

principle as ‘Whatever Happened, Happened’: even an atomic bomb exploded by the castaways cannot change the past and bring them home. The 1995 film *12 Monkeys* (or its 1962 progenitor *La Jetée*) similarly plays with the chronology of a single event: a character sees himself release an apocalyptic virus and usher in the very future he was sent back in time to prevent.

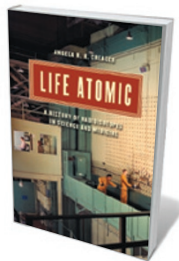
But maybe time travel can occur in other ways; perhaps it is possible to change the past after all. The *Star Trek* episode ‘City on the Edge of Forever’ has Dr McCoy travelling back in time to Depression-era America. There he saves the life of a woman, thus changing the future so that the *Enterprise* is never built. So Kirk and Spock travel back in time and change the past, to save the present, at the price of annihilating the woman with whom Kirk has fallen in love.

In Charles Stross’s 2009 sci-fi novella *Palimpsests* (much influenced by Isaac Asimov’s *The End of Eternity* and 1930s sci-fi pioneer Olaf Stapledon’s grander cosmic visions), each intervention in the past revises present and future. In this scenario, when you kill your ancestor, the Universe becomes one in which you were never born. So you never went back in time, so you didn’t kill your ancestor, so you were born, so you were able to travel through time, so you did kill your ancestor, so ... Stross makes a virtue of this: the initiation into his Stasis, a sort of universal time-police, is to go back and kill your own grandfather.

The other change-the-past trope is to make today’s world a better place by getting rid of some of its more evil past denizens — Desmond Warzel’s short story *WIKIhistory* (go.nature.com/txib8y) is the funniest version of this I’ve seen: newbie time travellers keep killing Hitler, so the gurus have to go back and fix the past each time. Or perhaps each intervention cleaves off a new Universe, as in the so-called many-worlds interpretation of quantum mechanics (itself a rich source of scientific and science-fictional ideas, as discussed previously in these pages; go.nature.com/f3oz9w). Indeed, it seems that understanding the possible (or impossible) physics of time travel will require a full understanding of the ‘theory of everything’, marrying general relativity and quantum mechanics.

In any scenario, it seems impossible to have time travel without paradoxes or violations of physical laws. So some physicists have theorized that a corollary to the fundamental laws may be that time travel is effectively impossible. In some varieties of the principle, any time machine is censored, hidden inside a black hole formed as a side effect to its creation, walled off from the rest of the Universe by an event horizon. Stephen Hawking has come up with a stronger version, the ‘chronology protection conjecture’: the laws of physics, relativistic and quantum-mechanical,

Books in brief



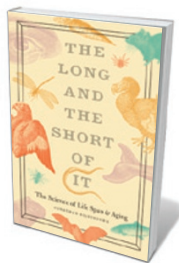
Life Atomic: A History of Radioisotopes in Science and Medicine *Angela N. H. Creager* UNIVERSITY OF CHICAGO PRESS (2013)

The Manhattan Project’s impact reverberated beyond the atomic bomb, reveals Angela Creager in this lucid scientific history. It paved the way for the Oak Ridge National Laboratory in Tennessee to mass-produce radioisotopes — elemental variants that emit radiation — for peacetime use. These newly abundant products of the “physicists’ war” transformed biology, particularly as molecular tracers in processes such as protein synthesis. Creager deploys radioisotopes as “historical tracers” to explore shifts in medicine, perceptions of cancer risk and the porous “civilian-military divide”.



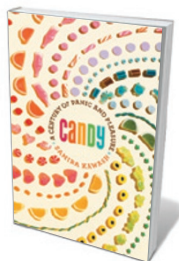
Space Has No Frontier: The Terrestrial Life and Times of Sir Bernard Lovell *John Bromley-Davenport* BENE FACTUM (2013)

He made waves in radio astronomy, founded the UK-based Jodrell Bank Observatory and was an ‘incidental’ cold-war spy. Bernard Lovell, who died aged 98 in 2012, emerges as complex and brilliant in John Bromley-Davenport’s biography. There is much to savour, from Jodrell Bank’s use both in anti-Soviet defence and in tracking the Soviet satellite Sputnik; Lovell’s risky, newly revealed 1963 visit to the Soviet Deep Space Network; and the observatory’s latest role as control centre for the Square Kilometre Array radio telescopes.



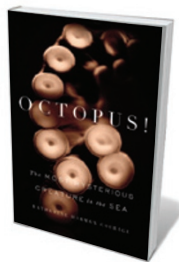
The Long and the Short of It: The Science of Life Span and Aging *Jonathan Silvertown* UNIVERSITY OF CHICAGO PRESS (2013)

Ecologist Jonathan Silvertown revivifies an old story in this primer on the science of ageing. His look at lifespan centres on a “Methuselah’s menagerie” of bats, naked mole rats, ocean quahogs and humans — in whom cancer is often the price of longevity. He skips from heredity to semelparity (“once-only” reproduction followed by death), drawing on studies of everything from the Japanese hump earwig to human twins. The result is packed with cultural allusions and useful scientific shorthand: if whales lived at the metabolic rate of shrews, for instance, they “would boil the ocean around them”.



Candy: A Century of Panic and Pleasure *Samira Kawash* FABER & FABER (2013)

That Halloween haul is a tricky treat. Once reviled as an intoxicant and trigger for lust, candy is now attacked as biochemically dangerous. It is also, as Samira Kawash reveals, a fascinating strand of US cultural history. Sweets evolved from a luxury into the first junk food as, from the 1850s onwards, mass-production technology and sugar chemistry transformed the confectionery industry and built empires such as Mars. Now, argues Kawash, the hidden ‘candification’ of processed foods with corn syrup presents a bigger health hazard than the lollipop — so blatantly sugary that it is easy to avoid.



Octopus! The Most Mysterious Creature in the Sea *Katherine Harmon Courage* CURRENT (2013)

Three hearts, eight arms and blue blood — the bizarre appeal of the octopus holds us in a sucker-like grip. They can change colour in three-tenths of a second, thanks to skin sacs called chromatophores. Their arms hold two-thirds of their brain capacity. They can play, use tools, solve mazes and open child-proof bottles. Katherine Harmon Courage’s reportage on what the mollusc is teaching us about robotics, invertebrate intelligence and camouflage is excellent, but sits oddly with the interspersed octopus recipes. [Barbara Kiser](#)