

face during the standing ovation that followed the announcement that the LHC had found his eponymous boson.

Perhaps the book's strongest facet is its triumphant championing of basic scientific research. Carroll's aim is broad and sweeping: to establish the central importance of science in humanity's wrestle with the question of existence. He terms the finding of the Higgs boson a "success for the human race" in answering our "restless desire to understand our world." *The Particle at the End of the Universe* illustrates that finding it "is its own reward," emphasizes the "universality of the scientific impulse," and waxes poetic in juxtaposing art and science. The vast behemoth of modern physics, the LHC, and the scintillating discovery of the Higgs boson are not only important because they illumine the "secrets of the Universe"—the entire effort tells us something profound about ourselves.

10.1126/science.1255862

NEUROSCIENCE

Where I end, where you begin

By Séamus A. Power

Nicholas Epley begins *Mindwise* outside a courthouse in Addis Ababa, Ethiopia. Epley (a social psychologist at the University of Chicago) and his wife have just legally adopted two Ethiopian children. Epley is both perplexed and anxious before first meeting their biological father, who has agreed to have them adopted. What did this man think, believe, feel, and want for his children? This opening vignette is the first of many examples taken from the author's personal life, news headlines, and empirical science that drive this fast-moving and highly readable book. Epley's central concern is articulating the ways in which we both understand and, very often, misunderstand other people, even those close to us.

Epley delivers the good news that we all have a sixth sense, an ability to read minds. The bad news is that we are not very good at it. However, there is hope. In the book, Epley draws on a wealth of empirical social psychological research to help make sense of how humans understand and misunderstand one another. Moreover, his experiments show how people, even couples,

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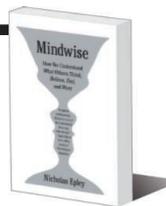


Mindwise

How We Understand What Others Think, Believe, Feel, and Want

Nicholas Epley

Alfred A. Knopf, 2014. 265 pp.



overestimate how well they think they know others. Not only do the participants in his studies misunderstand one another, they are also largely unaware of their mistakes.

Some of the shortcomings of our mind-reading ability stem from how we engage and disengage it at inappropriate times. Epley reveals how we dehumanize other people. That is, how we fail to attribute minds to other people, such as the homeless or terrorists, when it is advantageous or even necessary to do so. Conversely, humans also anthropomorphize; we attribute minds to nonhumans such as gods, family pets, and technological objects like robots and even alarm clocks that force us out of bed in the morning. According to the author, these evolutionarily ingrained intuitions are only half of the reason why people converse with gods in the sky while ignoring homeless people who ask for spare change.

The book covers a variety of ways by which we try to read others' minds: We often project our own thoughts, wants, feelings, or beliefs onto the minds of others—assuming that they think what we think. We stereotype groups and consequently fail to see how individuals might be like us. We often incorrectly make inferences about others' mindsets based on our observations of their behaviors. (Most people who stayed in New Orleans despite the warnings about Hurricane Katrina were not irresponsible or stupid. They simply had no means to leave or

nowhere else to go.)

These mind-reading tools allow us to make sense of complex social interactions to a degree better than chance. However, their faults indicate they could be improved, and Epley ends *Mindwise* by suggesting ways to do so. The secret lies in perspective getting rather than perspective taking. According to Epley, the latter, egocentric strategy at best reinforces—and at worst amplifies—stereotypical and incomplete understandings of others. He espouses the more direct strategy of opening the lines of communication and getting someone else's perspective as a potential solution to understanding the mind of the other. It worked for Kennedy and Khrushchev in resolving the Cuban Missile Crisis. It can also work for us in our relationships with colleagues, friends, family, and significant others.

10.1126/science.1255866

HISTORY OF CHEMISTRY

Elemental discoveries

By James McDonagh

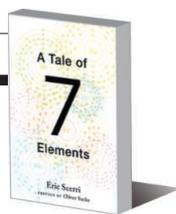
The periodic table has become a symbol of scientific understanding and the power of the scientific method. It is used by the popular media to signify scientific excellence, a logical progression to better understanding of the natural world. But how many people really appreciate the subtle complexities, trials, and tribulations that underlie this edi-

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A Tale of Seven Elements

Eric Scerri

Oxford University Press,
2013. 304 pp.



fice of science? In *A Tale of Seven Elements*, philosopher of science Eric Scerri provides an expert perspective on the history of the periodic table, focusing principally on the last seven naturally occurring elements to be discovered.

Scerri opens the book by setting the discoveries in their historical context, the era of active science between the first and second world wars. While noting the difficulties faced by women entering the physical sciences, he points out that several of the seven elements (protactinium, hafnium, rhenium, technetium, francium, astatine, and promethium) were discovered by women, whose key contributions had often been overlooked.

The author's concise and meticulous account blends philosophy, history, and science, presenting the deep, although not immediately obvious, connections among them. He provides an informative history of the classification of chemical elements, from Dalton's atomic weights to Mendeleev's periodic table. In addition to introducing concepts such as radioactivity and isotopes, Scerri expounds on the far-reaching consequences of quantum theory for chemistry (including Bohr's deduction of atomic structure).

