Breakthrough Technologies 2014

The Connection Between Art and Innovation

Review p. 86
The Dangers of Data-Driven Social Engineering

Business Report p. 67
How the NSA Revelations are Reshaping the Tech Industry

Q&A p. 22
The Connection Between Art and Innovation
Introducing the K900, from Kia.

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They say that tradition is what makes a luxury sedan, but is that truly the case? Or can luxury simply be defined by the way something looks? The way it feels? The way it makes you feel? Perhaps it’s the way it makes others feel about you? While some will cling to the notion that heritage is what makes a luxury sedan, the open-minded will form an opinion of their own.

From the Editor

IN THIS ISSUE OF THE MAGAZINE, BRIAN Bergstein, MIT Technology Review’s deputy editor, interviewed Sarah Lewis, a curator, about the “accomplishments that come from seemingly improbable circumstances and the connections between art and science” (see “Q&A: Sarah Lewis,” page 22). Asked about Samuel Morse, who invented the telegraph after years of struggling as a painter, Lewis says:

“Few people recognize that when they’re moved by a work of art, they’re moved by an artist’s ability to solve a problem that is often a long-standing, timeless one. For Cézanne, it was how to realize nature in paint. He didn’t sign 90 percent of his paintings, because he didn’t feel he had yet solved the problem ... All these different works are solutions to problems. For some people, there’s no differentiation between finding something new in paint and finding something technically.”

Lewis also talks about how attempts to solve problems in art and technology often risk failure—not merely the failure that Silicon Valley cheers (where venture capitalists decline to continue funding a startup, and the entrepreneur turns to another venture) but deep failure, where “your entire life” is a loss.

This desire to solve problems, which is common to all real artists and true innovators, recalls the career of James Turrell, who “for almost half a century ... has been making innovative art out of the most fundamental elements: light, space, and time.” In “Enlightened Spaces” on page 76, the art critic Martin Gayford describes Turrell’s masterpiece, at an extinct volcano called Roden Crater: “in sheer scale, the most ambitious artwork of the late 20th and early 21st centuries.” It is “still unfinished after 40 years in the making.”

The artwork, in the Painted Desert of Arizona northeast of Flagstaff, “features a huge circular opening to the sky, circumscribed by the rim of the crater itself, and creates the illusion (from ... inside the crater) of a heavenly dome above,” Gayford writes. “Below the surface are many openings and chambers that are configured with particular celestial sights.” Tunnels at Roden Crater function as camerae obscurae, projecting onto walls images of the sun at the summer and winter solstices, or of the moon every 18.61 years.

The installation at Roden Crater may never be finished. As an attempt to solve the problem of how (in Turrell’s words) he could create “spaces that engaged celestial events in light,” the monumental artwork may be a lifetime’s failure. On the project’s website, Turrell has posted a message: “I ask for your patience, realize that no one has been more patient than I have.”

Every year, we highlight 10 technologies that we believe will have a great impact. (See “10 Breakthrough Technologies,” page 25.) This year, each breakthrough was the solution to a long-standing problem, and in a few cases it followed decades of frustration. Whether the problem was creating machines that have the balance and agility to walk and run across rough and uneven terrain (see “Agile Robots,” page 30) or designing virtual-reality goggles finally good enough and cheap enough to be widely used (see “Oculus Rift,” page 50), the solutions demanded artistic creativity as well as a willingness to suffer failure. Technologists tend to remember those innovators who succeeded in solving problems (and we celebrate them in these pages); yet more heroic are those who contributed without recognition to the incremental improvements or necessary but unsuccessful experiments that led ineluctably to the breakthrough itself.

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Five Most Popular Stories
MIT Technology Review Volume 117, Number 2

50 Smartest Companies: Illumina
This is a convenient synopsis of Illumina’s journey, but it does rather overstate their research effect so far. One run on a small Illumina machine kicks out about 40 gigs of data. Now run that three days a week and think about the server farms that will have to be built to support all of this. It’s definitely progress but it’s not all roses and champagne quite yet. —syb

50 Smartest Companies: Tesla
I still think electric cars are either a dead end or destined to remain boutique. Fuel cells, once we can extract hydrogen in an environmentally neutral fashion (as opposed to from natural gas), will be superior. Heck, even now a high-efficiency hybrid can put up numbers close to an electric. The evolution of the automobile is beginning to resemble the evolution of the locomotive, and diesel electrics pretty much won that one. —Stan U.

