

The Madhouse Effect: How Climate Change Denial is Threatening Our Planet, Destroying Our Politics, and Driving Us Crazy
MICHAEL E. MANN
AND TOM TOLES
Columbia University
Press: 2016.

and anthropogenic climate change (as well as second-hand smoke and the dangers of pesticides). We read of the television, radio and Internet ‘shock jocks’ who chase ratings by giving equal weight to scientific consensus and denier rhetoric. The power of vested interests in US politics and implications for state and federal action on climate change are made abundantly clear, with Mann an amiable, if rather despairing, guide.

He begins with an overview of the scientific method, the science of global warming and key uncertainties — such as feedback mechanisms, whereby warming can itself boost greenhouse-gas emissions and so cause even more warming. He and Toles then explore the “six stages of denial”, ranging from ‘it’s not happening’ through ‘it’s self-correcting’ to ‘geoengineering will fix it all’.

Where this book shines is in its exploration of the debate in the United States, and a veritable who’s who of denial. As the November presidential election looms, it’s useful to learn about key players’ stances. Unsurprisingly, most of the contenders for the Republican nomination when the book was finished back in July emerge as outspoken critics of climate science and international action. The party’s current candidate, Donald Trump, wants to renegotiate or leave the 2015 Paris climate agreement joined by President Barack Obama in September, and has called climate change a hoax. But Mann suggests that several candidates were influenced by cryptic political and financial forces in the fossil-fuel industry, which apparently bankroll denier activity and lobbying to protect their interests.

The authors discuss how Republican senator Jim Inhofe (Oklahoma) is waging a “war” on climate science by using hearings of the Senate environment committee that he chairs to try and debunk climate change. Mann’s writing is subjective in places — such as when discussing former Virginia attorney-general

CLIMATE SCIENCE

Denialism deciphered

Dave Reay enjoys a wry history of US climate–science obfuscation.

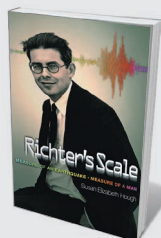
As an iconic climate-change image, the ‘hockey-stick graph’ by geophysicist Michael Mann — showing global temperature change over the past 1,000 years — is up there with the greats. Others include the Keeling curve of changing atmospheric carbon-dioxide concentrations and the ‘boiling frog’ metaphor from Al Gore’s 2006 documentary *An Inconvenient Truth*. Mann’s figure (from a seminal paper: M. E. Mann *et al. Geophys. Res. Lett.* **26**, 759–762; 1999) appears in ‘Climate Science 101’ lectures the world over; was a touchstone of the 2001 third assessment

report of the Intergovernmental Panel on Climate Change; and still elicits invective from deniers (S. Lewis *Nature* **483**, 402–403; 2012). Who better than Mann, then, to explore the history of climate-change denial, and its politics, personalities and implications?

The Madhouse Effect is a breezy, engaging read, interspersed with wry illustrations courtesy of cartoonist Tom Toles of *The Washington Post*. It offers many excellent insights into life on the front line battling US climate-science obfuscation. We learn about the cadre of contrarian scientists routinely rolled out to cast doubt on issues such as ozone depletion

NEW IN
PAPERBACK

Highlights of this
season’s releases



Richter’s Scale: Measure of an Earthquake, Measure of a Man

Susan Hough (Princeton Univ. Press, 2016)

Charles Richter’s eponymous, logarithmic scale of earthquake classification made him globally famous. In this illuminating biography, seismologist Susan Hough describes Richter’s accidental arrival at the Seismolab of the California Institute of Technology, and the colleagues there who resented his fame. A surprising selection of Richter’s poetry surfaces, reflecting his sentiments on married life and mortality (see Gregory Beroza’s review: *Nature* **445**, 599; 2007).

Ken Cuccinelli, an erstwhile alger of data manipulation, now an oyster farmer on an island threatened by rising sea levels. But he generally manages to avoid score-settling.

In 2009, Mann's work was caught up in the 'Climategate' scandal (nature.com/climategate). This was the unauthorized release of more than 1,000 e-mails from the Climatic Research Unit at the University of East Anglia in Norwich, UK — many containing private correspondence, some to or from Mann. Excerpts were published by climate sceptics to smear scientists and cloud public and political judgement. Mann gives this seismic event just a couple of pages. He explains briefly how the e-mails were taken out of context and that references to a "trick" used to "hide the decline" referred simply to a trick of the trade: combining direct measurements of global temperature with proxy estimates. Given that Mann was bombarded with threats and abuse following Climategate, a fuller exploration — as in Fred Pearce's *The Climate Files* (Guardian Books, 2010) — would have been good to see.

