

The moment when Lemuel Gulliver first sees the flying island Laputa.



IN RETROSPECT

Gulliver's Travels

Greg Lynnall unpeels the science in the satire on the 350th anniversary of Jonathan Swift's birth.

When *Travels into Several Remote Nations of the World*, ostensibly by "Lemuel Gulliver", was published in London in 1726, almost everyone knew that its author was actually Jonathan Swift. Dean of St Patrick's Cathedral in Dublin, Swift was also a published satirist of some notoriety. But *Gulliver's Travels*, as it is now known, immediately garnered acclaim "from the cabinet council to the nursery", as Swift's friend, the writer John Gay, reported. Even today, the fantastical elements of

Travels into Several Remote Nations of the World

JONATHAN SWIFT
Benjamin Motte:
1726.

this four-part story remain popular with children. And as a satirical masterpiece, it is also one of the most remarkable encounters between science and the literary imagination ever penned. Swift not only reflected deeply on the natural philosophy of his day, but also created prescient visions of its future.

Swift signals that preoccupation with

science both subtly and overtly. Gulliver is an empiricist. Although he encounters wondrous places and peoples far beyond known experience, he describes them in the matter-of-fact tone used by scientists and travel writers in the pages of the Royal Society's *Philosophical Transactions*. Gulliver insists on the truthfulness of his far-fetched story, and his attention to numerical precision and empirical description are crucial to the joke. Like any good natural historian, Gulliver weighs, measures and in some cases brings back to England the exotic specimens he discovers, such as the stings of partridge-sized wasps.

In the giants' realm of Brobdingnag, Gulliver even becomes a kind of human microscope. With his naked eye, he views gigantic lice crawling on his hosts; his description imitates those in Robert Hooke's ground-breaking book *Micrographia* (1665). The tables are shockingly turned when Gulliver becomes an object of curiosity himself, so critiquing European ideas of 'otherness'. Brobdingnagian philosophers, for instance, struggle to place him in their established taxonomies, and resort to calling him a *lusus naturæ* ('sport of nature').

Gulliver's impulse towards the factual is stretched to breaking point in the miniature world of Lilliput. Here, he graphically describes the difficulties of (for instance) bodily excretion when one is a giant.

There is stretching, too, in the different scales of Swift's fictional worlds. Despite the finely imagined detail, the dimensions don't always stand up to analysis. Yet Swift knew about mathematical proportion when calculating them. In many respects, he has astounded readers with his successful applications of theory and predictions of science and technology. For instance, using Johannes Kepler's third law of planetary motion, Swift imagines that the people of his floating civilization of Laputa have discovered the two moons of Mars and their orbits. These moons would remain undiscovered for another 150 years, yet Swift predicted their orbits almost exactly. (A crater on one of them, Deimos, is named after him.)

This part of Gulliver's voyage contains Swift's most sustained treatment of science. Laputa is a city in the clouds. Its officer-astronomers use the power of magnetism to hover the island above the province of Balnibarbi, threatening to deprive its inhabitants of sunlight and rain, or crush them completely. Here, Swift embraces the scientific treatise as a literary form (unlike, for instance, Mary Shelley, whose titular protagonist in the 1818 *Frankenstein* shies away from explaining how he creates life). Gulliver describes the aerial propulsion of Laputa in detail, even incorporating a force diagram

Gulliver is attacked by giant wasps in Brobdingnag.

that would not have been out of place in the *Philosophical Transactions*.

For some, the flying island's tyrannical grip offers a powerful warning about the military application of science. "Laputa showed me the possibility of scientific horrors," wrote philosopher and pacifist Bertrand Russell in the 1950s. But this weapon of mass destruction is also a political allegory for Britain's imperial oppression of Ireland. In particular, it recalls the 'Wood's halfpence' affair of the early 1720s, in which Britain imposed coinage on the

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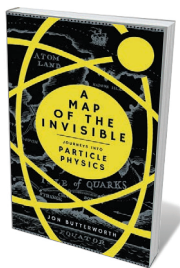
nation without the Irish parliament's consent. The affair provoked furious ripostes from Swift in seven pamphlets now known as the *Drapier's Letters*. Crucially, the master of the British mint at the time

was none other than Isaac Newton. The sneering words about scientists' political ambitions in this part of the book are probably partly aimed at him.

