control experiments in which they injected the hydrogel without added cells: Some of the animals' hearts still showed improvement compared with untreated animals.

Based on those findings, a handful of labs are now experimenting with hydrogel treatments, including two materials that are in clinical trials. Neither is from Burdick's lab, but as he notes, "It's important we all keep moving forward to figure out how this therapy could be used, because it's different than any current treatment." In addition, different types of hydrogels could suit different patients' needs.

Some experimental heart attack treatments require surgery to open up the chest, but the two hydrogel materials already in clinical trials are injected into the damaged tissue through a long catheter inserted through the skin -- eliminating the need for open-chest surgery.

Burdick and his graduate student Christopher B. Rodell, in collaboration with Robert C. Gorman, M.D., also at Penn, are using this same minimally invasive technique in their own work. But his team has gone a step further by identifying properties that would be useful in treating heart attack patients and then designing hydrogels with those properties. For instance, his group developed a hydrogel that forms additional crosslinks between the polymer chains after injection. The resulting material is stiffer and lasts longer than a gel without these additional crosslinks and the gels in clinical trials.

In fact, Burdick's gel is unique among hydrogels in providing mechanical support to stabilize the damaged area. In sheep studies, this gel limits formation of scar tissue, thinning of the heart's walls and enlargement of the heart. By preserving the organ's size, the gels also reduce leakage of blood through the mitral valve. Together, these benefits maintain the heart's blood-pumping ability and could stave off heart failure.

The team's materials are based on hyaluronic acid (HA), a type of sugar molecule that occurs naturally in the body. The researchers modified the HA molecules by attaching adamantane and cyclodextrin groups to allow the gels to flow through catheters, and they added thiol and methacrylate groups to enable post-injection cross-linking to stiffen the hydrogel. Once the researchers finalize the hydrogel formulation and delivery method, they hope to partner with a catheter firm to bring a product to market. Burdick's team and other research groups are also designing hydrogels that contain drugs or cells that can repair heart tissue.
Story Source:

The above post is reprinted from materials provided by American Chemical Society. Note: Content may be edited for style and length.

https://www.sciencedaily.com/releases/2016/08/160822083246.htm
China's Attempt at the 'Bilbao Effect'

A curvy new opera house is part of a plan to make Harbin, in northeast China, the “Venice of the East.”

- JACOB DREYER
- @dreyer_jacob

Harbin Opera House, designed by MAD Architects, opened last December. (Benny Shaffer)

It’s only May, but the international architectural press has already highlighted the Harbin Opera House, designed by the bad-boy architect Ma Yansong, as one of the year’s most interesting new buildings. On the glossy web pages of Dezeen, ArchDaily, and their equivalents, fantastical images of it proclaim that the future is still coming, and has chosen to stop by the capital of China’s Rust Belt, wintry Heilongjiang province, en route.

But what does this building have to tell us about how architecture and high culture can revitalize regions that seem to be dead in the water? Can cultural infrastructure really offer cities a new lease on life?

During boom times, China’s leaders bragged that the economy had done in 20 years what took the West 200. The flip side of this staggering pace of change is that certain Chinese regions have careened right into the post-industrial doldrums of American cities like Detroit and Buffalo, or anywhere once dependent on manufacturing, but no longer.

Heilongjiang, in the far north, is such a place. Its economy, based on oil extraction and heavy industry, flourished in the 1960s, but as the global economy transformed, local producers found themselves unable to...
compete with the quality and prices available from foreign competitors. The decline left communities limping by on subsidies, and spurred migration to China’s more prosperous cities.

Harbin today. (Benny Shaffer)

Harbin is a ruin of its former self, a city founded by Russian colonists in the late 19th century and once known as “the Paris of the East.” Subtract the beauty left by the internationalism of the decaying city center—the Russian Orthodox churches, the grand boulevards—and you could say the same about Changchun, Shenyang, Shijiazhuang, or many of the Chinese cities whose economies revolved around manufacturing.

These conditions were beautifully, albeit morbidly, captured in the 2014 film Black Coal, Thin Ice, a noir thriller set in an unidentified city in Heilongjiang. The ruined architecture makes for an evocative and complex backdrop, but the communities that have been undone by economic globalization are harder to capture. What is clear is that drug use, alcoholism, crime, and many other social problems have been exacerbated by the demise of industry in China’s Rust Belt.

Harbin’s population stands at about 5 million and keeps growing (according to sometimes unreliable official statistics), albeit slowly in comparison with other Chinese cities. Population growth may attest more to the misery in the surrounding countryside than Harbin’s own dynamism. It remains deeply poor compared to China’s boom towns. Even by the government’s own inflated figures, the disposable income of residents is a fraction of that in Shanghai, approximately 28,000 RMB a year (about $4,300) compared to almost 48,000 (about $7,300).

Enter Ma, China’s answer to Rem Koolhaas, whose museum is the latest and most grandiose attempt to capture the “Bilbao Effect,” so called after the success of the Spanish city of Bilbao in rebranding itself with an iconic museum, Frank Gehry’s Guggenheim Bilbao. While cultural (and financial) capital becomes ever more concentrated, the dream of creative rebirth can be a seductive Pied Piper for administrators of languishing cities. After all, if every reader of design websites knows where Harbin is, then a full-throated recovery can’t be far off, right?
Like the sports stadiums plopped into American cities at the expense of local taxpayers, these big architectural symbols check the box for leaders who want to show visible, tangible indications of urban change.

Harbin’s leaders have voluptuous plans to transform their town not into a Paris, but a “Venice of the East,” as the city is situated in wetlands (which are unfortunately frozen for much of the year). The Jiangbei district north of the river will host high-tech industries; the Harbin Institute of Technology, one of China’s better universities, will feed it with intellectual capital. Architecture offers what seems like a convenient shortcut: the sign of a thriving urban culture, with tricky political questions of ownership and rights to the city sidestepped.

Like the sports stadiums plopped into American cities at the expense of local taxpayers, these big architectural symbols check the box for leaders who want to show visible, tangible indications of urban change. But sometimes, urban fabric is not visible, or tangible: It’s the feeling of home and safety we have in our communities, and the belief that the future of our town includes us.

(Benny Shaffer)

Bilbao, the oft-cited model for architecture-led regeneration, is a small city in a place with good weather and good food. So it’s not surprising that a museum could serve as a spark for tourism. More difficult to understand is how such a complex can help a top-heavy city of several million, which spends months of each year in subzero temperatures, fundamentally transform itself.

As urban economies seek to adapt to globalization and a new ecological consciousness, a shift away from manufacturing and resource-heavy industries may be inevitable—perhaps even a good thing. As for the fate of the opera house, it’s too soon to tell. Doubtless, it will inspire both pride and resentment among locals.

Ultimately, though, no one needs a cultural island (like the one the opera house is built on). We need cultural policies broad enough to encompass the entire city, extending the right to the city to all. Beautiful buildings are a great start, but when contemporary art and culture are seen as practical ways to revitalize decaying cities, the communities they are intended to serve can’t be left behind.
Saint Sophia Cathedral in Harbin’s Daoli district. (aphotostory / Shutterstock.com)

http://www.citylab.com/design/2016/05/chinas-rust-belt-tries-for-the-bilbao-effect/484508/?utm_source=nl__link1_053116
How Greek Drama Saved the City

Daniel Mendelsohn

JUNE 23, 2016 ISSUE

Eolian Museum, Lipari, Italy/Erich Lessing/Art Resource

Jason meeting Medea, with Amor between them; detail of a Sicilian red-figure cup, circa 350 BCE
At the climax of Aristophanes’ comedy Frogs, a tartly affectionate parody of Greek tragedy that premiered in 405 BCE, Dionysus, the god of wine and theater, is forced to judge a literary contest between two dead playwrights. Earlier in the play, the god had descended to the Underworld in order to retrieve his favorite tragedian, Euripides, who’d died the previous year; without him, Dionysus grumpily asserts, the theatrical scene has grown rather dreary. But once he arrives in the land of the dead, he finds himself thrust into a violent literary quarrel. At the table of Pluto, god of the dead, the newcomer Euripides has claimed the seat of “Best Tragic Poet”—a place long held by the revered Aeschylus, author of the Oresteia, who’s been dead for fifty years.

A series of competitions ensues, during which excerpts of the two poets’ works are rather fancifully compared and evaluated—scenes replete with the kind of in-jokes still beloved of theater aficionados. (At one point, lines from various plays by the occasionally bombastic Aeschylus are “weighed” against verses by the occasionally glib Euripides: Aeschylus wins, because his diction is “heavier.”) None of these contests is decisive, however, and so Dionysus establishes a final criterion for the title “Best Tragic Poet”: the winner, he asserts, must be the one who offers to the city the most useful advice—the one whose work can “save the city.”

Today, the idea that a work written for the theater could “save” a nation—for this was what Aristophanes’ word polis, “city,” really meant; Athens, for the Athenians, was their country—seems odd, even as a joke. For us, popular theater and politics are two distinct realms. In the contemporary theatrical landscape, overtly political dramas that seize the public’s imagination (Arthur Miller’s The Crucible, say, with its thinly veiled parable about McCarthyism, or Tony Kushner’s AIDS epic Angels in America) tend to be the exception rather than the rule; and even the most trenchant of such works are hardly expected to have an effect on national policy or politics (let alone to “save the country”). Such expectations are dimmer still when it comes to other kinds of drama. The lessons that A Streetcar Named Desire has to teach about beauty and vulnerability and madness are lessons we absorb as private people, not as voters.

The circumstances in which we attend theatrical performances today underscore the segregation between our theater and what Aristophanes would call “the city.” When we see a drama or a musical comedy, we do so as private persons expressing personal preferences: we choose the play we happen to be interested in at the moment; we select the date and the time and the seats we prefer. When we enter the theater, however, the “selves” that we have expressed in making these choices disappear; we assume a kind of willed anonymity, exchanging the familiar world of lights and activity and noise for an uncanny, hushed darkness.

Private, personal, anonymous, invisible: it would be hard to think of a theatergoing experience less like the one familiar to the ordinary Athenian citizen during the 400sBCE. This—the so-called “Athenian century,” the hundred-year period of Athens’s political and cultural dominance from the establishment of its democratic government, in 509 BCE, to its humiliating defeat at the end of the three-decade-long Peloponnesian War, in 404—was also the century, not coincidentally, in which the great dramatic masterpieces of Aeschylus, Sophocles, and Euripides were composed, produced, and performed for the first time.

That the fates of Athens and of tragedy were so closely entwined suggests a profound organic connection between the polity and the genre. For us, the children of Freud, great drama is often most satisfying when it enacts the therapy-like process by which the individual psyche is stripped of its pretensions or delusions to stand, finally, exposed to scrutiny—and, as often as not, to the audience’s pity or revulsion. (One thinks again of Streetcar.) But although there are great Greek plays that enact the same process—Sophocles’ Oedipus inevitably comes to mind—it would appear, given the strange twinning of Athenian
drama and Athenian political history, that for the Athenians, tragedy was just as much about “the city” as it was about the individual.

The notion of “the individual” in our sense of the word would, indeed, have been strange to an Athenian of the classical period: when the philosopher Aristotle famously says that “the human is a political animal,” he doesn’t mean that we are all like Lyndon Baines Johnson but, rather, that the human species is naturally social and civic—by nature suited to live in a polis. Over the course of the fifth century BCE, tragedy evolved into an ideal literary vehicle for exploring, and often questioning, the political, social, and civic values of Athens itself.

In his treatise Poetics, the first extended work of theater criticism in the Western tradition, Aristotle, writing in the mid-300s BCE and looking back to the great century of Athenian drama and, beyond that, to the dim origins of drama itself, suggests that tragedy grew out of a kind of ritual chorus known as dithyramb, sung in honor of the god Dionysus. (We know that in the fifth century—perhaps a century and a half after the primal moment that Aristotle was trying to reconstruct—dithyrambs were sung at public festivals by choruses of fifty singers, men or boys. These were led by anaxarchon, a performer who “led off” the singing.) The philosopher asserts that tragedy grew out of moments of “improvisation” on the part of these chorus leaders who, evidently, decided at a certain point that instead of simply feeding the opening bars of the chorus to their fellow singers, they were going to sing a few lines of their own.

Whether this notion was based on hard evidence known to the philosopher and since lost or was simply a shrewd surmise, the theory has an obvious appeal: its basic image—of the leader who sets himself apart from the group, the individual who is willing to stand isolated from others—is, in embryo, central to most Greek tragedies. Every one of the thirty-two Athenian tragedies that have survived from antiquity enacts the process whereby a character makes a decision to stand in opposition to something—fate (expressed in oracles), family, the state; and every one of those plays consists of a series of arguments about that decision. These arguments take the form of speeches that are delivered in the presence of a chorus that never leaves the stage and that, at intervals, sings elaborate songs that comment on, or are thematically related to, the controversy at the heart of the play. What is noteworthy in all this, what contributes “the political” element (in Aristotle’s sense), is the constant presence of this chorus: the group that, like the city itself, is always watching, listening, observing.

These relatively simple formal components allowed Athenian dramas to explore with particular incisiveness the city’s great social and civic preoccupations. Many people know that Athens in the fifth century BCE was a radical democracy, in which all citizens voted directly on most matters of pressing public concern, and in whose day-to-day workings all citizens were, at least theoretically, expected to participate. (Certain offices were assigned by lot.) What is less well known is that the great aristocratic families of an earlier era in the city’s history continued to hold and to covet power, manipulating the ostensibly democratic system in order to preserve their prestige and privileges. Pericles, for instance, belonged to a family that might well be compared to the Vanderbilts or the Rockefellers of a later age.

Unsurprisingly, the tensions between glamorous, charismatic, and powerful leaders—“heroes,” in a word—and the masses, who are simultaneously susceptible to, and suspicious of, those heroes’ allure, often make themselves felt in Greek tragedy, where uneasy dynamics between the main characters and the chorus are a central feature in many works. Whatever else Sophocles’ Oedipus is about, the arc that it traces from the chorus’s worshipful adulation of the hero at the beginning of the play to the revulsion and pity they feel for him by the play’s final revelation of his true identity reminds us that our relationship to great leaders is often an ambivalent one.
The opposition between individual and group, between actor and chorus, that is one of the two essential components of tragedy’s structure allows these plays to dramatize with particular elegance certain kinds of political conflicts—and, indeed, to examine certain kinds of polities. Aeschylus’s Agamemnon begins with the Watchman hinting darkly at the smoldering resentment felt by the people toward the queen, Clytemnestra, who has seized power illicitly with her paramour, Aegisthus. By the end of the play this tension erupts into open confrontation between the queen and the chorus leader, a dire instability that is only resolved at the end of the final play of the trilogy to which Agamemnon belongs, when the rule of law is established at last.

