

Putative spaceplane *Columbia* coming apart, underscoring that lives were at risk. *SpaceShipTwo*, held under carrier plane *WhiteKnightTwo*.

Other colourful characters enter the narrative. They include John Carmack, the video-game designer who founded Armadillo Aerospace in Mesquite, Texas, to shoot for the prize; Steve Bennett, who sent his Starchaser rocket soaring above north-west England; and the Romanian Dumitru Popescu, who as an engineering student recruited his wife to help build rockets in his father-in-law's backyard. More famous names also emerge. Erik Lindbergh recreated his grandfather's flight in a modern plane to cope with the emotional pressure of his family's intense legacy and raise money for the prize. Entrepreneurs Anousheh and Amir Ansari used their personal fortune to sponsor the X Prize (and, eventually, to buy Anousheh a ride to the International Space Station in 2006). British billionaire Richard Branson ensured that an enormous Virgin logo was painted on the side of *SpaceShipOne* so that the television cameras would catch it in the morning light.

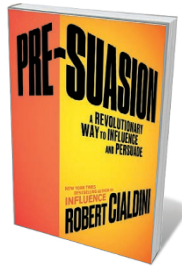
Guthrie sketches the interplay between these personalities as they jostle towards the X Prize deadline of December 2004. In the end, no competitor came close to the scrappy Rutan, who won the purse with two flights five days apart.

What remains unanswered is whether all this geekiness more than a decade ago has truly transformed commercial space-flight. In lieu of contributing to the X Prize, entrepreneur Elon Musk founded SpaceX in Hawthorne, California, which is now ferrying cargo to the space station (and will soon do the same with astronauts, along with aerospace company Boeing). Its competitor Blue Origin, set up by Amazon founder Jeff Bezos, was barely known in 2004 but has since pioneered reusable suborbital rockets that could save costs. There may or may not be a long-term business case for private spaceflight, but at the moment space tourism does not seem to be it.

Ultimately, *How To Make A Spaceship* is about the entrepreneurial work needed to launch such a project; short shrift is given to technical details and subsequent history. The fatal *SpaceShipTwo* accident is relegated to an epilogue, and an engine-test explosion that killed three of Rutan's employees in 2007 is not even mentioned. Yet Branson's Virgin Galactic continues to sell seats on future space flights for a quarter of a million dollars each. It expects to send a re-build of *SpaceShipTwo* into the skies on its first test flights later this year. ■

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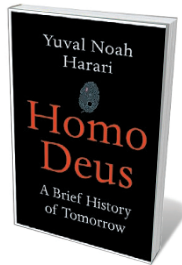
Books in brief



Pre-Suasion: A Revolutionary Way to Influence and Persuade

Robert Cialdini SIMON AND SCHUSTER (2016)

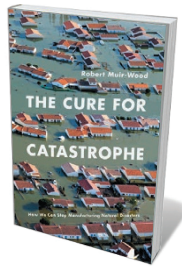
Fittingly, *Influence* (William Morrow, 1984) became one of the most influential studies in behavioural science, a triumph of field research on persuasion and how to resist it by social psychologist Robert Cialdini. Here Cialdini turns the tables, analysing how to harness persuasion by “frontloading” attention and pinpointing patterns of association conducive to change. His trove of findings and case studies covers how our focal points determine who we see as influential, how babies can be “pre-suaded” to be helpful, and how language can become a fulcrum in fraught negotiations.



Homo Deus: A Brief History of Tomorrow

Yuval Noah Harari HARVILL SECKER (2016)

Historian Yuval Noah Harari's blockbuster *Sapiens* (Harvill Secker, 2014; see *Nature* **512**, 369; 2014) was a trenchant treatise on what he sees as our species' resistible rise to global dominion. In this equally acerbic forecast, Harari argues that the biological paradigm that casts organisms as biochemical algorithms shaped by natural selection could open the way to domination by networked computer algorithms. He opines that, as search engines and social media absorb our life histories and artificial intelligence advances, “dataism” may even make humanity obsolete.



The Cure for Catastrophe: How We Can Stop Manufacturing Natural Disasters

Robert Muir-Wood ONEWORLD (2016)

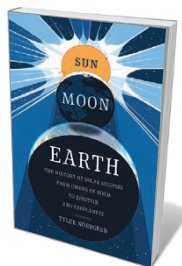
From the August earthquake in central Italy to the Fukushima crisis of 2011, multitudes of ‘natural’ disasters are exacerbated by shoddy construction, non-existent preparedness and political inertia. Disaster expert Robert Muir-Wood's study is science in the round, spanning centuries of catastrophes, key figures such as seismologist Charles Richter, forecasting, the intricacies of insurance (multistorey concrete buildings are revealed as “weapons of mass destruction” in a quake) — and a detailed, workable recipe for resilience.



Revenge

Alastair Reynolds GOLLANCZ (2016)

This latest science-fiction gem by astrophysicist Alastair Reynolds is a pacy space opera set in a far-future universe, where a broken civilization hangs on in a phalanx of artificial worlds. Rebellious teenagers Fura and Adrana join the crew of a solar-sailed vessel, riding the photon winds in search of lost technologies in the galactic deeps. Reynolds makes the human story compelling in a narrative that, spiced with bizarre characters aplenty and propelled by vengeance, smacks intriguingly of everything from Robert Louis Stevenson's *Treasure Island* to *Mad Max*.



Sun Moon Earth

Tyler Nordgren BASIC (2016)

On 21 August 2017, the United States will experience its first total solar eclipse in 40 years. Astronomer Tyler Nordgren's primer maps essentials for that event, contextualized by a fascinating history that sweeps us from Anaxagoras' explanation of eclipses in the fifth century BC to Arthur Eddington's test of Einstein's theory of general relativity during the May 1919 total eclipse. Nordgren is a wonderful guide to both the science and the sensory thrills, such as the shimmer of Baily's beads or the eerie twilight of totality. **Barbara Kiser**