Such passages have led some to view Swift as 'anti-scientific'. Yet he numbered scientists of the day among his closest friends. These included his tutor at Trinity College Dublin, natural philosopher St George Ashe; physician, satirist and Royal Society member John Arbuthnot; and Dublin schoolmaster and mathematician Thomas Sheridan. Swift often remarked on their absent-mindedness — a trait shared with the Laputians, in whom it is physically manifested by each having "one of their eyes turned inward, and the other directly up to the zenith".

Swift had also witnessed the mental deterioration of local merchant Joseph Beaumont, whose obsessive attempt to calculate longitude at sea — the scientific question of the day — ended in suicide. It is perhaps no wonder that Gulliver's visit to the Academy of Projectors, the research institute in Balnibarbi's capital, Lagado, is tinged with tragi-comedy. He sees experimenters "driven equally on by hope and despair". Their hare-brained schemes include turning excrement back into food, breeding naked sheep and extracting sunbeams out ▶

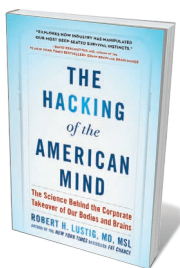
Books in brief



A Map of the Invisible: Journeys into Particle Physics

Jon Butterworth WILLIAM HEINEMANN (2017)

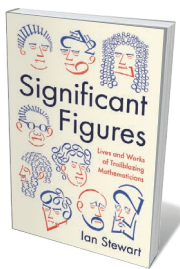
Yearning for a late holiday? Bosonia, the Isle of Leptons and farthest Antimatter beckon in this bracing voyage into particle physics, captained by experimental physicist Jon Butterworth. Ever an original writer, he maps the territory of the standard model and beyond, elucidating in turn wave-particle duality, the quantum field and the subatomic realm, all the way to ripples in space-time and the hunt for the Higgs boson (which, as a veteran of the Large Hadron Collider at Europe's physics lab CERN, he navigates expertly). Sea legs achieved, you're ready for wilder shores, such as the Dirac-Milne universe.



The Hacking of the American Mind

Robert Lustig AVERY (2017)

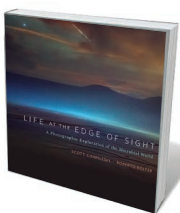
In *Fat Chance* (Hudson Street, 2012), endocrinologist Robert Lustig linked high-fructose corn syrup to obesity. Here, bolstered by up-to-date neuroscience, Lustig's argument broadens, showing how the relentless marketing of hedonic products such as processed food and digital devices encourages overconsumption. By targeting the brain's reward system, corporations "hack" minds, triggering biochemical disruption that can slide into addiction and depression. Lustig's prescriptions — from a wholefood diet to altruistic acts — are more reminder than revolution, but salutary nonetheless.



Significant Figures: Lives and Works of Trailblazing Mathematicians

Ian Stewart PROFILE (2017)

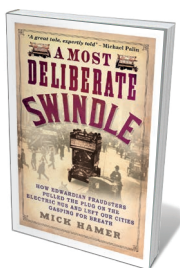
Mathematics, notes Ian Stewart, stretches back to the Babylonians' quadratic equations in an unbroken line of several millennia. His assured chronicle traces the discipline through the discoveries of 25 luminaries from around the world. In among Henri Poincaré, Ada Lovelace, Carl Friedrich Gauss and Srinivasa Ramanujan are Liu Hui, who contributed to empirical solid geometry in the third century AD; Sofia Kovalevskaya, the Russian revolutionary who advanced partial differential equations and mechanics; and the brilliant, inspirational topologist William Thurston, who died in 2012.