The other essential structural element of tragedy—the agones, those stark confrontations between two individuals, each often acting as a mouthpiece for an entire worldview—allowed the genre both to articulate and to investigate other kinds of tension that surged through the Athenian polity. The best-known example occurs in Sophocles’ Antigone, which turns on a bitter opposition between two very different notions about the individual’s relation to the state. One of the two main characters, the new king Creon, insists on the authority of Thebes and on obedience to its laws, whereas the other, his niece Antigone, insists on adherence to religious custom and allegiance to family and clan. In real life, these two concerns were and are, of necessity, interdependent. The staged conflict in Sophocles’ play dramatizes the difficulties of finding an equilibrium between them.

The equilibrium at issue is, occasionally, that within a single individual’s mind; sometimes, a troubled character becomes a microcosm for “the city” as a whole. In Euripides’ Bacchae, the protagonist is an overly rigid young king with an obsessive interest in maintaining political control (and in what we would call psychological “boundaries”; he’s very anxious about sexuality, among other things). His preoccupation with authority leads him, as it does the king in Antigone, to ignore social and religious obligations at terrible cost to his city. This political failing is enacted in Bacchae’s highly symbolic finale, a scene of astonishing violence in which the youthful ruler is literally torn to pieces: no longer in control of anything, even his own body.

Bacchae, it’s worth pointing out, was produced in 405 BCE, one year after its author’s death and a year before the fall of Athens itself—a polity whose inability to maintain its own balance, one might say, led to its “tragic” fall from the heights of political and cultural supremacy. And 405 was also the year that saw the first performance of Frogs, the comedy that expressed Aristophanes’ forlorn hope that a play could save the city.

2.

The circumstances under which the Athenian citizen attended these dramas, followed these plots, and analyzed these conflicts further emphasized the theater’s public and civic concerns. All Greek tragedies were originally composed for and performed as part of a grand religious and civic ceremonial known as the City (or “Greater”) Dionysia, held each spring in honor of Dionysus (a deity who, as the timing of the festival suggests, also presided over vegetative fertility and growth). The climax of this celebration, which went on for five days and featured magnificent processions and sacrifices, was the theatrical performances. Each year, three dramatists were selected to present four plays each: three tragedies (sometimes linked by plot or theme as a trilogy) plus one so-called “satyr play,” a short comedy whose ribald humor was, presumably, meant to alleviate the intense emotionality of the serious dramas that preceded it.

These performances had virtually nothing in common with the ones we are familiar with today. Whereas our theaters plunge us into darkness as a necessary condition for the “suspension of disbelief,” Greek plays were performed in broad daylight, the performances starting at dawn and ending at sundown. This meant, among other things, that the citizens who attended the plays were not anonymous, as we are, but as plainly visible to one another as the actors and chorus on the stage were.
Those chorus members, it’s worth mentioning, were not professionals but ordinary Athenian men and boys who’d been selected to sing and dance in the performance: the spectators therefore saw themselves reflected on stage—a feature of Athenian tragedy that must have given audiences a thrilling sense of connection to the dramas that were unfolding (particularly, you can’t help feeling, those in which the choruses stood up to kings and tyrants).

The audience members didn’t choose their seats, as we do, but were seated according to “tribes”: the ten subcommunities into which all Athenian citizens were divided as part of the city’s political structuring. The evidence suggests that citizens were strongly expected to attend: by Aristotle’s time, a fund had been established to help poorer Athenians pay to attend the theatrical and civic festivals.

The identity of the audience specifically as members of the polis was reflected in the elaborate pre-performance ceremonies. Before the performances began, the city’s ten leading generals, the stratêgoi, solemnly poured libations before the vast audience. (The Theater of Dionysus could hold as many as 18,000 spectators.) Following that rite, the tribute that had been amassed that year from Athens’s subject-allies was paraded around the theater precinct; then the names of citizens who had greatly benefited the city in some way were recited by heralds, each civic benefactor receiving an honorary garland or crown.

Finally, the sons of Athenian soldiers who had died in the city’s wars—boys who had since been raised at the state’s expense—were paraded before the vast audience. The official proclamation that was recited by a herald during this portion of the ceremonies underscored the elaborate connections between the city, its citizens, and the theater that lay at the heart of the entire festival:

These young men, whose fathers showed themselves brave men and died in war, have been supported by the state until they have come of age; and now clad thus in full armor by their fellow citizens, they are sent out with the prayers of the city, to go each his way; and they are invited to seats of honor in the theater.

The daylight, the fanfare, the solemn rites and loud proclamations, all cumulatively emphasizing the authority and might of the city, the dignity of its military leaders and institutions, the honors that attached to civic service and to military self-sacrifice: we are very far here from the private, anonymous way in which we today experience the theater.

To be aware of all this is, often, to be forced to rethink our customary responses to some of the most familiar Greek tragedies. Antigone often appears to modern audiences as a straightforward parable about the virtue of individual resistance to state oppression. In the play, the headstrong young Theban princess Antigone defies a decree issued by the city’s new ruler, her uncle Creon (to whom, as the play opens, she pointedly refers as “the general”), which forbids anyone from burying the body of her traitorous brother, Polyneices, who has been slain while trying to invade the city.

She opposes Creon’s decree in the name of family ties and of religious law, which insists that bodies must be interred with due ritual. In her defiance, we have liked to see an unambiguously heroic act of conscience—an admirable act of individual resistance to the state. Small wonder that Sophocles’ drama has been a favorite of later adapters with a pointedly political agenda: Jean Anouilh, for instance, whose Antigone premiered in Paris in 1944 and was clearly intended as a parable of resistance to the Nazi occupation.

But it is hard not to wonder how, precisely, the original audience would have considered the act of resistance to military and political authority that is the fulcrum of the play. There is no doubt that the spectators would have had sympathy for Antigone’s obsessive sense of obligation to bury her dead brother—proper disposal of
the dead being a social and religious imperative in Greece as in all other cultures. But just how would the young woman’s frequently voiced contempt for “the general” and his decree have struck an audience that, only minutes before the actor playing Antigone uttered this speech, had witnessed a moving ceremony presided over by the city’s greatest generals and honoring its civic leaders, a rite during which they beheld the poignant sight of young men who had been raised by “the state”—the orphaned children of soldiers who, unlike Antigone, had unquestioningly followed the orders of their commanding officers, at the cost of their own lives?

So, too, with many other plays. There is a wrenching moment early in Aeschylus’s Agamemnon when the chorus recalls the long-ago crime that has led to the play’s action: Agamemnon’s sacrifice of his daughter Iphigenia at the beginning of the Trojan War, a rite performed in order to win fair winds for the Greek armada as it sailed for Troy. It is in revenge for this infanticide that Clytemnestra murders Agamemnon at the climax of Aeschylus’s play. (Like Antigone, Agamemnon’s queen sees herself as the champion of family ties that have been eclipsed by those of the state.) And yet here again, an awareness of the tribal and patriotic energies that must have animated the audience members as they watched this play for the first time makes it difficult to dismiss Agamemnon’s decision (as modern audiences tend to do) as crass military opportunism or political self-interest. The Iphigenia myth symbolizes, and the play dramatizes, a far more complicated and vexed reality: that whenever a city goes to war, every family, every private household, must “sacrifice” its children.

From these few examples yet another crucial feature of Greek tragedy emerges, the nuances and ramifications of which are also best appreciated in light of the realities of Athenian culture and society. The conflict between ideologies, between competing allegiances, that animates the plays written for the Athenian stage is often dramatized as a conflict between a man and a woman: Clytemnestra versus Agamemnon, Antigone versus Creon, many more. Looking at the titanic heroines of Greek drama—not only Clytemnestra and Antigone but Sophocles’ Electra and Euripides’ Phaedra, Hecuba, and Helen—it can be easy to forget that in classical Greek society, women were meant to be largely invisible: confined, at least in theory, to the women’s quarters of their houses, compelled to wear veils in public, unable to own property, and denied any role in political life. (There is still debate about whether women even attended the tragic performances.)

We cannot know the precise extent to which these social conventions were observed in day-to-day life, but certainly the women and girls in Greek tragedy were aware of them. In a drama by Euripides called The Children of Heracles, a young girl who volunteers to be a human sacrifice in order to save the city of Athens makes her entrance by apologizing for having violated feminine decorum by speaking in public.

Yet despite the limitations imposed on them in real life—or, perhaps, because of them—women as represented on the tragic stage could speak for values and concerns that were too easily trampled on by men, or had been left out of their plans. In Euripides’ Medea, the heroine is, to be sure, outraged that her husband has abandoned her for a younger woman (this all-too-familiar story being the focus of many a modern production); but attentive readers will notice that what bothers her even more than this blow to her vanity is the fact that Jason has broken the oath he took when he married her. It is this betrayal—the betrayal of words and their connection to action—that she incredulously refers to throughout the play.

There is an irony here that, it is hard not to suspect, would have struck the original audience of the play in 431 BCE—the year in which the Peloponnesian War began—with discomfiting force. For here, it’s the woman (and, indeed, a non-Greek) who champions the integrality of language, the connection between words and deeds; while her Greek husband—a legendary hero, no less—is portrayed as a glib opportunist whose mortifying sophistries about how he’s leaving her and the children for their own sake convince neither the other characters nor the audience.
In the same playwright’s Trojan Women, produced only months after Athens carried out a savage reprisal against a rebellious ally during the Peloponnesian War, the mothers, wives, and daughters of the brutally conquered Trojans of myth become, in abject defeat, triumphant symbols of civilization itself. As Cassandra, the prophetess daughter of the murdered Trojan king, Priam, reminds her captors, the Greek “winners” of the great war have in fact lost, because they have abandoned the moral, ethical, and cultural values that make humans civilized. By contrast, she observes, the defeated Trojans have maintained their values and traditions, and are thus, in some larger sense, the real victors. The fact that this moving case is made by an unmarried young woman—which is to say, a member of Athenian society who was unable to participate in the political decisions that set great wars in motion in the first place—lends a complexity, even an irony, to Trojan Women’s pronouncements about war and civilization.

Complexity; irony. I don’t mean to suggest that a lively awareness of the social and civic conditions that produced Greek drama should lead us to exchange one reductive kind of reading (Antigone is a moral heroine, Creon is a political villain) for another—in which, say, Antigone’s resistance would have been frowned on. Rather, the contradictions I’ve mentioned should deepen and complicate our readings of Greek tragedy.

The tension between the celebratory civic ceremonial that preceded the plays and the acts of defiance and opposition to authority and social norms that furnish so many of those plays’ plots surely created a space for fruitful consideration of the complexities of life as a citizen. Every polity, to recur once again to the example of Antigone, must find a way to balance the concerns of the state with the concerns of individuals and their families: the point of Sophocles’ play is not that Antigone is “right” and that Creon is “wrong,” but rather that each character has a valid point to make. The problem—and the source of dramatic excitement—is that each is unable to see any validity in the other’s views.

This consideration takes us very close to what it is that makes Greek tragedy “tragic.” A play about an unambiguously heroic young woman, someone’s mother or sister or daughter, squaring off against an unambiguously villainous general or king, a man greedy for military renown or for power, would not be morally interesting. What gives Antigone and Agamemnon and other plays their special and unforgettable force is that they present the irresistible spectacle of two worldviews, each with its own force, harrowingly locked in irreducible conflict. And yet while the characters in these plays are unable to countenance, let alone accept, their opponents’ viewpoints, the audience is being invited to do just that—to weigh and compare the principles the characters adhere to, to reflect on the necessity of seeing the whole and on the difficulties of keeping the parts in equilibrium. Or, at least, to appreciate the costs of sacrificing some values for others, when the occasion demands.

It is in this way—by sensitizing its audience to such bitter conundrums, to the agonizing choices that come with being both an individual and a citizen—that Athenian drama could educate those who saw it performed. This is why, at least in theory, tragedy could “save the city.” As we know, tragedy failed in the end to save Athens. But we cannot doubt that, during the great century of its efflorescence, Athenian drama provided many thousands of citizens with opportunities to reflect deeply on their lives and on the city with which those lives were so inextricably bound.

New device could help improve taste of foods low in fat, sugar and salt

American Chemical Society

Summary:

Scientists may be closing in on a way to let consumers savor the sweet taste of cake, cookies and other delights without the sugar rush. They have isolated several natural aromatic molecules that could be used to trick our brains into believing that desserts and other foods contain more fat, sugar or salt than they actually do.

Share:

FULL STORY

Adding certain aromas to foods made with less fat, sugar or salt could make these products more appealing to consumers.

Credit: © Voyagerix / Fotolia
Scientists may be closing in on a way to let consumers savor the sweet taste of cake, cookies and other culinary delights without the sugar rush. In preliminary tests using a new device developed in-house that allows them to screen for odor compounds in real foods, they have isolated several natural aromatic molecules that could be used to trick our brains into believing that desserts and other foods contain more fat, sugar or salt than they actually do.

The researchers will present their work today at the 252nd National Meeting & Exposition of the American Chemical Society (ACS).

"Most consumers know that they should be eating more healthful foods made with reduced amounts of fat, sugar and salt. But this is problematic because these are the very ingredients that make many of the foods we like taste so delicious," says Thierry Thomas-Danguin, Ph.D. "Based on our lab work, we’ve come to believe that aromas can help compensate for the reduction of fat, sugar and salt in healthful foods and make them more appealing to consumers."

Aroma plays a vital role in how we perceive food (just try pinching your nose closed while you eat -- odds are you won’t taste anything). Based on this fact, food scientists have long used chemical aromatics, essential oils and botanical extracts to enhance the flavor of food and beverages to boost sales.

Recently, scientists have turned their attention to using aromas to improve the taste of foods made with reduced amounts of fat, sugar and salt, which many consumers avoid because of their notoriously bland flavor.

"If you buy a product made with 30 percent less salt, and you don’t like it because it isn’t very tasty, what do you do?" Thomas-Danguin asks. "You’ll probably reach for the table salt and put some into the product. So the target is missed. Our goal is to optimize the reformulation process, so the food industry can produce more healthful products that consumers will like as they are and will choose to eat them regularly."

