

absent throughout the lives of highly violent, anti-social men regardless of demography". Games and play are thus powerful tools for socialization. They have potential for therapy, too: in children with attention deficit hyperactivity disorder, and in military personnel with post-traumatic stress disorder.

McGonigal gives vivid case studies of how games can be used for serious purposes, as well as for entertainment. She describes *World Without Oil*, a game she helped develop to encourage players of all ages to envisage possible scenarios for the world when oil has run out. *Quest to Learn* is a US school programme that uses role play and challenges to teach science to children aged 12–17 years. *Superbetter* is a superhero-themed, multiplayer game that aims to accelerate your recovery time after injury. Others include *Foldit*, a game in which players compete to discover how proteins fold; *Free Rice*, an educational game that helps fight real-world hunger; and *Lost Joules*, which investigates ways to save energy.

McGonigal is best known as a developer of alternate-reality games, which bring together real-world concerns and game-world experiences. She outlines, for example, *Chore Wars*, which introduces a competitive element into household tasks. Through a system of points and rewards, it can get people so motivated that they end up sneaking home to vacuum.

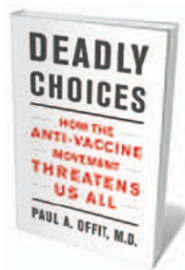
At the Serious Games Institute at Coventry University, UK, my colleagues and I are using games to foster learning about a diverse range of problems: for example, to train global emergency-response teams, to promote good hygiene in hospitals, to reduce misdiagnosis by physicians and to help children cross the road safely. Our research has shown that play can change behaviour among non-gamers and alter attitudes in those who play games regularly. But more investment and capacity-building are needed to reach out to wider sectors of the community.

As the cost of producing computer games drops, and as new devices become more mainstream — such as brain-computer interfaces and haptics that mimic the feel of objects in virtual environments — their appeal will continue to broaden and games will become more pervasive socially. In the future, the use of artificial intelligence will allow even more people to participate in immersive learning environments.

Games, McGonigal concludes, do more than engage, motivate and inspire. Increasingly part of our communities, online and offline, they support social interaction and are part of a collective intelligence. By playing together, she argues, we will be able to save the world and design a beautiful future. ■

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Books in brief



Deadly Choices: How the Anti-Vaccine Movement Threatens Us All

Paul A. Offit BASIC BOOKS 288 pp. £18.99 (2011)

Following on from his widely praised book *Autism's False Prophets* (Columbia Univ. Press, 2008), vaccine researcher Paul Offit vigorously tackles claims that childhood inoculations cause autism, diabetes and cancer. He dismantles the reasoning of the anti-vaccine lobby and warns of the risks of the re-emergence of deadly childhood diseases owing to declining vaccination rates. With a greater focus on the underlying science, his book complements Seth Mnookin's recent work *The Panic Virus* (Simon & Schuster, 2011; reviewed in *Nature* **469**, 468–469; 2011).



Antibiotic Resistance: Understanding and Responding to an Emerging Crisis

Karl S. Drlica & David S. Perlin FT PRESS 288 pp. \$49.99 (2011)

The evolving resistance of bacteria to available antibiotics is of growing concern for public health and medicine. In their thorough primer, microbiologists Karl Drlica and David Perlin explain how such resistance arises and the array of difficulties it causes in the treatment of infectious diseases. They describe how drug resistance can be exacerbated by human activities such as the misuse of antibiotics, and set out strategies for minimizing resistance and extending the clinical life of these drugs.



Quirk: Brain Science Makes Sense of Your Peculiar Personality

Hannah Holmes RANDOM HOUSE 288 pp. \$26 (2011)

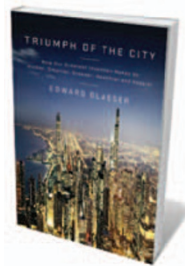
Why are people so different? Science writer Hannah Holmes explains the brain science and human psychology behind our myriad personalities. She describes how we have evolved a range of character traits, such as extraversion, neuroticism or agreeableness, which allow us to navigate our social world. She details genetic clues behind mental disorders such as depression, schizophrenia and anxiety. And she explains how personality dictates other behaviours — from the political party you support to the type of car you drive.



The Quantum Story: A History in 40 Moments

Jim Baggott OXFORD UNIVERSITY PRESS 320 pp. \$29.95 (2011)

The story of twentieth-century physics is essentially a shift from our belief in certainty to our acceptance of uncertainty. The reason is the development of quantum theory, a set of counter-intuitive ideas about the atomic world that are hugely successful but still make physicists feel uncomfortable. Science writer Jim Baggott describes 40 major episodes in the growth of quantum ideas, from physicist Max Planck's musings on the energetics of black-body radiation to the latest aspects of particle physics being unearthed at CERN, Europe's high-energy physics lab near Geneva, Switzerland.



Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier

Edward Glaeser THE PENGUIN PRESS 352 pp. \$29.95 (2011)

Rather than being ridden with crime, filth and poverty, cities are healthy, green and rich, argues economist Edward Glaeser. Travelling to metropolitan areas around the globe, he reports that urbanites from New York to Kolkata have access to better health care and education and use less energy than those who live in the suburbs or in rural communities. We should feel more positively toward our cities, he feels, as they are great places to live and thrive.