Despite the political tensions, Mann and Toles strike a positive tone in the final section. They highlight action being taken at community, city and state levels, and the potential of the Paris agreement to avoid the most damaging effects of climate change. And they find hope in the power of individual choice to shift the most recalcitrant hangovers from our carbon-intensive history. Their key recommendations are for each of us to support renewable energy and carbon pricing, to vote for politicians who do the same and to stop equivocating on climate science.

As Mann points out, denialists are not likely to read this book. For climate researchers outside the United States, it is an eye-opening primer (despite its baffling references to baseball stars) on the vested interests with which their US colleagues must do battle. For a wider readership, it makes clear just how high the stakes are. If tackling climate change is indeed a war, then Mann and Toles have certainly earned their stripes. I salute them. ■

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MEMOIR

Love and uncertainty

Werner Heisenberg's wartime letters to his wife record scientific and personal privations, finds **Ann Finkbeiner**.

Werner Heisenberg is a conundrum. He won the 1932 Nobel Prize in Physics for creating the foundations of quantum mechanics and his uncertainty principle, which describes how it is impossible to know a particle's location and its momentum simultaneously. During the Second World War, directed by the Nazi government, he headed Germany's unsuccessful efforts to create an atomic bomb. Why didn't he succeed? Why did he try?

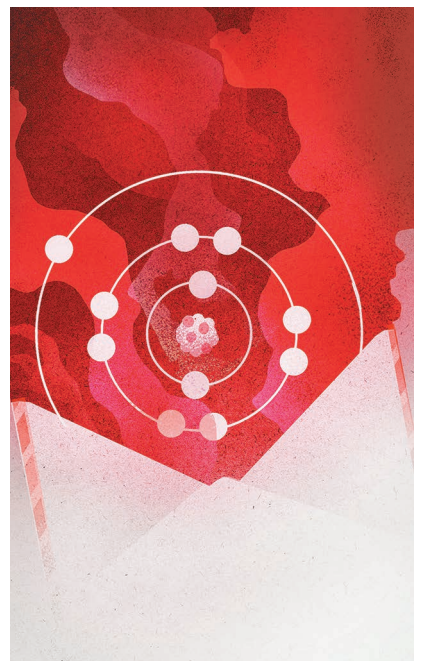
There are no unambiguous answers here, although clarifying Heisenberg's motives is one reason that his daughter, Anna Maria Hirsch-Heisenberg, gives for publishing the letters between him and her mother. What the letters do illustrate is Hirsch-Heisenberg's other reason for publishing (in German in 2011, and now in English for the first time): how a couple much in love lives through a war.

Werner begins his letters with "My dear Li". Li is Elisabeth, née Schumacher; they met in 1937 at a musical evening. The two talked — a conversation, Werner wrote, that seemed to have begun so long ago that continuing it for the rest of their lives felt natural. Two weeks later, they were engaged; four months later, they began a 40-year marriage. But Heisenberg had to travel for research and was rarely at home, thus the letters. This collection spans the tumultuous years from 1937 to 1946.

The letters, necessarily discreet about politics and the military, contain mostly the quotidian — frighteningly so, this being Germany during that war. By 1939, Werner lives in Leipzig and Li has moved to their safe country house in southern Germany. Li has had twins; she will have four more children in the next five years. The war has started. "I get caught up pondering the dark picture everybody is painting," Li writes, "how fortunate that the children ... are so



My Dear Li: Correspondence, 1937-1946
WERNER HEISENBERG AND ELISABETH HEISENBERG; ED. ANNA MARIA HIRSCH-HEISENBERG, TRANSL. IRENE HEISENBERG
Yale University Press: 2016.



unencumbered and jolly." Werner makes a long lecture trip to the United States, where he finds the audiences receptive and the students bright. He tells his US colleagues who offer him jobs that he needs to stay in Germany "so that I might also be here afterward and help"; as he writes to Li, "we are just not at home here".

Over the next few years, Werner alternates between Berlin, where "it is quite ▶



How to Clone a Mammoth

Beth Shapiro (Princeton Univ. Press, 2016)
Ecologist Beth Shapiro parses possible impacts of the "unextinct". Reintroducing mammoths to Siberia, for example, could restore grasslands and keep carbon trapped in the permafrost (see Henry Nicholl's review: *Nature* **521**, 30-31; 2015).



Future Arctic: Field Notes from a World on the Edge

Edward Struzik (Island, 2016)
Arctic journalist Edward Struzik compresses 30 years of circumpolar observation in this portrait of a thawing world. As warmer oceans induce powerful storms that hasten the ice's retreat, ecological anomalies surface, such as the grizzly bear-polar bear hybrid.