In earlier work, Thomas-Danguin set out to prove that if the right aroma is added in the right amount in the right places in the right food, the brain can be fooled into thinking there is more fat, sugar or salt in it. Study participants were asked to taste flan, a type of custard, made in layers containing varying amounts of ham aroma and salt. The researchers found that the ham aroma, even though it contained no salt, increased the perception of saltiness of the flan. In fact, some participants thought one variation of the custard made with ham aroma and salt distributed unevenly in layers throughout it tasted the same as a flan made in the traditional way with 40 percent more salt.

In their latest study, Thomas-Danguin and his colleagues at the Centre des Sciences du Goût de l’Alimentation in France, sought to find a new way to isolate aroma molecules associated with sweet tastes. So they created a first-of-its-kind device called a Gas Chromatograph-Olfactometry Associated Taste (GC-OAT) and used it in conjunction with an olfactoscan, which delivers a continuous stream of aromas through a tube to a subject’s nose.

Participants were asked to smell real fruit juice aroma through the olfactoscan. Meanwhile, the researchers used the GC-OAT to isolate molecules from the juice. Then, they added the molecules one at a time into the olfactoscan tube. As the participants smelled each of these mixtures, they were asked if the molecule contributed to their perceived sweetness of the fruit juice. Thomas-Danguin says the preliminary results suggest that this new technique could eventually help food manufacturers better formulate more healthful foods without sacrificing taste, aroma or texture of the original products.
Story Source:

The above post is reprinted from materials provided by American Chemical Society. Note: Content may be edited for style and length.

https://www.sciencedaily.com/releases/2016/08/160822083242.htm
Strange Trees: An Illustrated Atlas of the World’s Arboreal Wonders

From the cocoa tree that gives us chocolate to the Philippines’ rainbow tree, a global tour of rooted marvels.

BY MARIA POPOVA

Hermann Hesse called trees “the most penetrating of preachers.” Three centuries earlier, a forgotten English gardener asserted that they “speak to the mind, and tell us many things, and teach us many good lessons.”

Perhaps because trees are the oldest living things in the world, they have permeated our ancient mythology and our scientific sensemaking. More than a beautiful metaphor for life and death, trees have even saved our lives and, in inspired moments, we have saved theirs.

In Strange Trees and the Stories Behind Them (public library), French author Bernadette Pourquié and illustrator Cécile Gaminichoreograph an illustrated tour of the world’s greatest arboreal wonders, from species that have witnessed the dinosaurs roam this Earth to exotic marvels like Brazil’s “Walking Tree” (Red Mangrove) and the Philippines’ “Rainbow Tree” (Mindanao gum tree) to underappreciated procurers of human delights, such as the sapodilla tree that gives us chewing gum and the cocoa tree without which there would be no chocolate.
Rainbow Tree (Mindanao gum tree)
Ghost Tree (Davida)
Walking Tree (red mangrove)
Chewing Gum Tree (sapodilla)
Bottle Tree (Brachychiton rupestris)

Alongside each imaginative illustration, partway between botany and fairy tale, is a one-page autobiography of the respective tree, describing its natural and cultural habitat in a short first-person story fusing curious science facts, history, and local customs.
Chocolate Tree (cacao tree)
Don’t worry about getting bonked on the bean with a pod: cocoa trees don’t lose their seed pods, even when ripe. They dry up, unless, of course, a hungry parrot happens by.

I hope you didn’t forget your adventurer’s cooking kit: a club, a banana tree leaf, an oven, some rocks, and a healthy dose of patience.

Smash three pods with your club and save one hundred seeds to make about four ounces of chocolate. Let them ferment for a week, and a white pulp will seep out. Next, let them dry on a banana tree leaf for two weeks, stirring them frequently: you’ll get brown cocoa “beans.” Now break open their shells, wash them, and roast them for twenty to thirty minutes at 215 to 285 degrees Fahrenheit. Then crush them over heat with rocks. Now you have “cocoa paste,” from which you can make chocolate.
Complement the wonderful *Strange Trees* with this photographic tour of the world’s oldest living trees, the heartening story of how Marianne Moore saved a majestic elm with a poem, and the philosophical and uncommonly poetic Japanese pop-up book *Little Tree*.

Illustrations courtesy of Princeton Architectural Press

[https://www.brainpickings.org/2016/06/09/strange-trees/?mc_cid=f6eda9a29b&mc_eid=d1c16ac662](https://www.brainpickings.org/2016/06/09/strange-trees/?mc_cid=f6eda9a29b&mc_eid=d1c16ac662)
The Role of Cities in Preventing Crisis

A conversation with the scholar Josef Konvitz.

- RICHARD FLORIDA
- @Richard_Florida

Venezuelan citizens are suffering from a recession, the world's highest inflation rate, and multiple water and power cuts. (Carlos Garcia Rawlins / Reuters)

Economists increasingly note that cities are a key driving force of the modern global economy, but urbanism rarely features prominently in the conversation about economic crisis and recovery. In his new book Cities and Crisis, Josef Konvitz—a former head of urban affairs and regulatory policy at the Organization for Economic Co-operation and Development—examines the vulnerability of cities, the limits to existing policies to cope with threats, and the key role cities should play in any economic recovery.

Ultimately, Konvitz argues that cities are indeed at the center of crises in the 21st century. Under-investment in infrastructure, low levels of research and innovation, spiky levels of urbanization, uneven development, and a significant increase in income inequality contributed to the breakdown of the global economy in 2008. To ensure a lasting recovery, new approaches to urban development and policy are required at the regional, national, and global levels.
I spoke with Konvitz, who lives in Paris, about the limitations of current policy, and about how governments can better prepare for future crises by making cities the focus of national and global governance.

Your book puts cities and urbanism at the center of economic crises, not just today, but historically. Tell us more about the role of cities in the long sweep of economic crisis.

The last great economic crisis before 2007 was linked to unmanageable debt levels, speculation, and a collapse of demand in the 1920s. Postwar recessions have been comparatively mild. Since the 1880s, cities have become better protected against recurrent, generic catastrophes: cholera epidemics, devastating fires, sieges and bombardment, as well as destruction caused by floods and earthquakes. We became complacent. Now we face a reversal of what has been a long-term trend to make cities safer.

Just because urban housing markets in some countries led to the housing crisis in 2007-2008, it would be a gross mistake to generalize that there is something fundamentally wrong about modern urban development. Many highly urbanized countries that have been badly affected by the consequences of the global financial crisis were innocent bystanders when the crash began.

Today we are in the post-crisis crisis. Many urbanists adopt either a pessimistic view of cities as dystopian, dysfunctional systems whose growth is the cause of many incurable ills, or focus on cities as beacons of opportunity and innovation that minimize the role of national governments. Instead, we need real policy changes to make cities safer and more resilient given the range of threats to which they are exposed.

A homeless man sleeps on the streets of Athens, Greece, which is facing its sixth year of recession and high unemployment. (Petros Giannakouris/AP)
You write a lot about uneven development and spiky urbanization. Today, our most advanced, innovative, and successful cities have become increasingly unequal and segregated, with the rich moving back in droves, effectively walling themselves off from the less advantaged. How does spatial inequality link with urban crises? What can be done to address it locally and globally?

Spatial inequality differs from the great gaps between rich and poor in very large, global cities, which get all the attention. The problems of spatial inequality in Glasgow, for example, are linked to environmental factors, the condition of the housing stock, long-term unemployment following de-industrialization, and failed social policies. If more rich people moved into Glasgow, adding to the tax base and increasing spending, things might actually get better. In many places, spatial inequality is endemic. What has changed is the will to do something about it. Physical regeneration is the easier part. Targeting health problems or correcting educational deficiencies are more difficult, and take longer. Managing space better is the imperative. We know what to do, but not how to do it.

Widening disparities and the displacement effect of rising property prices can lead to the generation of distressed urban areas, compounding the effects of inequality. It has become too easy in London, for example, to privatize space that ought to be public. New York does not have to grant permission for the construction of some of the world’s most expensive residential real estate, but if it does so, it should also set up early warning systems and modes of intervention to stop a spiral of decline in parts of the city where social and economic change can lead to ghettos. And in the small number of very expensive cities that are often market-makers in the global economy—New York, Tel Aviv, Hong Kong—young people cannot find reasonable accommodation to rent or cannot afford to buy. The street movements in these cities were not led by the poor, but by well-educated, middle-class, young professionals.

Falling household wealth in cities is a sign that urban economies are under-performing. Populist, extremist politicians in many countries exploit the frustration felt by people who no longer believe that life will ever get better. Long commuting times, congestion, oppressive noise, degraded land, etc. are like a tax. The problems of cities do not start with the growth of manufacturing in China. They start at home.

You point out that our “knowledge of cities is inadequate,” and that it has been that way for a long time. Why do we need to improve our knowledge of cities, and how can that help us avoid crises and generate a broader, more sustainable prosperity?

Most national statistics are based on aggregate units as large as states, regions, or national territories. Urban economies spread over many jurisdictions, making it difficult to know what is happening at the sub-national level. For macro-economists, cities are a kind of “black hole”: They know that what goes on in cities affects innovation, but they don’t know how. Even mayors do not know how much is spent or invested by all parts of government in their jurisdictions. Yet management experts still peddle the idea that cities should be run like a business, with a business model.

We have to act now, with existing tools and data. Remember that the best studies of the Great Depression only began to appear in the 1950s. Rather than waiting for a recovery that in any case will not lift all boats, many cities—impatient with national governments—are creating and valorizing specific local assets, investing in good design and environmental remediation, strengthening education at all levels, and improving health care and access to it. But many cities are still in a passive mode. And when a recovery does come, they will struggle.
You write that “cities, as economic motors, need two critical inputs—innovation and infrastructure.” Lots of people invoke Keynes on the need for more infrastructure spending as a way out of economic crisis. But certain kinds of infrastructure like roads and highways spread us out, while other kinds create the density required for innovation. Tell us more about what the public and private sectors can do to ensure that we get infrastructure right.

In the 1920s and 1930s, a backlog of overcrowded, unsanitary housing, under-developed mass transit systems, properties without electrification or connections to sewer systems—the legacy of rapid industrialization—shaped an agenda for investment-led reform in the Great Depression. There is no comparable agenda today. There is a huge funding gap between the more than $50 trillion needed for infrastructure by 2030 and the amount being spent—and that is without taking into account the cost of coping with climate change.

Great projects have dynamic effects, precipitating changes throughout urban regions that are all but impossible to model in advance because no one can anticipate their impact. Projects are often sold on the basis of the number of construction jobs or new housing starts that will follow. This narrow approach to cost-benefit analysis would have led the Victorians to conclude that a major sewer system for London was too expensive. By the same token, bridges and tunnels linking New York and New Jersey would never have been built a century ago. The test of good infrastructure is whether it makes best use of the density, size, and complexity of cities.

The George Washington Bridge, connecting New York and New Jersey. (Mel Evans/AP)

Look at Le Grand Paris Express: 68 new stations for an automated subway on 200 kilometers of track at a cost of 24.7 billion euros over 15 years, three new metro lines, between 250,000 and 400,000 new housing
units to be built near the new stations, and over 100,000 new jobs in suburban cities better connected with each other and the center of Paris. The rate of return, through higher per capita income, spending, and higher corporate profits, makes this a wise investment with a one-hundred-year horizon. Cash-rich, the private sector can act fast when government with a vision sets the strategic framework for the urban future.

For years, the public sector has been waiting for the private sector to invest. The big builders and operators are waiting for government to lead. Until the factors such as complex regulatory procedures and the lack of capital budgets that have held down infrastructure investment in recent years are addressed, calls for increased spending, which already echo in electoral promises, are likely to remain unanswered.

It’s no secret that urbanists like to promote urban policy. You make the very important point that “specific urban policies framed around urban objectives matter less to the development of cities than other fiscal and sectoral policies which were drafted with other objectives in mind.” Tell us more about what you mean here.

Cities were largely autonomous in the 19th century, guided by local elites and reliant on local taxes. Depressions and two world wars, which wiped out bourgeois capital and overwhelmed local governments, made the centralization of policy-making and taxation inevitable. As a result, cities were increasingly regulated by laws and through budgets for education, natural resources, transport, working conditions, health, etc. Policies specifically focusing on urban issues became a kind of residual. Urban policies are more about costly problems associated with disadvantage than about growth and opportunity linked to trade, research and development, small business, etc.

De-industrialization, the infrastructure crisis, and rising inequality are problems in their own right, but they are also indicative of shortcomings in how governments struggle to intervene to improve the conditions of life in cities. The example of water shows how things can go wrong: Think not only of lead in the water supply of Flint, but also of severe problems of water management in Spain, the American West, Mexico, or India. Even well-run cities with vibrant economies can become hostage to problems that got out of control.

You talk a lot not just about economic crises, but of the role of cities in natural disaster and other crises. You point to the staggering risks coastal cities face from rising water levels and fiercer storms brought on by climate change. Tell us more about what can be done to mitigate these huge risks in many of the world’s biggest and most important cities.

The coastal zone, the space shared by water and land, is the most difficult to manage. Where water and land meet, economic, environmental, and cultural objectives are difficult to reconcile. Because there are competing pressures on a limited and fragile space, priorities must be set, but control rests with too many different authorities, each with its own mandate. Not everyone will get their way. Huge engineering works in London or New York City may be necessary, but are not sufficient. Sometimes the problems are just shifted to another jurisdiction (East Anglia in the U.K. or New Jersey in the U.S.), where governments may have to stop people from building where they want to live, or relocate entire communities.

Adjusting political systems and economic perspectives to account for the rate of spatial change is a major challenge. Risk consciousness should not lead to panic or paralysis. Instead, people need to be trained to cope when disaster hits. Resilience follows when there is a higher stock of social capital, when people of different ages and incomes live near one another, when businesses are rooted in the places where their workers live, and when governments have undertaken a strategic analysis of what needs to be improved.

Over the next century or so, billions more people will move to cities and we will spend hundreds of trillions of dollars building new cities and rebuilding old ones. A troubling situation, which you point out in the book, is that agglomeration and urbanism in many of the most rapidly urbanizing parts of the world are not leading
to growth, opportunity, jobs, or development. What can we do to make sure we get this next great wave of urbanization right?

The priority should be to avoid the needless loss of capital stock through disease, drought, natural disaster, war, and corruption. Leadership in urban innovation and policy probably still rests with developed countries in Asia-Pacific, Europe, and North America. There are many useful, even inspiring, initiatives around the world, including in countries with high rates of growth and low incomes. Western countries have no monopoly on how to make societies resilient, but the initiative for global regulation lies with the United States and the European Union.