Life at the Edge of Sight

Scott Chimileski and Roberto Kolter BELKNAP (2017)

From the microbial mats at Grand Prismatic Spring in Wyoming's Yellowstone National Park to yeasts, bacteria and diatoms, the realm of minute life — the foundation of the planetary ecosystem — is ceaselessly compelling (A. Woolfson *Nature* **536**, 146–147; 2016). Microbiologists Scott Chimileski and Roberto Kolter explore it by meshing sumptuous images with sharp text. Their swirling narrative segues through deep time; lingers on slime moulds, tardigrades ('water bears'), rotifers and the microbes driving fermentation; and speculates enticingly on extraterrestrial microbiota.

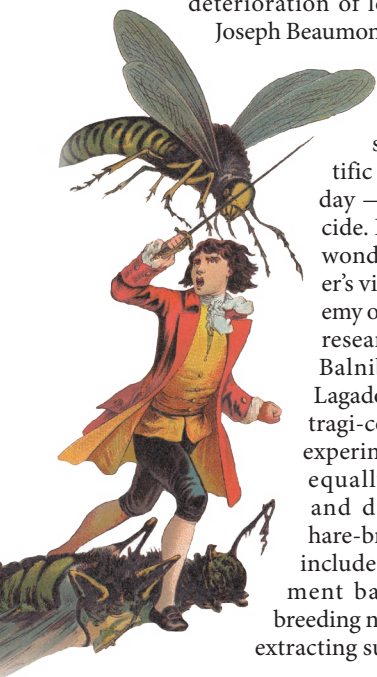


A Most Deliberate Swindle

Mick Hamer REDDOOR (2017)

On 18 April 1906, a knot of journalists gathered in central London to goggle at a technological marvel. The clean, quiet electrobus looked set to be stiff competition for the city's lumbering, petrol-guzzling omnibuses. Yet, as Mick Hamer reveals in this accomplished exposé, it was a doomed debut. The London Electrobus Company was packed with swindlers (among them a judge) whose fraudulent activities sank the venture, ensuring the internal combustion engine's problematic dominance in transport technology. [Barbara Kiser](#)

GETTY



► of cucumbers. There is even a random-text-generating word-frame called the Engine, reminiscent of Gottfried Leibniz's late-seventeenth-century calculating machine, the step reckoner.

Collectively, these experiments and inventions urge a sceptical view of the utopian claims made for science by some of Swift's near-contemporaries, such as the apologist Joseph Glanvill. Indeed, scholars have identified real-life parallels for nearly all of these projects — yet another indicator that Swift was well-informed about goings-on at the Royal Society. An experiment in which Hooke artificially ventilated a live dog's lungs, for instance, is scatologically parodied.

Yet the Lagadan projects do more than serve as distorting mirrors of real ones. They are imbued with Swift's singular imagination and informed convictions. The latter are perhaps clearer in the king of Brobdingnag's outright endorsement of scientific research: that “whoever could make two ears of corn” grow “where only one grew before; would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together”. Swift is not just distinguishing between the merits of pure and applied science, but also arguing that the kinds of science pursued are the results of political, social and moral choices.

Gulliver's final meeting is with the Houyhnhnms, rational horses with the power of speech. Their land is plagued by feral animals known as the Yahoos — which, Gulliver is shocked to learn, have human physical form beneath their fur. The Yahoos amplify all of humanity's worst traits, and through them Swift challenges the anthropocentric view of the world in a way that seems very modern. However, the Yahoos also show us what humanity is not: something Gulliver fails to recognize. When the traumatized voyager finally returns home, he prefers the inhabitants of his stables to his own family.

Ultimately, Gulliver is an embodiment of blinkered reductionism — an error Swift believed he saw in the science of his time. It is testament to Swift's genius that many of the questions raised in his work continue to resonate today. ■

Greg Lynn is the author of *Swift and Science*, and *Reader in English at the University of Liverpool, UK*. He is currently researching Swift's reception in the culture of science, and would welcome hearing from anyone interested in this satirist and his work.
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PUBLIC HEALTH

Design for living

Judith Glynn takes in a show that probes the nexus of graphic art, behaviour and public health.

