

be above or below an Asian man? It's horrifying to recognize that that's how people thought, but we have to face up to that, not pretend it didn't happen.

### Regarding sexism — how should we understand the caricature of astronomer Caroline Herschel, from 1790?

In that picture, she represents a curiosity, a woman who's discovering a comet. She's not being valued because of the contributions she made; she's being portrayed as a freak. She's got exaggerated features, a great mark on one cheek from the smallpox she had when a child. The speech bubble is in fractured English because she was German and had an accent. She's being mocked, but why? Might it be because men were afraid that women might turn out to be clever?

### Vaccination was a common topic. Why?

The famous caricature by Gillray from 1802 is a comment on Edward Jenner's introduction of a smallpox vaccine that was based on cowpox. It shows the recipients turning into cows. At the time, a real concern was what would happen as a result of putting foreign material, animal material, inside a human body. And unlike now, there was good reason to be suspicious, because the vaccine hadn't been properly tested and the equipment was so dirty that people often became sick.

In the late nineteenth century, long after the British government had made smallpox vaccination compulsory for babies, there were still fears about it not being 100% effective and about disease being transmitted through the procedure. The underlying debate was about the conflict between individual liberty and the right of a government to protect the nation.

### Are these equivalent to coronavirus cartoons?

No, I think they're very different. Most people today aren't really aware of the intricacies of scientific debates. Science is on a pedestal, it's the basis of the whole of society; there's no point laughing at it. In modern cartoons, it's not scientists and doctors who are mocked — it's politicians, leaders such as Donald Trump and Boris Johnson, who don't listen closely enough to experts like Anthony Fauci, head of the US National Institute of Allergy and Infectious Diseases. I did see a wonderful German cartoon about Brexit and the variant discovered in the United Kingdom last year. It showed a big, fat virus painted with a Union Jack and laughing smugly because the United Kingdom had a different disease from the rest of Europe. As the caricaturists of the eighteenth and nineteenth centuries knew, pictures are an extremely effective way of conveying a message.

### Interview by Alexandra Witze.

The interview has been edited for length and clarity.

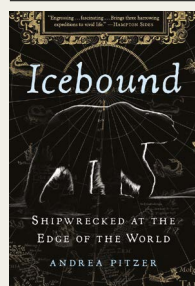
## Books in brief



### Change

Damon Centola *Little, Brown Spark* (2021)

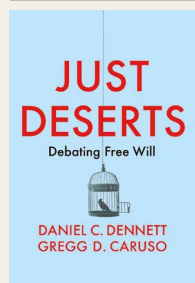
Sociologist Damon Centola investigates the types of network that create major social change. Compelling examples range across history, geography and social settings — from ancient China to the Black Lives Matter movement. China led in technological innovation for well over a millennium, then lost out to European nations because, Centola says, the centralized control that captured and spread ideas from all over China later stifled independent thought. “The key to initiating social change is to target the periphery,” he argues.



### Icebound

Andrea Pitzer *Simon and Schuster* (2021)

In ancient Greek mythology, the North Pole was a temperate region. Sixteenth-century mapmaker Gerardus Mercator thought it could be a route to China. Inspired by such beliefs, in 1594–97, navigator William Barents sailed on three Arctic voyages, dying after losing his ship to ice in the sea now named after him, and spending a year fighting off polar bears, hunger and cold. Drawing on three Arctic expeditions of her own, journalist Andrea Pitzer captures the story vividly. She concludes that global warming will soon open the Barents Sea to summer navigation.



### Just Deserts

Daniel C. Dennett & Gregg D. Caruso *Polity* (2021)

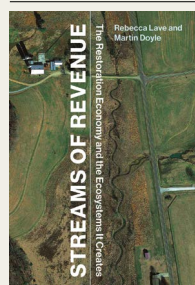
Philosophers have debated whether free will exists for centuries; scientists since the arrival of quantum theory a century ago. This vigorous discussion of punishment, morality, choice and more offers three exchanges between philosophers Daniel Dennett and Gregg Caruso. Caruso agrees with Albert Einstein's 1929 comment: “I do not believe in free will ... My own career was undoubtedly determined ... I claim credit for nothing.” Dennett, by contrast, thinks that the free will required for moral responsibility is compatible with determinism.



### Extraterrestrial

Avi Loeb *Houghton Mifflin Harcourt* (2021)

The subtitle, ‘The First Sign of Intelligent Life Beyond Earth’, will provoke scepticism. Yet author Avi Loeb is an astrophysicist at Harvard University in Cambridge, Massachusetts. He says an object seen in 2017 moving rapidly through the inner Solar System, deviating from Earth's gravitational field, must have been interstellar. Most astronomers think it was a strange comet — but it lacked key features. To Loeb, it was technology from a distant alien civilization. He argues cogently, elegantly and modestly for this controversial claim.



### Streams of Revenue

Rebecca Lave & Martin Doyle *MIT Press* (2021)

‘Stream mitigation banking’ lets US developers damage water ecosystems in exchange for buying credits to restore a comparable habitat. Geographer Rebecca Lave and hydrologist Martin Doyle discuss the arrangement's questionable operation from 1998 to 2018 in their nuanced study for river scientists, ecological and environmental economists, and advocacy groups. Instead of creating “weirdly unnatural ecosystems”, could the system be reformed to restore nature's “messy, dynamic, complex ecosystems”? **Andrew Robinson**