You also say that cities are key to recovery and long-term prosperity. How can we develop policies and strategies to ensure that cities play their most vital and powerful role?

Governing structures in most countries date from a time when agriculture and extractive industries, and hence rural regions, shaped politics. Short of an overhaul of the relations between national and sub-national governments (as in France) or a remodeling of urban boundaries (as in Denmark), three things can be done: 1) adopt coherent programs that cross existing jurisdictional boundaries; 2) align national and local priorities and budgets, synchronizing timing across budget cycles (probably utopian in the United States); and 3) make a vision of the future seem achievable. Inventing the city of tomorrow calls for innovation in governance. It is striking that in many countries, being a successful mayor is a springboard to the prime ministry or presidency (not in the U.S.).

Drinking fountains at Flint Northwestern High School in Flint, Michigan. (Carolyn Kaster/AP)
You devote an entire chapter to cities and governance. There are so many levels of government—not to mention the private sector, NGOs, urban advocacy groups, and, of course, neighborhoods and citizens—that affect cities and urbanization. What is the appropriate balance of power between international institutions, nation states, cities, and neighborhoods that would help us achieve a broader, shared urban prosperity?

There is no best model for multi-level governance. When a system has become dysfunctional and a brake on growth, it should be changed. Look at France in 2015: A long-dormant project to reduce the number of regions and virtually eliminate the departments was revived and enacted in only five months. The number of regions was cut from 22 to 13. Most of the duplication in function between regions and departments has been eliminated in favor of regions, which now have greater taxing and spending flexibility, and more responsibility for economic development at the sub-national level. The result will be less centralization. At the same time, every urban agglomeration, composed of several municipalities, has had to elect a metropolitan council with its own leader.

The challenge is not to make crises impossible, but to reduce uncertainty. Some problems call for greater centralization, others for greater decentralization, or even more power-sharing at a supra-national level. We need an ethos for inter-dependence, based on an understanding that the risks cities face, which are increasingly cross-border, can only be managed if we co-operate.

You say that we are in the middle of a great economic and urban transformation. But, like me, you are a fan of Jane Jacob’s last cautionary work, Dark Age Ahead. Do you think that this transformation can avoid chronic crises (you write that “crises are the new normal”) and other dysfunctions? Can we come out the other side with better cities and a more inclusive kind of urbanism?

Jane Jacobs often wrote that, because cities generate problems, they are also where innovations to solve those problems are found—inventions that in turn create jobs, lift incomes, and enhances the quality of life. It is almost more important for cities to take up useful innovations than it is for them to direct the power of innovation on themselves. But the problem-solving process seems to have broken down. The longer the crisis lasts, the greater the likelihood that a paradigm shift will become inevitable. The process can be wrenching, but, based on precedent, it takes place well within the span of a generation. Because the last paradigm shift of this order of magnitude occurred between 1880 and 1910, no one today has any experience guiding the birth of a new framework for economic regulation and urban development. We can take hope from history. Urbanization has never been reversed except by force.

This interview has been edited and condensed.

Is it your second cousin? Cotton swabs may tell you

New Kyoto University DNA test advances forensic analyses

Source:
Kyoto University

Summary:
With a new technique, a simple swab sample can accurately confirm relatedness between two individuals as distant as second cousins. With more DNA datasets at hand, the method could be utilized to identify disaster victims in mass floods and tornadoes that destroy entire communities.

Share:

FULL STORY

A new DNA testing technique can accurately confirm relatedness between two individuals as distant as second cousins. With more DNA datasets at hand, the method could be utilized to identify disaster victims in mass floods and tornadoes that destroy entire communities.
The precision of DNA testing portrayed on mystery television shows could soon become reality. With a new technique developed at Kyoto University, a simple swab sample can accurately confirm relatedness between two individuals as distant as second cousins. With more DNA datasets at hand, the method could be utilized to identify disaster victims in mass floods and tornadoes that destroy entire communities.

"Up till now, the accuracy of verifying pairwise blood relations between parents and children were 95 percent and siblings around 72 percent. With slightly more distant relatives like aunts and uncles it goes down to five percent. As for cousins and second cousins, it was practically impossible," says study author Keiji Tamaki. "This new technique brings all of this to nearly 100 percent."

All it takes is a dab inside the cheek with a cotton swab. From these samples they compare 170 thousand single nucleotide polymorphisms (SNP), which are locations where the genetic code varies minutely from person to person. Instead of simply comparing how each individual SNP matches, they also examine how many consecutive matches there are.

"Our inspiration for the project came from tsunami victims in the 2011 Great East Japan earthquake," says Chie Morimoto, who led the study. "Many tsunami victims passed away, and over 70 of them have yet to be identified even though five years have passed."

DNA collected from personal belongings left at home -- for example, toothbrushes the person used to use -- are reliable material for personal identification. Tsunamis, however, wipe away entire communities, leaving forensic scientists with no direct clues. In such instances, testing for blood relations is the only beacon of hope; but this also had its limitations, because it can only confirm blood relationships between first-degree relatives like children or siblings.

For the time being the team only has enough information for the Japanese population, but with sufficient data the method could be applied anywhere in the world.

"The DNA from the Great East Japan tsunami victims have been subjected to a prolonged period of time, so we won't be able to apply this method immediately to these people," says Morimoto. "At the moment we're making improvements so that we can utilize DNA from degraded samples like these."

Story Source:

The above post is reprinted from materials provided by Kyoto University. Note: Content may be edited for style and length.

Journal Reference:


https://www.sciencedaily.com/releases/2016/08/160822100657.htm
Analyzing how gun violence affects high-risk populations

Research treats shootings like an epidemic -- by applying public health models

Data indicate an individual's odds of being a gunshot victim increase with exposure to gun violence. 

Credit and Larger Version

June 30, 2016

Yale University sociology professor Andrew Papachristos leads a team of researchers that collects information on an all-too-common occurrence in cities like Chicago, Boston, Newark, Cincinnati and Oakland, California: gun violence.

The work focuses not on mass shootings or isolated incidents of violence; Papachristos’ team has worked to gather data on populations that face persistent threats of gun-related attacks and homicides, often connected to gang and drug activity.

Papachristos’ research shows they have properties similar to epidemics of disease. That means they affect particular communities disproportionately and multiply through exposure and can spill over into new areas after reaching a certain threshold.

Papachristos says, however, those same characteristics also provide some insight on how to treat gun violence. With the support of the National Science Foundation (NSF) Social, Behavioral and Economic Sciences directorate, he’s gathering information aimed at helping policymakers do just that. Namely, research shows that solutions community-based economic and social approaches may be most effective at thwarting gun violence.

“Scientists, especially social scientists, have to address the hard questions,” he said. “This is one of them.”
Papachristos’ work seeks to understand the patterns of gunshot victimization, including that in Yale’s hometown of New Haven, Connecticut. His research team analyzed years’ worth of information on shootings and arrests in those cities. By doing so, they were able to identify the social networks of those charged as shooters, including incidents of “co-offending” involving multiple suspects and defendants, all associated with one another. Their results showed that a high concentration of shooting victims were actually connected within the same social networks as the accused shooters -- and that, as an individual becomes exposed to more gunshot victims, his or her own chance of victimization increases.

During a recent visit to NSF, he described his research.

Q. What’s the focus of your current work?

A. My research looks at how gun violence is concentrated and moves among high-risk populations. The basic idea is to take the analogies about an “epidemic” of gun violence more seriously, applying what we know from public health and epidemiology to understand, quite literally, who gets shot. We can use that information not only to understand gun violence better, but to leverage it for intervention and prevention.

Q. When this problem is depicted in media, it’s often in terms of bad actors, good actors and the innocent people in between. You seem to talk about redefining who victims are.

A. This is where science and policy need to come into conversation with each other, because the majority of victims are young men with criminal records, and for a long time, the policy toward those people has been to lock them up -- to treat them as offenders, not victims. If you want to drive the number of victims down, you have to care about saving those lives. Period. You can’t move the homicide rate without saving the lives of young men with criminal records, and that means treating them differently than we have in the past.

This requires different solutions -- different employment opportunities, different services. If they’re coming out of jail, they’re likely to be homeless, they’re often unqualified for any family-sustaining jobs or have a difficult time getting those jobs that are available. Educational opportunities for them are abysmal.

Q. Why is it important from a research standpoint to have information about who the victims of gun violence are?

A. Part of the goal is to better understand the victims of gun violence, so they don’t just get lumped into categories. When we think about risk factors, that doesn’t help you understand who the individual victims are. Our research applies the methods we’ve learned in other areas of science to understand how particular individuals may or may not be in harm’s way. The idea is to understand who within a community is at the most elevated level of risk today, not just to create a set of aggregate risk factors. Those are often the people who don’t get the attention of services and systems, and I think they need not only research attention but policy attention.

Q. How is gun violence like an epidemic?

A. It’s an epidemic on at least two fronts. On the first, most basic level, it’s an epidemic in terms of its unequal effect on the population. Young black men are affected at a rate much higher than young white men. The level of violence among that population is at an epidemic level. What my research shows is that it also moves in epidemic-like patterns throughout populations.

Q. Can you talk about some of the cascading effects you’ve seen in your research?
A. A cascade is when a shooting happens, and then sometime later someone else in your network gets shot, and then sometime later someone else in that person’s network gets shot and so on. We had a hypothesis that would happen, but I didn’t know just how prevalent it would be.

Q. Are you seeing commonalities among the communities you’ve studied, or are these individualized?

A. There are more similarities than differences. The networks in Chicago work like the networks in Cincinnati and the networks in Boston and the networks in Hartford. We actually see similar rules regardless of the city.

Q. How do you define a “network” for this research?

A. We’re looking at behavioral networks of co-offending or co-arrest. So two people that engage in a crime together (and are arrested by the police) have a link. We look at entire populations of people who have been arrested for the people who have been engaged in acts of co-offending.

Q. This type of violence often seems to be an area where people seek simple solutions, but you talk about the idea of social system-wide solutions -- of addressing the problem from the prenatal ward all the way up to the ER. Why is that important?

A. The long-term solution, in terms of addressing the inequities in gun violence -- not just the absolute number of shootings, but the differences among populations -- comes down to fixing communities. We know the effects of education on reducing harm and trauma are massive. There have been studies that have shown that when a kid is exposed to a homicide, he basically loses three months of school. But what mitigates that is having a mentally healthy mother. Having health care for a mother isn’t trivial.

The kinds of support systems I’m talking about have to do with monitoring and supporting communities from a public health standpoint. When a community experiences a shooting or experiences violence, there should be systems in place that can be put into effect. The networked approach can provide a useful tool for interventions in the here and now, and hopefully create some room to work on larger community level change.

-- Rob Margetta, (703) 292-2663 rmargett@nsf.gov

Investigators
Andrew Papachristos

Related Institutions/Organizations
Yale University

Stop the Misuse of Philanthropy!

Lewis B. Cullman

SEPTEMBER 25, 2014 ISSUE

At ninety-five, as a businessman and philanthropist, I want to call attention to little-known ploys in US philanthropy that rob our society of hundreds of millions of dollars earmarked for important charitable causes—leaving money stashed away in financial institutions and doing no good for anyone except money managers and other financial intermediaries.
In the past twenty years, I’ve given away close to $500 million of my own money. After I pioneered the leveraged buyout in 1964, I watched how innovators, imitators, and swarming incompetents tore the companies they acquired apart. Then when I graduated into what I like to call my “distributive phase,” I saw how private foundations were able to take unfair advantages of the charitable deduction.

Writing in The New York Review back in 2003, I explained how a donor gets a tax deduction for all of the money put into a private foundation, yet the foundation is required to spend only 5 percent of its assets per year. That doesn’t mean “donate 5 percent to charity”—it means the 5 percent can be used for “administrative costs.” And I’ve commented on how these administrative costs may include generous salaries for family members and lavish all-expenses-paid tours to foreign countries for board members and administrators, all in the name of “research.” A recent article by Pablo Eisenberg in The Chronicle of Philanthropy disclosed payments made by the Otto Bremer Foundation to three of its board members amounting to over $1.2 million. Operating charities like the New York Public Library and the Metropolitan Museum of Art, on whose boards I serve, pay no trustee fees.

Recent estimates indicate that at least $700 billion is tucked away in private foundations, money that could be doing good for charities and for the economy—and you and I as taxpayers have underwritten the tax benefits awarded those foundations.

I’ve been angry about this for years. I’ve expressed my frustration in these pages, in The Wall Street Journal, and in interviews, and will continue to do so. But now I want to complain about a newer wrinkle that makes me even more indignant, one I deem “philanthropic gamesmanship.”

The more aggressive game in philanthropy I have in mind, one with a soothing but misleading name, is called Donor-Advised Funds (DAFs). Back in 1991, the Boston-based Fidelity Investments applied to the Brooklyn IRS and got a ruling that drastically changed the tax landscape governing charitable donations. Donors get the same tax benefits when they give to a DAF that they would get by contributing to a museum, soup kitchen, university, or any other federally accepted charity. But rather than having the gift made directly to a charity, the funds can simply sit in the account awaiting instructions from the donor. If the donor never gets around to making distributions, they stay in the account earning substantial fees for investment managers. Recently, mutual fund management companies such as Fidelity, Vanguard, and Charles Schwab have set up separate charity accounts to compete for funds.

These funds can provide such tax benefits because the donor must give up all legal control over his or her money when the transfer is made to a DAF. The control is transferred to the administrators of the DAF. Here’s a good example of what can happen. I’m a considerable supporter of a major cultural institution, and on its board of trustees. That institution had been receiving a sizable donation each year from a particular donor. When that donor had died, he had given his money to a DAF administered by a community trust. When the institution in question paid a call to the community trust, seeking confirmation about the continuation of the annual donation, it was told, “We’re not necessarily continuing to give that gift.” Note the use of the word “we”—nothing to do with the past practices of the late donor.

The 1969 Tax Reform Act set the rules for private foundations, but at that time there was no mention of DAFs. Professor Ray Madoff at Boston College Law School has long argued for laws that require timely payouts from DAFs; she says that there is now more than $60 billion tied up in them, and that the amount of money involved is growing at a high rate. Rather than the American people benefiting, it’s Fidelity and others who are thriving.
Professor Madoff is hosting a symposium on this and other topics at the “Convention on Promotion of Meaningful Reform in Philanthropy” in Boston this September 18–20. I plan to attend, and hope the conference will concentrate attention on ways to improve the system of charitable contributions.