As Scerri notes, his seven focal elements are all "rather exotic." Many are radioactive, and they are generally of low abundance. The book's overarching theme highlights how the discoveries shaped history and how historical and social pressures shaped them. This is exemplified by the priority dispute over hafnium, in which wartime alliances stifled the acceptance of a correct claim. Scerri quotes a British journal editor's response to an article submitted in the early 1920s: "We adhere to the original word celtium given to it by Urbain as a representative of the great French nation which was loyal to us throughout the war." Scerri also notes the impact of competition for personal prestige and resources, aspects that are often overlooked in textbook accounts of the discoveries of elements.

The holistic accounts largely succeed at guiding the reader through the complex connections and numerous priority claimants, although in places the narrative can be difficult to follow. Scerri intended the book for "readers interested in digging a little deeper into the science of the elements and the periodic table." *A Tale of Seven Elements* proves his aim true.

10.1126/science.1255968

EXTINCTION

Our enduring legacy?

By Kendra Smyth

A thought-provoking work of scientific journalism, Elizabeth Kolbert's *The Sixth Extinction* tackles the sobering reality of the large-scale loss of biodiversity happening before our eyes. Although the fossil record documents five previous great extinctions, this time the driving catalyst is neither asteroid nor volcanic eruption but a single inhabitant of Earth: us. For millennia, humans have succeeded extravagantly to the detri-

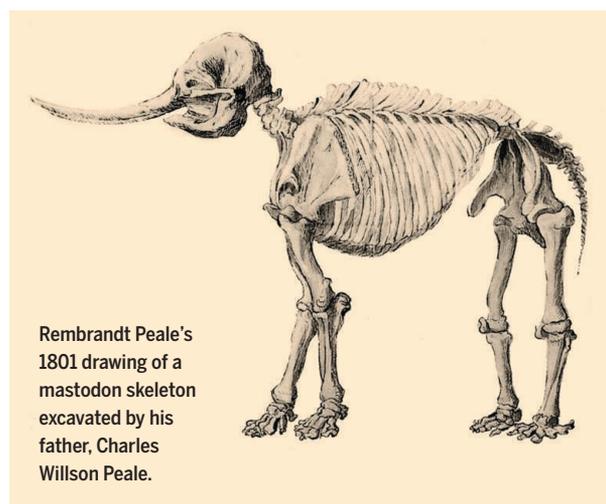
as a concept. In the mid-18th century, the prevailing view was that species were immutable, decreed by God. When mysterious bones were unearthed in present-day Kentucky, scientists rationalized that they were remnants of elephants or hippos that had wandered astray. As Thomas Jefferson put it, "Such is the economy of nature that no instance can be produced of her having ... formed any link in her great work so weak as to be broken." Then in 1796 the French naturalist Georges Cuvier argued that life had a history, one "marked by loss and punctuated by events too terrible for human imagining." The concept of extinction was born, although not readily accepted for decades.

Today, we struggle to grasp a different concept of extinction: humans are responsible for transforming the biosphere. Despite desperate searches for alternative explanations, the evidence Kolbert presents is undeniable: at warp speed, humans have altered the composition of the atmosphere, acidified the oceans, hunted and fished large species to their brink, and destroyed ecosystems. "Right now," she writes, "... we are deciding, without quite meaning to, which evolutionary pathways will remain open and which will forever be closed. No other creature has ever managed this, and it will, unfortunately, be our most enduring legacy." The implications are haunting.

In pushing other species to extinction, what happens to us? Ecologist Paul Ehrlich warns "humanity is busy sawing off the limb on which it perches." Kolbert, halfheartedly optimistic, observes that we should not underestimate human ingenuity. Nonetheless, she gives scant reference to possible solutions, such as scattering sulfates or water droplets into the atmosphere to reflect sunlight or brighten clouds. Although her attempt to conclude on an upbeat note falls flat, it is not wholly misguided. Instead, we are left with an appreciation of the diversity and complexity of life, a desire to transition to a more sustainable world, and a reminder that every ending is a chance for a new beginning. The sixth extinction might be the end of the world we know, but it will not be the end of life.

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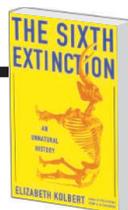
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Rembrandt Peale's 1801 drawing of a mastodon skeleton excavated by his father, Charles Willson Peale.

ment of other species. "Though it might be nice to imagine there once was a time when man lived in harmony with nature," Kolbert notes, "it's not clear that he ever really did."

Through masterful field reporting, Kolbert transforms a collection of daunting facts into an entertaining and enlightening journey of scientific discovery, accessible to scientists and laymen alike. She takes readers along as she visits over a dozen scientists at field stations and laboratories around the world: herpetologists in Panama, marine biologists in Australia, botanists in the Andes, paleontologists in New Jersey, and anthropologists in Germany. Intermixed with these scientific reports and personal narratives is an intriguing historical account of the origin of extinction



The Sixth Extinction An Unnatural History

Elizabeth Kolbert

Henry Holt, 2014. 335 pp.