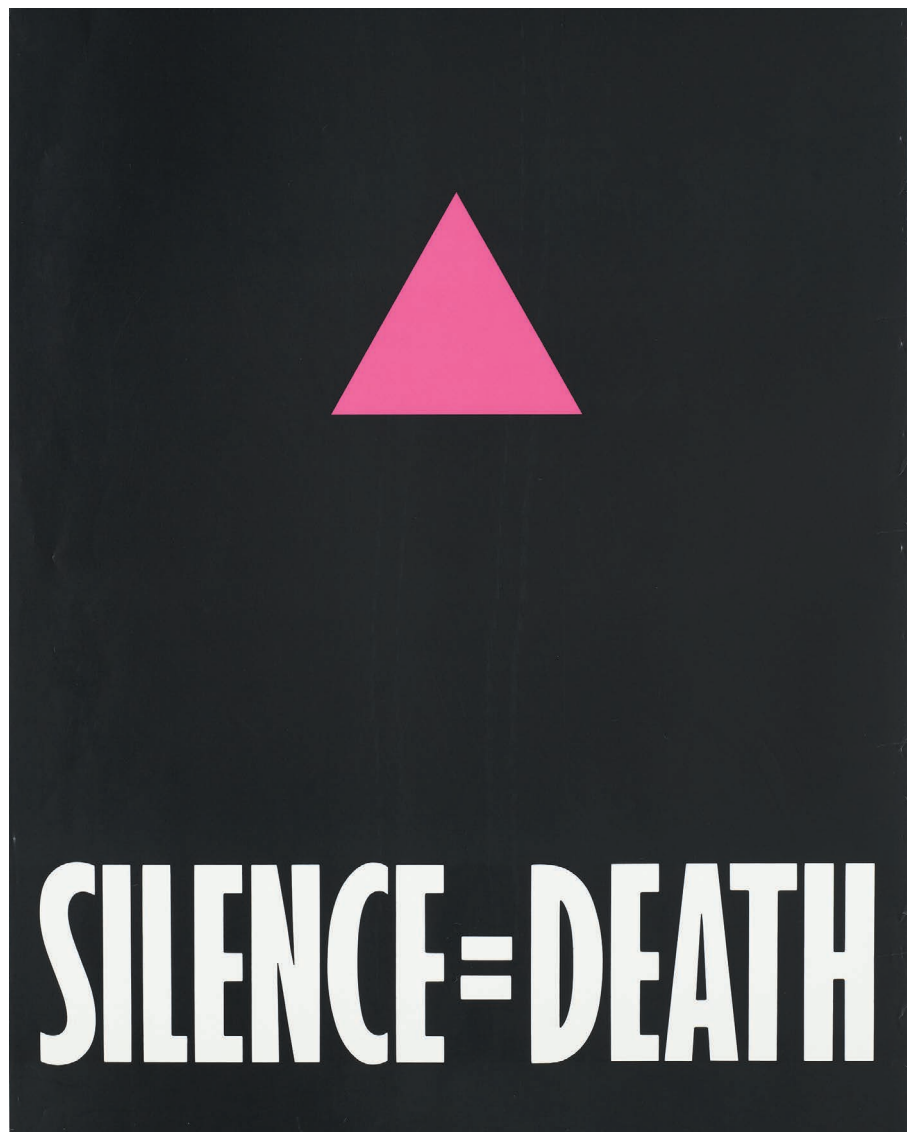
In 1987, with AIDS raging in New York City, six gay activists created a poster to break the silence over the epidemic. It featured a pink triangle — the badge forced on homosexual people in Nazi concentration camps, but inverted and appropriated by the gay community as a symbol of solidarity. Underneath were the words SILENCE = DEATH. Adopted by protest group ACT UP, the poster helped to galvanize action on HIV and AIDS. Equally unforgettable was Britain's

Can Graphic Design Save Your Life?

The Wellcome Collection, London.
Until 14 January 2018.

contemporaneous “Don't die of ignorance” campaign: its AIDS tombstone appeared on leaflets, billboards and television advertisements.

These iconic images — along with the AIDS tombstone itself — are on display in the Wellcome Collection's exhibition *Can Graphic Design Save Your Life?* in London. The show gathers some 200 objects



This poster was used to raise awareness of AIDS in New York City in the 1980s.