It should be obvious that many operating charities can put to good use the huge sums now stagnating in banks or DAFs. Before I hit one hundred, I’d like to see all money designated as “charitable”—which the American government and its people underwrite through tax deductions—get into the hands of those who really need it. There should be a simple, uncomplicated bill relating to foundations and DAFs, fair and easy to understand, requiring that donated money not come under the control of profit-making financial managers. I urge all those who believe that charitable donations can make a difference in this world to make sure that tax-deductible gifts be given to operating charities in a timely fashion.

1. 1


2. 2


Young Barack Obama on What His Mother Taught Him About Love

“Perhaps that’s how any love begins, impulses and cloudy images that allow us to break across our solitude, and then, if we’re lucky, are finally transformed into something firmer.”

BY MARIA POPOVA

In 1990, a promising law student and writer not yet thirty was elected as the first African-American president of the Harvard Law Review. His editorial work for the journal impressed the publishers of the The New York Times imprint into offering him a book deal and so began his quest to capture “the fissures of race … as well as the fluid state of identity — the leaps through time, the collision of cultures — that mark our modern life.”

That young man was Barack Obama (b. August 4, 1961) and that manuscript became his lucid and lyrical memoir Dreams from My Father: A Story of Race and Inheritance (public library).
A beautiful writer with an unmistakable voice, Obama reflects on the extremes of ambition and self-doubt familiar to writers, all the more amplified by youth:

Like most first-time authors, I was filled with hope and despair upon the book’s publication — hope that the book might succeed beyond my youthful dreams, despair that I had failed to say anything worth saying. The reality fell somewhere in between.

It wasn’t until Obama had ascended in the political realm, more than a decade later, that his potent and poetic writing garnered the attention which its creative merit warrants. (I am reminded here of Hermann Hesse’s wonderfully prescient wisdom on publishing: “That stratum of writers and intellectuals which seems from time to time to lead because it shapes public opinion or at least supplies the slogans of the day — that stratum is not identical with the creative stratum.”) But his mother, Stanley Ann — one of the most captivating presences in the book — didn’t live to savor her son’s success. She had died of cancer, “with a brutal swiftness,” a few months after the book’s publication.

Stanley Ann Obama with young Barack
And yet it was she who had taught Obama about what would become the greatest guiding force of his life — the power of love, not only in the impersonally interpersonal political sense of building on Martin Luther King, Jr.'s “experiment in love,” but in its most personal manifestation between two human beings who have chosen each other as partners in every dimension of life, the trying and the triumphant, and continue to choose each other every day of their lives.

In one of the most moving passages in the book, Obama tells the story of how his parents got together — an anecdote his mother once relayed, which illustrates the wonderfully imperfect yet unconditional nature of real love. He writes:

She sighed, running her hands through her hair. “We were so young, you know. I was younger than you are now. He was only a few years older than that…”
She stopped and laughed to herself. “Did I ever tell you that he was late for our first date? He asked me to meet him in front of the university library at one. When I got there he hadn’t arrived, but I figured I’d give him a few minutes. It was a nice day, so I laid out on one of the benches, and before I knew it I had fallen asleep. Well, an hour later — an hour! — he shows up with a couple of his friends. I woke up and the three of them were standing over me, and I heard your father saying, serious as can be, ‘You see, gentlemen. I told you that she was a fine girl, and that she would wait for me.’”

Embedded in the story is a broader meditation on time, the universality of the human experience, and what we each most long for as we surrender, often with enormous resistance and at the price of great discomfort, to love:

My mother laughed once more, and once again I saw her as the child she had been. Except this time I saw something else: In her smiling, slightly puzzled face, I saw what all children must see at some point if they are to grow up — their parents’ lives revealed to them as separate and apart, reaching out beyond the point of their union or the birth of a child, lives unfurling back to grandparents, great-grandparents, an infinite number of chance meetings, misunderstandings, projected hopes, limited circumstances. My mother was that girl with the movie of beautiful black people in her head, flattered by my father’s attention, confused and alone, trying to break out of the grip of her own parents’ lives. The innocence she carried that day, waiting for my father, had been tinged with misconceptions, her own needs. But it was a guileless need, one without self-consciousness, and perhaps that’s how any love begins, impulses and cloudy images that allow us to break across our solitude, and then, if we’re lucky, are finally transformed into something firmer. What I heard from my mother that day, speaking about my father, was … the love of someone who knows your life in the round, a love that will survive disappointment. She saw my father as everyone hopes at least one other person might see him; she had tried to help the child who never knew him see him in the same way. And it was the look on her face that day that I would remember when a few months later I called to tell her that my father had died and heard her cry out over the distance.

Obama began writing this memoir the summer he met the love of his own life, 25-year-old Michelle Robinson. The two were married three years later and he soon came to echo what his mother’s story had taught him about love in articulating his own experience of that supreme human gift. In 1996, when Obama was still unsure of whether he would pursue a political career or become a writer, photographer Mariana Cook — who would later come to photograph some of the world’s greatest human rights leaders — visited Barack and Michelle Obama in their Chicago home as part of a project exploring coupledom in America.

Cook conducted a short interview with the future President and First Lady, in which 35-year-old Obama reflects on the mystery and magnetism of his love for his wife:

Michelle is a tremendously strong person, and has a very strong sense of herself and who she is and where she comes from. But I also think in her eyes you can see a trace of vulnerability that most people don’t know, because when she’s walking through the world she is this tall, beautiful, confident woman. There is a part of her that is vulnerable and young and sometimes frightened, and I think seeing both of those things is what attracted me to her.

Echoing Virginia Woolf’s abiding wisdom on the “moments of vision” that make relationships last, he adds:

What sustains our relationship is I’m extremely happy with her, and part of it has to do with the fact that she is at once completely familiar to me, so that I can be myself and she knows me very well and I trust her completely, but at the same time she is also a complete mystery to me in some ways. And there are times
when we are lying in bed and I look over and sort of have a start. Because I realize here is this other person who is separate and different and has different memories and backgrounds and thoughts and feelings. It’s that tension between familiarity and mystery that makes for something strong, because, even as you build a life of trust and comfort and mutual support, you retain some sense of surprise or wonder about the other person.

Dreams from My Father is a tremendously beautiful and insightful read in its totality. Complement this particular fragment with Tom Stoppard’s perfect definition of love, Frida Kahlo on how love amplifies the beauty of the other, and Anna Dostoyevsky on the secret to a happy marriage, then revisit philosopher Alain Badiou on how we fall and stay in love and psychologist Erich Fromm on what is keeping us from mastering the art of loving.

https://www.brainpickings.org/2016/06/13/barack-obama-dreams-from-my-father-love/?mc_cid=f6eda9a29b&mc_eid=d1c16ac662
Sleep makes relearning faster and longer-lasting

Association for Psychological Science

Summary:

Getting some sleep in between study sessions may make it easier to recall what you studied and relearn what you've forgotten, even six months later, according to new findings from Psychological Science, a journal of the Association for Psychological Science.

"Our results suggest that interleaving sleep between practice sessions leads to a twofold advantage, reducing the time spent relearning and ensuring a much better long-term retention than practice alone," explains
psychological scientist Stephanie Mazza of the University of Lyon. "Previous research suggested that sleeping after learning is definitely a good strategy, but now we show that sleeping between two learning sessions greatly improves such a strategy."

While studies have shown that both repeated practice and sleep can help improve memory, there is little research investigating how repetition and sleep influence memory when they are combined. Mazza and colleagues hypothesized that sleeping in between study sessions might make the relearning process more efficient, reducing the effort needed to commit information to memory.

A total of 40 French adults were randomly assigned to either a "sleep" group or a "wake" group. At the first session, all participants were presented with 16 French-Swahili word pairs in random order. After studying a pair for 7 seconds, the Swahili word appeared and participants were prompted to type the French translation. The correct word pair was then shown for 4 seconds. Any words that were not correctly translated were presented again, until each word pair had been correctly translated.

Twelve hours after the initial session, the participants completed the recall task again, practicing the whole list of words until all 16 words were correctly translated.

Importantly, some participants completed the first session in the morning and the second session in the evening of the same day ("wake" group); others completed the first session in the evening, slept, and completed the second session the following morning ("sleep" group).

In the first session, the two groups showed no difference in how many words they could initially recall or in the number of trials they needed to be able to remember all 16 word pairs.

But after 12 hours, the data told another story: Participants who had slept between sessions recalled about 10 of the 16 words, on average, while those who hadn't slept recalled only about 7.5 words. And when it came to relearning, those who had slept needed only about 3 trials to be able to recall all 16 words, while those who had stayed awake needed about 6 trials.

Ultimately, both groups were able to learn all 16 word pairs, but sleeping in between sessions seemed to allow participants to do so in less time and with less effort.

"Memories that were not explicitly accessible at the beginning of relearning appeared to have been transformed by sleep in some way," says Mazza. "Such transformation allowed subjects to re-encode information faster and to save time during the relearning session."

The memory boost that participants got from sleeping between sessions seemed to last over time. Follow-up data showed that participants in the sleep group outperformed their peers on the recall test 1 week later. The sleep group showed very little forgetting, recalling about 15 word pairs, compared to the wake group, who were able to recall about 11 word pairs. This benefit was still noticeable 6 months later.

The benefits of sleep could not be ascribed to participants' sleep quality or sleepiness, or to their short-term or long-term memory capacity, as the two groups showed no differences on these measures.

The results suggest that alternating study sessions with sleep might be an easy and effective way to remember information over longer periods of time with less study, Mazza and colleagues conclude.
Story Source:

The above post is reprinted from materials provided by Association for Psychological Science. Note: Content may be edited for style and length.

https://www.sciencedaily.com/releases/2016/08/160822083446.htm
Nuclear Power Fights for a Spot in Illinois' Clean Energy Future

State lawmakers are debating whether to keep ailing nuclear plants alive. The outcome will set a precedent for more states to come.

- JULIAN SPECTOR
- @JulianSpector

Steam escapes from Exelon's nuclear plant in Byron, Illinois. (AP Photo / Robert Ray)

With hard times setting in for some nuclear power plants, Illinois state legislators are trying to decide whether they should put nuclear facilities on life support, or lay them to rest early.

A combination of market forces and policy choices has made the nuclear business tougher in recent years, and that’s the case at two facilities in Illinois operated by Exelon. The company is telling lawmakers that the money-losing reactors will have to be brought offline prematurely unless the state lends support. That would result in lost jobs and a big dip in the state’s capacity to produce electricity—one that could have dirty, carbon-burning power plants stepping up to close the gap. With jobs, tax dollars, and environmental quality at stake, it’s turned into a dramatic battle in the final days of the state’s legislative session.
Exelon is searching for a way to subsidize the struggling plants, arguing that the steady, zero-carbon energy source is a public good worthy of public support. One idea in particular is dividing environmental groups: Should nuclear plants, by virtue of being carbon-free, be grouped in with solar, wind, and other renewable energy sources in state initiatives to clean up the grid? It’s a dilemma that could soon spill over into other states as the business and policy landscapes change around clean energy.

When nuclear goes

Nuclear plants produce lots of energy without emitting carbon, but more and more of them are failing to keep up with the low prices of their competitors in wind, solar, and natural gas. That has put thirteen American nuclear plants at risk of closing early in the next two years, according to Environmental Progress, a pro-nuclear clean energy advocacy group that has been active in the Illinois case.

In other markets where nuclear plants have shut down recently, renewables haven’t been able to scale up fast enough to fill the gap. In California, New England, Germany, and Japan, utilities turned to fossil fuels to meet the demand. This puts policymakers in a rather awkward position: do they allocate hundreds of millions of dollars to prop up particular nuclear plants belonging to otherwise profitable multi-billion dollar energy corporations, or let them shutter, inviting more carbon emissions and job losses?

It’s not just local officials who are torn: This choice has also divided the environmental community among those who think that reducing carbon emissions is paramount and see nuclear as necessary for that, and those who want to end nuclear energy and believe renewables offer a viable alternative in the long run. Then there
are the consumers to think about: in a world of carbon constraints, is it cheaper to subsidize some nuclear plants than replace them with a slew of other clean energy infrastructure?

"It would be a blow from a sheer carbon perspective" to lose the nuclear plants, says Dick Munson, Midwest clean energy director at the Environmental Defense Fund. “Obviously, there are some environmentalists and anti-nuclear groups that view reactors from more than simply their carbon emissions perspective."

The Illinois plan

Negotiations are ongoing in the waning days of the legislative session, so the details of the bill will likely change. The whole thing could collapse if the different players can’t find enough common ground.

Things started last year with Exelon asking for help for all its nuclear plants, to be paid for by a surcharge on electricity bills. That didn’t go over well, so earlier this month the utility suggested a change to how the state rewards clean energy. Currently, Illinois requires 25 percent of the energy sold by utilities in the state to come from renewable sources, mostly wind and solar. Renewable standards like this have been a crucial driver of growth in wind and solar energy nationwide, though technical problems have marred Illinois’ plan.

Exelon proposed a change: switching from a renewable energy standard to a clean—or zero-emissions—standard. That would give nuclear a new role in the state’s non-carbon energy regulations and, proponents argue, give the struggling plants just enough of a boost to keep them open.

Opponents fired back, saying this amounts to a subsidy for the nuclear plants that don’t have financial troubles and that it’s not fair for ratepayers to bail out an industry that’s making money overall. Exelon and its allies came back with a more targeted proposal to subsidize just two plants, Clinton and Quad Cities, that it says would have to close in the next two years under current conditions (Exelon is publicly traded, and investors don’t like their companies holding onto money-losing assets for long). The bill would set a floor price for the plants, as Steve Daniels reported for Crain’s Chicago Business:

Exelon would furnish data to state utility regulators on expected costs and revenues, and then the state would approve a surcharge on bills to make up the difference. Yearly revenues from the surcharge are capped at $290 million.

This subsidy would be wrapped into a broader package of support for renewable energy and energy efficiency. The bill offers something to the renewables advocates, while keeping the clean power from nuclear. The key will be whether both sides feel they’re getting enough.

Finding a fair deal

In order to succeed, the deal has to please not just environmentalists and the utility, but the ratepayers at large. That means it can’t impose onerous rate hikes to prop up the plants that are losing money. Another point would be capping the profits the power companies can receive from the deal if things get better, says David Kolata, executive director of the consumer advocacy nonprofit Citizens Utility Board.