Marginally Useful
Paul Ford claims a “small number of humans have chosen to believe” in Bitcoin’s legitimacy. Not true: they simply found out they don’t need a third party to pay somebody. —Hellwiss @Hellwiss Right on! “Small number” isn’t even accurate. There are millions of people who own cryptocurrency. —timpeterson @Hellwiss They also found out that their fantasy money may be there one day and not there the next. Not to mention that its value can be half of what it was in a couple of weeks, or double. —simonts

Genome Surgery
The advances in genomics over the past decade have been incredible. I hope the field maintains its momentum, but I also hope people are discussing how to minimize the threat of improper use of these tools. —sgillila777

Making Conversation
The true horror is not that people may be “emoting into the void,” as Greg Egan concludes about the movie Her, but that behind the beguiling and entrancing voice is a malevolent and very human set of interests, be they corporate or political. Her completely dodges this angle, but the fact is that everything about Twombly could have been spied upon by the makers of the OS that Samantha arose from. Everything she sees and experiences could be mined to enhance the power of her creators. —Rigatoni
Glass Means Business

SIMSON GARFINKEL, IN HIS REVIEW OF Google Glass (“Glass Darkly,” March/April), says he fears Glass is too “creepy” to be widely accepted. But he’s missing the point.

Think of the first time you saw someone using a tablet. That person probably wasn’t a teenager at the mall. More likely, it was a delivery person, or maybe an operations professional at the airport. That same story is playing out now with Glass.

Our society will gradually work out cultural norms regarding Glass usage in everyday environments, and the angry tweets will fade.

Glass is especially useful for people who perform urgent work, who work on the go, who use their hands, or who are burdened by requirements for lots of documentation. That’s why startups focused on Glass are finding traction in areas such as law enforcement, manufacturing, energy—and health care, which is the focus of my own startup.

Many of the criticisms voiced by Garfinkel melt away in a professional setting. Far from being unwieldy, Glass can actually free physicians from laptops loaded up with electronic-health-record software. As with tablets, the hardware and the software need to evolve—and the price needs to drop—before we’ll see anything like mass adoption. Google knows this, and is no doubt investing in next-generation versions of the device that will tackle the well-trodden shortcomings pointed out by Garfinkel.

Our society will gradually work out cultural norms regarding Glass usage in everyday environments, and the angry tweets will fade. Don’t forget, we had to work through these issues with mobile phones, too. As more people use Glass, the developers who are now “Glassifying” existing smartphone apps just might be seen as prescient.

Ian Shakil
Founder and CEO, Augmedix
San Francisco

The Rights of Mann

I COULDN’T DISAGREE MORE WITH STEVE Mann’s plea for new legislation to protect the rights of those who wear, and use, wearable computers in public spaces (“Glass Allowed,” March/April). He acknowledges the need to balance the rights of Glass wearers with the right to privacy among those who don’t wear Glass, but he fails to understand that Glass can and will be hacked. People will find ways to manipulate Glass so that observers won’t be able to tell if they’re being recorded. This is not a commentary on Glass wearers—it’s just human nature. In the same issue, Simson Garfinkel makes several salient observations. Among others, he notes that application developers are already finding ways to skirt Google’s user rules, which include banning the use of its glasses for facial recognition or voice prints.

Wearable glasses may have huge benefits for a few to overcome disabilities. They might significantly benefit some people in their work. But for many they will be mere toys, the latest gadget. Is the convenience of a few Glass users worth sacrificing the rights of the many who will never use them?

John K. Gamman
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Correction: “Storing the Sun” (Demo, March/April) incorrectly stated that 60 pallets of batteries from Aquion Energy would be needed to serve a village of 200 people. Aquion estimates that only 20 pallets would be required.