

project, and to design several of the interactive song apps. One explains how viruses work: you see them injecting RNA into a cell and hijacking its reproductive mechanism. You can flick the viruses away, but if you do, the music stalls; you have to let the cell be attacked to hear the whole song. Another app, *Hollow*, animates DNA replication using a drum machine. When you touch different enzymes, they catalyse the DNA strand and trigger gothic musical loops.

What makes a good science exhibit?

It must satisfy someone with a PhD — and a two-year-old. *Social Light*, an exhibit on electromagnetism that I designed for the Science Museum in London, allows your body to refract simulated light like a prism, reflect it like a mirror or absorb it. At the Exploratorium in San Francisco, California, *Three Drops* shows how forces of nature work at different scales. There is a screen where you can take a virtual shower as water flows around your shadow. Then the image zooms in to a single drop, which you can bounce around; the surface tension is so strong you can't get 'wet'. Then it zooms further in to show water molecules attracted to people's bodies as if they were impurities in the water. Here, we drew on the work of molecular biologist Tanya Raschke, who showed that water molecules form chains and loops.

How does the world of science differ from that of art?

There is an irreproducible uniqueness to an artist's work that makes the field less stressful than science. In science, if you don't make a certain discovery, someone else will, so even people in the same lab are competing with one another. In art, innovation and risk-taking are lauded, but in science there is an aversion to risk because people need to get grant money from conservative review boards. I know scientists who could speak a single sentence that would completely ruin their careers. And, like Barbara McClintock's pioneering work describing genetic crossover in corn, that sentence might even be true a decade later.

What keeps you excited about your work?

My imagination can take me up to Jupiter, or down to the size of atom — there is no need to actually create something unless it's for an audience. That is why I have mostly stopped showing in art galleries, because I wanted to reach the general public. I try to make an interactive app or exhibit as perfect as it can be, and then release it to see how people respond. I feel satisfied when someone says that our work was the most wonderful thing they encountered in their day. ■

INTERVIEW BY JASCHA HOFFMAN

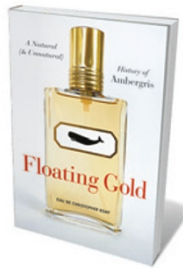
Books in brief



The Geek Manifesto: Why Science Matters

Mark Henderson BANTAM 336 pp. £18.99 (2012)

A geek revolution is upon us, asserts journalist Mark Henderson. Media stars such as physicist Brian Cox have lit the fuse by giving science cultural credibility. Now, says Henderson, with 7% of the UK electorate engaged or trained in science and more than 5 million scientists and engineers working in the United States, this sector of society is poised to gain real political clout. Ultimately, he argues, that could force change in everything from politics and government to health care and the environment as the intellectual honesty and innovative bent of the scientific mindset gains ground.



Floating Gold: A Natural (and Unnatural) History of Ambergris

Christopher Kemp UNIV. CHICAGO PRESS 232 pp. \$22.50 (2012)

Costly it may be, but the perfume fixative ambergris is weird stuff: a waxy mix of secretions and squid beaks from the intestines of the sperm whale. As molecular biologist Christopher Kemp relates, the beaks pass through the beast's four stomachs to form a dung-drenched mass. Often released when the whale dies, the floating lumps are seasoned by sea and sunlight, developing an odour likened to sandalwood, Brazil nuts and violets. Kemp's engrossing study takes us through history, tales of present-day hunters and cetacean science, poking its nose into the perfume industry on the way.



The Universe in Zero Words: The Story of Mathematics as Told Through Equations

Dana Mackenzie PRINCETON UNIV. PRESS 224 pp. \$27.95 (2012)

Mathematician and writer Dana Mackenzie brings to life 24 of the great equations that shape our world. We get Brahmagupta's subtle discovery of zero in 628 AD, the 350-year conundrum of Pierre de Fermat's last theorem, speculation over whether apples or moons inspired Isaac Newton's laws, the economic Black-Scholes formula that failed to prevent the Wall Street meltdown — and much more. Quietly learned and beautifully illustrated, Mackenzie's book is a celebration of the succinct and the singular in human expression.



Mr. Hornaday's War: How a Peculiar Victorian Zookeeper Waged a Lonely Crusade for Wildlife That Changed the World

Stefan Bechtel BEACON 272 pp. \$26.95 (2012)

One-time taxidermist William Temple Hornaday emerges from this lively biography as a nineteenth-century conservation hero — and a rampant racist. Stefan Bechtel tells how Hornaday saved the American bison and fought for legislation to save threatened species. Yet in 1906, as director of the Bronx Zoo in New York, he displayed Congolese pygmy Ota Benga in a cage, despite the protestations of local black clergymen. A fascinating portrait of a man both ahead of his time, and deluded by gross misreadings of Darwin.



Trusting What You're Told: How Children Learn from Others

Paul L. Harris HARVARD UNIV. PRESS 266 pp. \$26.95 (2012)

Children get information in two ways: from their own observation and exploration, and from other people. When the streams conflict, says educationalist Paul Harris, children often defer to the suggestions of others. But they are not uncritical: they "monitor the messenger", choosing whom to believe. Harris's challenge to the view of children as mini-scientists in a world-as-lab is well backed by research: a gripping trawl through the young human mind confronted with moral reasoning, the separation of fact from fiction and more.