“When you start dealing with the nuts and bolts of the issues, the details really matter and you have to make sure you don’t give consumers the bill without giving them the benefits,” Kolata tells CityLab.

The risk in setting a price floor for the nuclear plants, Kolata says, is that “you socialize risk and privatize profit.” When Exelon is making a lot of money, they don’t hand it back to the citizens; when they’re losing
money, they want the public to help them. He suggests that any price floor should come with a price ceiling, so that if market conditions change and the distressed plants start earning profits beyond a certain threshold, that money goes back to the consumers.

Illinois Attorney General Lisa Madigan thinks there’s no good deal to be had for citizens. “This proposal would force consumers to pay more only to boost the companies’ profits further,” she said in a statement.

As for whether or not nuclear plants should play a role in the state’s energy future, Kolata thinks there are plausible arguments on both sides. He’d like the legislation to send this question to be settled in an evidence-based contested hearing process before the state’s public utility commission. If Illinois has to meet a certain carbon reduction goal, either from the federal Clean Power Plan (currently moving through the courts) or a state-wide target, then it should be possible to calculate the portfolio that produces the best deal for ratepayers. Shutting down a nuclear plant would eliminate one expense, but impose other costs, like replacing it with new low-carbon capacity and adding new transmission lines.

"The goal from both a climate and a health perspective is to reduce pollution from power plants as much as possible,” Munson tells CityLab. “If we can create a mix for the near term that might include some reactors, but allows for the transition to resources that are totally clean, EDF would be open to considering it.”

The case for a clean energy standard

Illinois’ dilemma on how to deal with its struggling nuclear fleet stems from the broader challenge of figuring out how to value clean energy when the markets currently don’t. A carbon tax, for instance, would make fossil fueled electricity more expensive, and clean energy sources a better deal. Since the U.S. hasn’t been able to do that, policymakers turn to more blunt tools, like tax credits and portfolio standards for wind and solar.

That amounts to policy discrimination against nuclear energy, says researcher Michael Shellenberger, president of pro-nuclear Environmental Progress. Subsidies help wind and solar cut into nuclear plants’ market share—production tax credits, for instance, let wind producers sell at a loss and still turn a profit; nuclear plants don’t have that luxury. Shellenberger is concerned that policies meant to boost the newest clean energy industries are driving out the largest one: nuclear produces 87 percent of Illinois’ zero-carbon energy, for now.

Instead, he’d like to see a 100 percent clean energy standard that ramps up by a set date, with legal caps on how much rates can increase, in order to protect ratepayers. This is the same idea that other environmental groups rejected in the earlier draft of the Illinois bill, because they didn’t want to support profitable nuclear plants, or lump nuclear in with renewables, among other arguments. Shellenberger counters that if the purpose of the policy is to combat climate change, there shouldn’t be a problem with supporting any and all forms of clean energy.

“Everybody that got sold to do renewables portfolio standards was sold on the pollution and climate benefits of renewables,” Shellenberger says. “To then go and say, ‘Oh no, this wasn’t about climate, it’s about renewables,’—I think most people would go, ‘Wait a second, that’s a bait and switch.’”

Mandates for wind and solar have proven their efficacy in helping those industries move past their infancy. They are now the fastest-growing energy sources in the world. At a certain point, clean energy policies will need to move from the short-term goal of fostering wind and solar to the long-term goal, which climate experts say needs to be deep decarbonization. If energy markets shift and natural gas prices rise, nuclear
plants might survive on their own. If not, though, states will need to decide how much they value these low-emissions energy sources, and what they’re willing to do to keep them running.

http://www.citylab.com/politics/2016/05/illinois-exelon-nuclear-power-plants-renewable-energy-portfolio/484046/?utm_source=nl__link5_053116
Tackling intractable computing problems

Theoretical computer science project helps solve long-standing questions with benefits for security and machine learning

Researchers hope to develop machine learning algorithms with provable guarantees. [Credit and Larger Version]

June 29, 2016

Computers have proven capable of helping scientists solve many research problems, from the dynamics of black hole mergers to distant connections in reams of genomic data.

But there are some problems that computers cannot solve -- at least not in a reasonable time frame.

The question concerning which problems can and can't be solved efficiently, also known as "intractability," are a great scientific challenge for computer scientists. One such question is one of the longest-standing unsolved problems in computer science, something called "P versus NP."

This problem can be thought of as the question of whether every problem whose solution can be quickly verified by a computer can also be quickly solved by a computer. Or, put another way: is it substantially harder to find a solution than it is to check that a given solution is correct?
(P vs. NP is one of the Clay Mathematics Institute Millennium Prize Problems, with a million-dollar prize to whomever can find a solution.)

Intractability -- if it truly exists -- means we might not be able to always find accurate, efficient algorithms for some important problems: from eliminating bugs from software programs, to knowing for sure if and when our encryption schemes are secure, to fully understanding how the brain works.

Is finding solutions no harder than checking them? Can the ability to find good solutions ("creativity") become as routine as the ability to appreciate good solutions? P is the class of problems for which solutions can be found efficiently (in time that is polynomial in the length of problem description). NP is the class of problems for which solutions can be checked in polynomial time. NP contains P. Most experts believe that the two classes are different, but nobody has found a proof of this. If P=NP then creativity (in almost every conceivable discipline) can be automated. Cryptography becomes impossible. Trying to understand the relationship of P and NP seems fundamental to understanding computation. This question relates to the notion of computation itself, not merely about a specific model.

Credit: Sanjeev Arora, Princeton University

Limitations in these areas would have implications for privacy, economics and many scientific and societal problems.

Solving serious games
Supported by a $10 million National Science Foundation (NSF) Expeditions in Computing award, an interdisciplinary, multi-institutional team led by Sanjeev Arora at Princeton University worked between 2008 and 2013, to find the sources of intractability, to circumvent intractability when possible using approximations and other means, and to understand the implications of intractability for other areas, from physics and biology to economics and information theory.

During that time, the team made several theoretical advances, including a new understanding of the Unique Games Conjecture, which is one of the approaches used to try to make progress toward understanding the N versus NP question.

The Unique Games Conjecture postulates that for many of the problems people would most like to solve, the current algorithms for finding a good approximation cannot be improved.

Arora, working with Boaz Barak of Microsoft Research (previously of Princeton) and David Steurer of Cornell University, showed that there is an algorithm for solving Unique Games that is in fact better: one that is faster than exponential-time (where the time it takes to approximate the answer increases exponentially based on the data size) but still not as fast as polynomial-time (where the time to solution increases by a power of the data size). This means that some complex and seemingly intractable problems can be solved more efficiently than believed.

Their results were published in the October 2015 issue of the Journal of the ACM.

On the other hand, Subhash Khot, a theoretical computer scientist on the team who introduced the conjecture in the first place and subsequently won the 2010 Alan T. Waterman Award, made important progress towards proving the Unique Games Conjecture was in fact true. (There is still no consensus in the community regarding the truth of the Unique Games Conjecture.)

The team wrestled with a related real-world application as well: public-key cryptography, the means by which e-commerce and much of internet traffic is kept secure.

All current forms of public-key cryptography (such as SSL and SSH) use a handful of algebraic methods. However, emerging algorithms, both classical and quantum, could break them all. The team derived fundamentally new forms of public-key cryptography that might remain secure far into the future -- a way of harnessing intractability to support cybersecurity.

Insights from the study of intractability were applied to other fields, too. For instance, it was shown that the task of evaluating the worth of a financial derivative, the type of collateralized debt obligation that had a key role in the financial collapse of 2008, is related to solving intractable problems. In fact, under widely held intractability assumptions, it is possible for a person with secret information to construct derivatives that are basically indistinguishable from a normal derivative -- or more precisely, that distinguishing between the two requires a huge amount of computation -- but are actually worthless.
"Some of the important leaps, for example in the understanding of efficient approximation, public key cryptography, arithmetic complexity and the role of intractability in other sciences, seem to happen mainly due to the collaborative environment of the Intractability Center, supported by the NSF Expedition," said Avi Wigderson, a research team member from the Institute for Advanced Study. "I believe we proved that large groups can be effectively harnessed for theoretical projects."

As an added benefit, the project served a training ground for theoretical computer scientists. According to Wigderson, "the project trained a couple of dozen students and postdocs, many of whom are young stars in algorithms and complexity theory."

NSF Program Director Tracy Kimbrel agreed. "In addition to conducting world-class research in theoretical computer science, the team also innovated in attracting new talent to theory via new summer programs for undergraduates and high school students and a highly successful workshop where established women in theory reached out to undergraduate and entering graduate student women," Kimbrel said. "The role models at the 'Women in Theory' workshops have been credited with inspiring numerous women to pursue studies in theoretical computer science."

The researchers continue to build on the progress of the Expedition, taking the improved understanding of intractability in new directions.

New directions

Arora and colleagues at Princeton, for instance, are currently working on a further NSF-supported project to develop machine learning algorithms with provable guarantees about the quality of the solutions they provide or the time it will take to run the algorithm.
Such guarantees will be very important as machine learning algorithms are increasingly used for life-or-death applications like medical decision-making. Finding such guarantees often involves designing fundamentally new algorithms, or proving the guarantees for existing algorithms are sound.

"It is fair to say that the ideas and young researchers generated by this project will continue to impact research for many years to come," Arora said.

-- Aaron Dubrow, NSF 703-292-4489 adubrow@nsf.gov

Investigators
Assaf Naor
Boaz Barak
Michael Saks
Subhash Khot
Avi Wigderson
Eric Allender
Mario Szegedy
Robert Tarjan
Sanjeev Arora
Moses Charikar
Bernard Chazelle

Related Institutions/Organizations
New York University
Princeton University
Institute for Advanced Study
Rutgers University New Brunswick

Edible food packaging made from milk proteins

Source:
American Chemical Society

Summary:
Most foods at the grocery store come wrapped in plastic packaging. Not only does this create a lot of non-recyclable, non-biodegradable waste, but thin plastic films are not great at preventing spoilage. Scientists are now developing a packaging film made of milk proteins that addresses these issues -- and it is even edible.

Share:

FULL STORY

Researchers tested their milk-protein film as a packaging for blocks of cheese.

Credit: American Chemical Society

At the grocery store, most foods -- meats, breads, cheeses, snacks -- come wrapped in plastic packaging. Not only does this create a lot of non-recyclable, non-biodegradable waste, but thin plastic films are not great at preventing spoilage. And some plastics are suspected of leaching potentially harmful compounds into food. To address these issues, scientists are now developing a packaging film made of milk proteins -- and it is even edible.
The researchers are presenting their work today at the 252nd National Meeting & Exposition of the American Chemical Society (ACS).

"The protein-based films are powerful oxygen blockers that help prevent food spoilage. When used in packaging, they could prevent food waste during distribution along the food chain," says research leader Peggy Tomasula, D.Sc.

And spoiled food is just one issue. Current food packaging is mainly petroleum-based, which is not sustainable. It also does not degrade, creating tons of plastic waste that sits in landfills for years.

To create an all-around better packaging solution, Tomasula and colleagues at the U.S. Department of Agriculture are developing an environmentally friendly film made of the milk protein casein. These casein-based films are up to 500 times better than plastics at keeping oxygen away from food and, because they are derived from milk, are biodegradable, sustainable and edible. Some commercially available edible packaging varieties are already on the market, but these are made of starch, which is more porous and allows oxygen to seep through its microholes. The milk-based packaging, however, has smaller pores and can thus create a tighter network that keeps oxygen out.

Although the researchers’ first attempt using pure casein resulted in a strong and effective oxygen blocker, it was relatively hard to handle and would dissolve in water too quickly. They made some improvements by incorporating citrus pectin into the blend to make the packaging even stronger, as well as more resistant to humidity and high temperatures.

After a few additional improvements, this casein-based packaging looks similar to store-bought plastic wrap, but it is less stretchy and is better at blocking oxygen. The material is edible and made almost entirely of proteins. Nutritious additives such as vitamins, probiotics and nutraceuticals could be included in the future. It does not have much taste, the researchers say, but flavorings could be added.

"The coatings applications for this product are endless," says Laetitia Bonnaillie, Ph.D., co-leader of the study. "We are currently testing applications such as single-serve, edible food wrappers. For instance, individually wrapped cheese sticks use a large proportion of plastic -- we would like to fix that."

Because single-serve pouches would need to stay sanitary, they would have to be encased in a larger plastic or cardboard container for sale on store shelves to prevent them from getting wet or dirty.

In addition to being used as plastic pouches and wraps, this casein coating could be sprayed onto food, such as cereal flakes or bars. Right now, cereals keep their crunch in milk due to a sugar coating. Instead of all that sugar, manufacturers could spray on casein-protein coatings to prevent soggy cereal. The spray also could line pizza or other food boxes to keep the grease from staining the packaging, or to serve as a lamination step for paper or cardboard food boxes or plastic pouches. The U.S. Food & Drug Administration recently banned the perfluorinated substances that used to coat these containers, so casein coatings could be a safe, biodegradable alternative.

Bonnaillie says her group is currently creating prototype film samples for a small company in Texas, and the development has garnered interest among other companies, too. The group plans to keep making improvements, and she predicts this casein packaging will be on store shelves within 3 years.
Story Source:

The above post is reprinted from materials provided by American Chemical Society. Note: Content may be edited for style and length.

https://www.sciencedaily.com/releases/2016/08/160821093046.htm
The Undermining of American Charity

Lewis B. Cullman and Ray Madoff

New York City, 1977; photograph by Susan Meiselas

Our backgrounds may be relevant to the criticisms we make here of a major flaw in the financing of charities today. Lewis Cullman is a New York philanthropist who, at the age of ninety-seven, has given away over 90 percent of his wealth to charitable causes. Ray Madoff is a professor of law at Boston College and the director of a think tank on philanthropy at Boston College Law School who has written—as has Lewis Cullman—about the ways by which the tax system grants benefits to donors to private foundations without ensuring that those donations are put to charitable use.¹

We now write because we are alarmed about a major new force that has entered the field of charitable giving. It has so far been hardly noticed by the general public. But now it is threatening to undermine the American system for funding charity. This force is the commercial “donor-advised fund,” the fastest-growing, but still largely unknown, charitable vehicle.² Donor-advised funds (or DAFs) give donors all of the tax benefits of charitable giving while imposing no obligation that the money be put to active charitable use.
The rise of DAFs is a matter of grave concern because of the heavy reliance on charitable contributions in the US. In other countries it is common for universities, hospitals, art museums, symphonies, and social safety nets to be funded by governments. In the US, charitable organizations, supported by tax-favored private donations, carry out many of the same social functions. The American system depends on an adequate flow of private donations to working charities, and anything that disrupts this flow can have critical consequences for charitable organizations and the people they serve.

Here we explore the reasons for the current explosion of DAFs and its implications.

Most Americans have never heard of donor-advised funds and would be surprised to learn that, measured in donated dollars, the second-most-popular “charity” in 2015 (just behind the United Way) was not the Red Cross, the Salvation Army, or Harvard or other universities. It was Fidelity Charitable, an organization created and serviced by Fidelity Investments for the purpose of holding charitable donations. Fidelity Charitable acts as a middleman, attracting its customers’ charitable donations and managing them in separate client accounts. Money in such donor-advised funds is invested and held until the clients give instructions (“advise”) about distributions to operating charities.

Because of a 1991 IRS ruling obtained by Fidelity (and similar rulings obtained by other commercially sponsored DAFs), clients get the same tax benefits when they transfer property to their donor-advised funds that they would get by making outright contributions to a museum, soup kitchen, university, or any other federally recognized charity. But no deadline is imposed for the eventual distribution of these funds to an operating charity. If a donor fails to distribute the account during her lifetime, she can pass on the privilege of making distributions to her children or grandchildren or anyone else she chooses. The effect of these rules is that assets that have been given the tax benefits of charitable donations can be held in a DAF for decades or even centuries, all the while earning management fees for the financial institutions managing the funds, and producing no social value.

Although Fidelity was the first financial institution to create this type of charitable middleman, Schwab and Vanguard soon thereafter created Schwab Charitable and Vanguard Charitable—and together these organizations have all made it to The Chronicle of Philanthropy’s annual top ten charities in overall donations (squeezing out more traditional charities like the American Cancer Society). Goldman Sachs, T. Rowe Price, Raymond James, and many others have also created donor-advised funds, making charitable giving a growing part of the financial world’s business model for attracting and servicing its clientele.

This business plan has been highly successful. Many billions of dollars have been drawn into the orbit of charitable middlemen, and there is no end to their growth in sight. According to the National Philanthropic Trust, annual contributions to DAFs hit an all-time high of $19.66 billion in 2014. The increase in contributions, combined with a rising stock market, “drove total donor-advised fund assets above $70 billion for the first time.” The leader, Fidelity Charitable, has had particularly strong growth and it is widely expected that in 2016 it will surpass the United Way and receive more donations than any other charity in the country.

One of the most surprising aspects of the rise of DAFs is that donors participate in this $70 billion industry without any legal protections regarding their control over the distribution of the assets held in DAFs. When donors open donor-advised fund accounts they do so because they expect to have continuing control over their donations. This expectation is reinforced by marketing materials that allude to control. For example, one leading DAF sponsor, National Philanthropic Trust, describes DAFs as follows:
An easy way to think about a donor-advised fund is like a charitable savings account: a donor contributes to the fund as frequently as they like and then recommends grants to their favorite charity when they are ready.

Despite such references to control, legal agreements between donors and DAF sponsors in fact provide that the donor cedes all legal control over donated funds. Although a donor is given the right to make recommendations (sometimes referred to as “advisory privileges”), this is not much of a “right.” DAF sponsors are legally allowed to ignore donors’ advice about the disposition of their DAF funds.

For most donors, this will have little practical effect; donors will advise and the DAF sponsor will follow the donor’s advice. This is because the business model of commercial DAF sponsors is to profit from the fees they secure and not from appropriating donor funds. However, not all donors have been so lucky. In one case, a DAF sponsor went bankrupt and the donated funds were seized to pay its creditors. In another case, the DAF sponsor used donated funds to pay its employees large salaries, hold a celebrity golf tournament, and reimburse the cost of litigation when a dissatisfied donor sued. In both cases, courts ruled against the donors and upheld the rights of the fund sponsor to exert full legal control over DAF funds.

The larger question raised by this arrangement is, why would donors and DAF sponsors enter into legal agreements that fail to reflect their expectations? Who benefits? Who is harmed?

The main beneficiaries of the arrangements for commercial DAFs are the financial industry and its wealthy clientele. The financial industry profits from commercial DAFs in several ways.

First, financial institutions profit from commercial DAFs because they are a source of investment assets. Fidelity, Schwab, Vanguard, Goldman Sachs, and other financial institutions are in the business of managing money; the more money they manage, the more profits they make. By creating charitable entities that can hold charitable dollars for investment, the associated financial institutions create an additional revenue stream that adds to their bottom line.

Second, financial institutions are able to earn fees by providing management services to the charities set up specifically to hold the DAF funds. For example, the for-profit Fidelity Management provides all management services for Fidelity Charitable. This type of arrangement also conveniently enables commercial sponsors of DAFs to avoid federal disclosure rules that otherwise require charities to disclose the salaries of their top-paid employees.

Finally, commercial DAFs also provide financial benefits to individual financial advisers who can continue to receive fees for investing their clients’ charitable donations. When a client discusses charitable giving with his financial adviser, the adviser has every financial incentive to recommend that the client establish a DAF rather than make an outright gift to an operating charity. One effect of these arrangements is to add a good many members to the DAF sales force.

The financial industry has clearly had much to gain from entering into the DAF middleman business. The question is, why would donors contribute billions of dollars to DAF middlemen, preserving only the right to make nonbinding recommendations about the distribution of the funds? The answer is that DAFs help donors get maximum tax advantages for their charitable contributions. There are three main reasons for this.

First, commercial DAFs make it easy for donors to time their charitable donations in a way that produces the most tax benefits. The value of the charitable deduction is directly linked to the tax bracket of the donor. For someone taxed in the highest bracket (39.6 percent), a $100 donation produces almost $40 in tax savings. For someone taxed at a 15 percent bracket, the value of the tax deduction is only $15. And for the vast majority of
Americans who don’t itemize their deductions, the charitable deduction provides no benefit at all. DAFs allow donors to maximize tax savings by making large charitable contributions to DAFs in years when they owe high taxes (maximizing the tax benefit), and then using the funds to make distributions to charities in later years.

Second, commercial DAFs make it easy for donors to make contributions of property—including shares of stock—rather than cash. These donations can save an additional 20 percent in the capital gains taxes the donor would otherwise pay. Thus, while a gift of $100 cash by a high-income taxpayer can save that taxpayer nearly $40, a gift of $100 of property can save the taxpayer close to $60 in combined income and capital gains taxes.

Finally, DAFs make it easy for donors to save on taxes by getting the maximum tax benefit for contributions of “complex assets.” For financial institutions the words “complex assets” refer to property that is not publicly traded stock. Complex assets can include such varied holdings as commercial and residential real estate, art, private business interests, and even mineral rights, yachts, and taxidermy collections. A significant part of the work of commercial DAF sponsors consists of acting as a tax-free clearinghouse for complex assets.

The ability to get this enhanced charitable deduction for donations of complex assets is particularly valuable for taxpayers who have invested in hedge funds and other business interests that are not publicly traded. If a donor were to give one of these property interests to a private foundation (the other charitable vehicle that allows a donor to have ongoing control), only the amount of the initial investment could be deducted. If the donor were to give this interest instead to a DAF, the full current value of the asset could be deducted. For example, if a donor invested $100,000 in a hedge fund, and it grew to be worth $2 million, the donor would get only a $100,000 deduction if it were given to a private foundation, but would get a $2 million deduction if it were given to a DAF. This ability to provide a larger deduction for donations of complex assets has fostered the growth of DAFs. One proponent of DAFs has referred to this ability to exploit these previously untapped resources as an opportunity for “philanthropic fracking.”

Congress specifically prohibited donations of complex assets to private foundations from being deducted at their market value because it was concerned about problems of valuation. Since there is no ready market for complex assets, the donor must get an appraisal to set the value for the donation. Appraising is not an exact science and the donor has an interest in coming up with as high a value as is legally supportable. In addition, the DAF has little incentive to challenge this valuation.

The IRS has oversight responsibility, but it is extremely expensive for it to second-guess the appraised value of all contributions of complex assets, particularly if there is a lag between the time of contribution and the time of sale. If the property ultimately sells for less than the appraised value, that does not affect the tax status of the donor’s original charitable deduction. So in the above example, if the supposed $2 million interest was later sold for $1.5 million, the donor would still be entitled to his $2 million deduction even though only $1.5 million is ultimately made available for charity. The donor is happy; the DAF sponsor is neutral; the party that has been harmed is the taxpaying public.

Commercial DAFs have provided significant benefits for the financial services industry and for individual taxpaying donors. At the same time, the rise of DAFs has imposed costs on American taxpayers as well as operating charities and the beneficiaries they serve.

Additional tax benefits from charitable giving might be good for individual donors, but from the perspective of the public, they are an additional cost. This cost might be worthwhile if it resulted in more overall charitable giving. However, this is not the case. Charitable giving has been monitored for the past forty years
and, though subject to minor fluctuations, has remained remarkably constant at 2 percent of disposable net income.2

In addition, the added tax benefits from contributions of appreciated property are particularly troubling because of the inequitable way that these super-benefits are allocated. The wealthiest Americans are most likely to own stock and other appreciated property and, therefore, are in the best position to take advantage of this benefit. Indeed, taxpayers with annual income over $10 million made more than 33 percent of all charitable donations of appreciated property.3

The benefit for contributions of appreciated property has been widely condemned by tax experts as being "inequitable," "inefficient and unfair," and "a clear error."4 Commercial DAFs did not create this loophole—donors can also achieve this tax benefit by giving appreciated property directly to their favorite charities. But DAFs facilitate its exploitation.

Particularly troubling is the detrimental effect caused by the diversion to DAFs of funds that would otherwise have been contributed directly to operating charities. Many donors make annual contributions to their favorite charities at the end of the year in order to obtain the tax benefits of their charitable gifts. Anyone familiar with this process knows that there is often some degree of anxiety in deciding which charities to support and how much to give. DAFs relieve this anxiety by allowing taxpayers to get the tax benefits of charitable giving without having to make hard decisions about how their funds will be allocated. The problem is that once money is put into a DAF, it is likely that a significant proportion of it will stay there.

The first reason for this is inertia. Once the tax benefits of charitable giving have been claimed, there is less urgency in making decisions about distributions from the DAF. In addition, after putting charitable donations into a DAF, a more subtle transformation occurs. Instead of the donor thinking of this transfer as a charitable gift that has been made (the way one would feel about an outright transfer to a museum, for example), the donor now thinks of the DAF as a charitable asset in which he has a continuing interest. To the extent that donors think of DAFs this way, they are less likely to spend DAF funds. Behavioral economists refer to this desire to keep property in which one feels one has ownership interest as the "endowment effect."5

DAF sponsors encourage the endowment effect by building up the donors’ sense of ownership in the DAF. They do this by granting the donors the ability to manage the investment and by providing regular statements about how their investment is doing. Donors are also encouraged to pass these accounts on to their children and grandchildren, creating a "charitable legacy." The combined effect is to subtly encourage donors to hoard, rather than distribute, their DAF funds. Of course, this approach benefits the financial companies representing the DAF as well; the longer the property is held in the DAF, the greater the management fees.

This tendency to hoard rather than spend DAF funds is borne out by the most recently available statistics from the IRS, which show that the median annual payout rate from all DAFs was 7.2 percent, while nearly 22 percent of all DAF sponsors reported no grants at all.11 (Some commercial DAF sponsors claim payout rates that are significantly higher than 7.2 percent; but they do not generally calculate their payout rates using the same method as IRS statisticians.)12

Finally, DAFs are also detrimental because they disrupt the flow of money from private foundations to operating charities. Private foundations are required to distribute 5 percent of their assets each year and these distributions typically go to operating charities. However, according to current tax rules, contributions to donor-advised funds qualify as required distributions for private foundations. This means that a private foundation can meet its payout requirement by giving funds to a DAF, which itself has no payout requirement.
Donor-advised funds have been a bad deal for American society. They have produced too many private benefits for the financial services industry, at too great a cost to the taxpaying public, and they have provided too few benefits for society at large. When we consider their overall effect, we see that rather than supporting working charities and the beneficiaries they serve, they have undermined them. Congress should enact a rule requiring that donor-advised funds be distributed to operating charities within a reasonable period of time in order to assure a regular flow of money to working charities. In addition, private foundations should not be allowed to satisfy their payout rules by making contributions to donor-advised funds.

Congress should revise the tax incentives for charitable giving so that they more clearly work in the public interest. If it fails to do so it will deprive charitable organizations of the funds they need to make their essential contributions to American society.


2. Donor-advised funds originated in community foundations and national religious federations. These organizations, and other public charities, sponsor DAFs as well. This article focuses on the particular problems raised by commercial DAFs.


4. Donors must give up legal control over their DAF funds in order to be eligible for a tax deduction at the time of transfer. This disconnect between legal control and the expectations of the parties is captured in the internally contradictory definition of donor-advised funds from the tax code: IRC 4966(d)(2) defines a “donor-advised fund” as “a fund or account—(i) which is separately identified by reference to contributions of a donor or donors, (ii) which is owned and controlled by a sponsoring organization, and (iii) with respect to which a donor (or any person appointed or designated by such donor) has, or reasonably expects to have, advisory privileges with respect to the distribution or investments of amounts held in such fund or account…” [Emphasis added.]


12. The concept behind the IRS method is to divide the current year’s distribution by all of the funds that could have been distributed (year-end value plus amount distributed). Fidelity Charitable, by contrast, calculated its payout rate by dividing the current year’s distribution by the average asset value of the previous five years. This five-year average bears no relationship to the relevant factor of the amount of funds that could have been distributed. Moreover, since Fidelity Charitable has experienced enormous growth over the past five years, the effect of this method is to shrink the denominator, thereby increasing the supposed payout rate. The supposed payout rate is further boosted by including the amount distributed that year only in the numerator and not in the denominator.

http://www.nybooks.com/articles/2016/07/14/the-undermining-of-american-charity/
Pioneering Biochemist Erwin Chargaff on the Poetics of Curiosity, the Crucial Difference Between Understanding and Explanation, and What Makes a Scientist

“If I know what I shall find, I do not want to find it. Uncertainty is the salt of life.”

BY MARIA POPOVA

As a teenager, long before he became a pioneering biochemist, Erwin Chargaff (August 11, 1905–June 20, 2002) learned English from two women who ran a small school in his native Vienna. This fortuitous skill would later save his life. The year of his thirtieth birthday, Chargaff was offered a research position at Columbia University in New York, which he was able to take largely because he spoke English. “I was afraid of going to a country that was younger than most of Vienna’s toilets,” he would later recount. But there was something far more sinister to fear — the confluence of chance and choice that landed Chargaff in America spared him from the grim fate that befell his loved ones in Europe. His mother and sister — his only remaining family after his father’s untimely death — were among the millions of Jews killed by the Nazis.
As he witnessed from afar the inhumanity that made his homeland “tumble into the deepest abyss ever to engulf a civilized people,” Chargaff sought solace and meaning outside the human realm and immersed himself in science. He went on to discover base-pairing — a principle instrumental in identifying the double helix structure of DNA and thus a centerpiece of our understanding of genetics.

But Chargaff was also an extraordinary writer — not only an eloquent explainer and champion of science, but a lyrical memoirist and an incisive, erudite philosophical thinker. A master of what could best be described as biopoetics, he writes with infectious wonderment and tenderness about nature and human nature, about knowledge and mystery, about the electrifying joy of slicing through the darkness of being with the luminous saber of curiosity.

His 1978 autobiography, Heraclitean Fire: Sketches from a Life Before Nature (public library), is one of the finest books I’ve ever read, on par with Oliver Sacks’s On the Move. In reflecting on his own life, Chargaff speaks not only to what it means to be a scientist and how science in its highest form is done, but also to what it means to be human and what it takes to persevere on our most perennial quest — to understand reality and make sense of our place in it.

The discovery of this uncommonly wonderful book is a supreme testament to my longtime assertion, only half facetious, that literature is the original internet: A passing mention in an interview with trailblazing astronomer Vera Rubin in a forgotten book “hyperlinked” me to the autobiography of the great mathematician Mark Kac, in which he extols Chargaff’s as the gold standard for a scientist’s autobiography. The praise is more than merited, and anything said about the book here or anywhere is bound to belie its true splendor, which comes alive only with reading. The pages of this small, enormous book radiate layered and beautifully articulated wisdom on the many strands of life — psychology, philosophy, politics — absolutely inseparable, yet artificially segregated, from science.

From the fortunate and far-seeing platform of seven decades of life, Chargaff writes:

I came to biochemistry through chemistry; I came to chemistry … partly through the youthfully romantic notion that the natural sciences had something to do with nature. What I liked about chemistry was its clarity
surrounded by darkness; what attracted me, slowly and hesitatingly, to biology was its darkness surrounded by the brightness of the givenness of nature, the holiness of life. And so I have always oscillated between the brightness of reality and the darkness of the unknowable. When Pascal speaks of God in hiding, Deus absconditus, we hear not only the profound existential thinker, but also the great searcher for the reality of the world. I consider this unquenchable resonance as the greatest gift that can be bestowed on a naturalist.

Illustration from Flashlight by Lizi Boyd

Nearly half a century before physicist Sean Carroll coined his beautiful notion of poetic naturalism, Chargaff considers the historical development of our quest to know reality:
It is clear that to meditate on the whole of nature, or even on the whole of living nature, is not a road that the natural sciences could long have traveled. This is the way of the poet, the philosopher, the seer. A division of labor had to take place. But the overfragmentation of the vision of nature — or actually its complete disappearance among the majority of scientists — has created a Humpty-Dumpty world that must become increasingly unmanageable as more and tinier pieces are broken off, “for closer inspection,” from the continuum of nature. The consequence of the excessive specialization, which often brings us news that nobody cares to hear, has been that in revisiting a field with which one had been very familiar, say, ten or twenty years earlier, one feels like an intruder in one’s own bathroom, with twenty-four grim experts sharing the tub.

In the same era that Buckminster Fuller made his case for the genius of generalists, Chargaff speaks to the immense yet endangered value of a robust and indiscriminate curiosity in grasping the big picture:

Without a firm center we flounder. The wonderful, inconceivably intricate tapestry is being taken apart strand by strand; each thread is being pulled out, torn up, and analyzed; and at the end even the memory of the design is lost and can no longer be recalled.

Writing a few years after Hannah Arendt’s timeless meditation on thinking vs. knowing and the crucial difference between truth and meaning, Chargaff considers the cause and the consequence of this artificial fragmentation of curiosity:

It is hoped that our road will lead to understanding; mostly it leads only to explanations. The difference between these two terms is also being forgotten… These are two very different things, for we understand very little about nature. Even the most exact of our exact sciences float above axiomatic abysses that cannot be explored. It is true, when one’s reason runs a fever, one believes, as in a dream, that this understanding can be grasped; but when one wakes up and the fever is gone, all one is left with are litanies of shallowness.

Illustration from a 1967 children’s adaptation of Micromégas, Voltaire’s timeless parable about the redemptive power of critical thinking

In a sentiment that calls to mind philosopher Susanne Langer’s ideas on how our question shape our answers and direct our orientation of mind, Chargaff adds:
In our time, so-called laws of nature are being fabricated on the assembly line. But how often is the regularity of these “laws of nature” only the reflection of the regularity of the method employed in their formation! … Science is still faced with the age-old predicament, the lack of ultimate verification.

He considers how science is done (in the era’s gendered language on which Ursula K. Le Guin has made the finest, sharpest comment there is):

For a scientific concept to be formulated successfully, a concerted interaction of many requisites must occur. First of all, the right [person] must ask himself the right question. This may well be a random event that occurs much more often than we are aware… Less fortuitously, this [person] must find an audience, i.e., he must be able to publish and to find readers; and this may not have been so easy even in the bucolic days of the last century. But, most importantly, the times must be ripe for both question and answer.

Echoing Saul Bellow’s assertion that “only art penetrates … the seeming realities of this world” and reminding us, half a century after Bertrand Russell did, of the value of critical thinking in accepting interpretations of reality, Chargaff writes:

If art represents the highest form of reality that man — or at least modern secular man — is capable of attaining, the many instances in which great creations were rejected initially, and often with incredible malice, show how reluctant we are to grasp reality. We accept only what has been predigested for us by the so-called tastemakers; but this is then a spurious reality.

“Beams of Light Through Glass,” one of Berenice Abbott’s vintage science-inspired photographs of natural phenomena
Considering the different ways in which art, science, and spirituality explain reality, Chargaff cautions against the blinders with which specialization obscures the full scope of reality:

Our understanding of the world is built up of innumerable layers. Each layer is worth exploring, as long as we do not forget that it is one of many. Knowing all there is to be known about one layer — a most unlikely event — would not teach us much about the rest. The integration of the enormous number of bits of information and the resulting vision of nature take place in our minds; but the human mind is easily deceived and confused, and the vision of nature changes every few generations. It is, in fact, the intensity of the vision that counts more heavily than its completeness or its correctness. I doubt that there is such a thing as a correct view of nature, unless the rules of the game are stated clearly. Undoubtedly, there will later be other games and other rules.

With a concerned eye toward the discouragement of curiosity-driven research by the institutions of modern science — a concern that has only swelled in urgency in the decades since — Chargaff writes:

When I look back on my early way in science, on the problems I studied, on the papers I published — and even more, perhaps, on those things that never got into print — I notice a freedom of movement, a lack of guild-imposed narrowness, whose existence in my youth I myself, as I write this, had almost forgotten. The world of science was open before us to a degree that has become inconceivable now, when pages and pages of application papers must justify the plan of investigating, “in depth,” the thirty-fifth foot of the centipede; and one is judged by a jury of one’s peers who are all centipedists or molecular podiatrists. I would say that most of the great scientists of the past could not have arisen, that, in fact, most sciences could not have been founded, if the present utility-drunk and goal-directed attitude had prevailed.

Decades before astrophysicist Marcelo Gleiser made his elegant case for how to accommodate mystery in the conquest of knowledge, Chargaff considers the true measure of science:

It would seem to me that man cannot live without mysteries. One could say, the great biologists worked in the very light of darkness.

[...]

What is success in science? Illuminated darkness is not light. We find ourselves in the cavern of limitless possibilities. Take a flashlight with you, and you may find you are only in a lumber room. If I know what I shall find, I do not want to find it. Uncertainty is the salt of life.

Chargaff reflects on how the allure of uncertainty animated his own foray into science:

What I remember of my beginnings is the truly lyrical shudder with which I contemplated nature. I am not sure that I even knew what I meant by nature. It was the blood and the bones of the universe, its dawn and dusk, flowering and decay, firmament and graveyard. The alterations of the spiritual and the material tides, the oscillations between future and past, the mysterious fates of everlasting stone and short-lived fly: they filled me with admiration and reverence. Nature, it seemed to me, was almost the entire non-I, the entire non-small-boy... A small boy begins by being unable to explain the explainable, but when he grows old he often looks away from what cannot be explained. I am grateful that fate has preserved me from this form of blindness. Surrounded by a surfeit of solved riddles, I am still struck by how little we understand.
In a sentiment of supreme pertinence to our present struggle to wrest wisdom from the age of information, Chargaff echoes Thoreau’s insistence on the value of not-knowing and adds:

I would not go so far as to claim that knowledge and wisdom are mutually exclusive; but they are far from being communicating vessels, and the level of one has no bearing on that of the other. More people have gained wisdom from unknowledge, which is not the same as ignorance, than from knowledge.

Returning to his formative years, he considers once again the different paths to wisdom, those different modes of illuminating reality:

Should I not have thought of becoming a painter or a poet? But I was entirely ungifted for the first and not courageous enough for the second… I was a monad searching for a destiny that did not exist… What I had at the time — and it has never left me — was a dream of reality that we could only touch tangentially, an awe of the numinous of nature whose power rested in its very unattainability. It was a feeling for the necessity of darkness in the life of man. In the Sistine Chapel, where Michelangelo depicts the creation of man, God’s finger and that of Adam are separated by a short space. That distance I called eternity; and there, I felt, I was sent to travel.

That this may be a voyage without a destination was no concern of mine … Only the road counted, not the goal… When I floated into science, a naive young man could still imagine that he was devoting himself to the study of nature… For me nature has still remained a synonym for the highest form of reality.

Illustration by Soyeon Kim from Wild Ideas

Radiating from his recollection is a sublime definition of what makes a scientist:
The feeling that there is always more than he can find, that he is only pulling shreds out of an unfathomable continuum, forms part of my definition of scientist.

[...]

It is the sense of mystery that, in my opinion, drives the true scientist; the same force, blindly seeing, deafly hearing, unconsciously remembering, that drives the larva into the butterfly. If he has not experienced, at least a few times in his life, this cold shudder down his spine, this confrontation with an immense, invisible face whose breath moves him to tears, he is not a scientist. The blacker the night, the brighter the light.

Heraclitean Fire is a book so magnificent as to make it almost criminal that commercial forces have swept it out of print. Perhaps a publisher who prioritizes cultural stewardship over such forces will take mercy on this forgotten treasure and bring it back to life.

https://www.brainpickings.org/2016/06/13/erwin-chargaff-heraclitean-fire-science/?mc_cid=f6eda9a29b&mc_eid=d1c16ac662
Stopping scars before they form

American Chemical Society

Summary:

Most people start racking up scars from an early age with scraped knees and elbows. While many of these fade over time, more severe types such as keloids and scars from burns are largely untreatable, and can carry the stigma of disfigurement. Now scientists are developing new compounds that could stop scars from forming in the first place.

Share:

FULL STORY

During the natural scarring process, collagen proteins (green) in fibroblasts from a Dupuytren patient crosslink together.

Credit: Iyer lab

Most people start racking up scars from an early age with scraped knees and elbows. While many of these fade over time, more severe types such as keloids and scars from burns are largely untreatable. These types of
scars are associated with permanent functional loss and, in severe cases, carry the stigma of disfigurement. Now scientists are developing new compounds that could stop scars from forming in the first place.

The researchers are presenting their work today at the 252nd National Meeting & Exposition of the American Chemical Society (ACS).

"The treatment we’re developing is focused on the major needs of patients with burns, keloids and Dupuytren contracture, a hand deformity," says Swaminathan Iyer, Ph.D. "These patients have extensive scarring, which can impair their movements. There are no current treatments available for them, and we want to change this."

Burns lead to the hospitalization of tens of thousands of people in America every year, according to the American Burn Association. About 250,000 U.S. patients undergo surgical treatment annually for keloids, which are firm, overgrown scars, and for other types of excessive scarring, Iyer says. And a survey by RTI International found that an estimated 7 percent of Americans have Dupuytren contracture, a hand condition that develops when the connective tissue under the palm’s skin contracts and toughens over time.

To help prevent such conditions, Iyer and colleagues at The University of Western Australia, Fiona Wood Foundation and Royal Perth Hospital Burns Unit, together with Pharmaxis Ltd., (all in Australia) are studying compounds that inhibit an enzyme called lysyl oxidase, or LOX. During scar formation, this enzyme enables the collagen involved in wound healing to crosslink. This bonding underpins the fundamental biochemical process leading to scar formation, Iyer says.

"During the scarring process, the normal architecture is never restored, leaving the new tissue functionally compromised," he explains. "So our goal is to stop the scar from the beginning by inhibiting LOX. We have been fortunate to work in collaboration with the pharmaceutical company Pharmaxis, which is designing novel and highly selective small molecules that will allow the establishment of normal tissue architecture after wound repair."

The team tested their molecules using a "Scar-in-a-jar" model, which mimics scar formation. In short, this technique involved culturing human fibroblasts from scar tissues in a petri dish. The cells overproduce and secrete collagen, as they would in a real injury. In the study, the researchers added LOX inhibitors to cultures from patients with Dupuytren’s, keloids and other scar tissue, and detected changes using two-photon microscopy combined with biochemical and immunohistochemical analyses.

"The preliminary data strongly suggest that lysyl oxidase inhibition alters the collagen architecture and restores it to the normal architecture found in the skin," Iyer says. "Once the in-vitro validation has been done, the efficacy of these compounds will be tested in pig and mouse models. Depending on the success of the animal studies and optimal drug candidate efficacy, human trials could be undertaken in a few years."

The researchers' primary objective is to help patients with severe or extensive scarring, but Iyer says that the inhibitors could potentially be used for cosmetic purposes as well.

Story Source:

The above post is reprinted from materials provided by American Chemical Society. Note: Content may be edited for style and length.

https://www.sciencedaily.com/releases/2016/08/160821093040.htm