economic management.

Milanovic contrasts both models with social democratic capitalism, shaped by economist John Maynard Keynes among others, including politicians rebuilding national economies after the Second World War. He also sketches an alternative "people's capitalism", echoed in today's European and US progressivism.

Milanovic was trained in the Marxist economics of the former Yugoslavia. This might explain why historical forces are so central to his analysis — and why he is not optimistic about the chances of alternative models. He lists policies that might favour progressivism, such as improving publicly funded education. In my view, these are wishful thinking without analysis of the political obstacles to sensible policies (sensible, at least, to those who prefer to avert revolution). Nor does the book explore other current varieties of capitalism, such as the more egalitarian, consensual systems of Scandinavia or Japan. It would have been salutary to know how these are responding to the forces of globalization, technological overreach, an ageing population and environmental stress.

These existential pressures explain why all three books conclude that 'business as usual' in thinking about how to run an economy cannot continue. It is right to measure what societies actually value, as Stiglitz and his co-authors (and I) argue. It is also right, as Soros asserts, that the intellectual framework of economics must adapt to a world ever more removed from a focus on individual choices. This trend is under way in economic research, but a radical rethink is unlikely there: the incentives of academia encourage conservatism and incremental progress.

Better metrics and theories will not be enough to create a sustainable economic and social model. Or, they could — but only if they convince policymakers and the public to act differently. The future of capitalism is out of the hands of those who spend their time thinking about it. ■

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EPIDEMIOLOGY

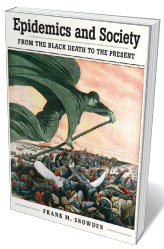
How pandemics shape social evolution

Laura Spinney weighs up Frank Snowden's sweeping history of the impact of infectious diseases on society.

When will we learn never to declare the end of anything? Only 50 years ago, two prominent US universities closed their infectious-disease departments, sure that the problem they studied had been solved. Now, cases of measles and mumps are on the rise again in Europe and the United States, new infectious diseases are emerging at an unprecedented rate, and the threat of the next pandemic keeps philanthropist Bill Gates awake at night.

So it's a shame that to make this point, *Epidemics and Society*, Frank Snowden's wide-ranging study on this rolling human reality, repeats the urban myth that in 1969, US surgeon-general William Stewart said, "It is time to close the book on infectious diseases, and declare the war against pestilence won." Even though Stewart never said this, it's clear that there was a pervasive, dangerously complacent attitude in the late 1960s. International public-health authorities were predicting that pathogenic organisms, including the parasite that causes malaria, would be eliminated by the end of the twentieth century. Snowden's broader thesis is that infectious diseases have shaped social evolution no less powerfully than have wars, revolutions and economic crises.

It's not a new message, but it bears repeating. Snowden, a historian at Yale University in New Haven, Connecticut, has assembled a vast amount of evidence, some the fruit of his own research. His global history spans more than a millennium of outbreaks, covering diseases from bubonic plague to smallpox, malaria, the respiratory illness SARS, Ebola and beyond. He rehashes the long history of scapegoating, violence, mass hysteria and religiosity that have accompanied epidemics, but only to speculate on their longer-term social, political and cultural consequences.



Epidemics and Society: From the Black Death to the Present
FRANK M. SNOWDEN
Yale University Press (2019)

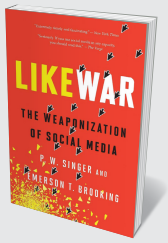
When cholera struck Paris in 1832 — in an epidemic that eventually killed nearly 19,000 Parisians — a conspiracy theory spread that the unpopular government under King Louis Philippe was poisoning wells with arsenic. The police and army were barely able to contain the violence that ensued. The institutional memory of those events fuelled dread of the "dangerous classes": poor people. That, Snowden argues, might help to explain why the two most egregious examples of class-based repression in the nineteenth century also took place in the French capital. These were the violent crushing of the 1848 revolution and the bloody destruction of the Paris Commune, the revolutionary government that briefly ruled the city 23 years later.

SCAPEGOATING AND VIOLENCE HAVE ACCOMPANIED EPIDEMICS.

The synergy between wars and epidemics in shaping history has long been recognized. Napoleon Bonaparte's nineteenth-century

NEW IN PAPERBACK

Highlights of this season's releases.



LikeWar
P. W. Singer & Emerson T. Brooking HOUGHTON MIFFLIN HARCOURT *(2019)*
As reports on politics and war flood social media, the medium itself is becoming weaponized: virality is valued over veracity. If you're online, you inadvertently become part of the war. Warning that 'you are what you share', defence specialists P. W. Singer and Emerson Brooking explore the real-world and online geopolitical impacts of this conflict, and how to prepare ourselves for the next unprecedented threat.

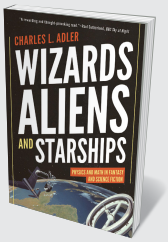
imperial expansion westwards across the Atlantic Ocean was halted by yellow fever, which his army encountered in France's Caribbean colony of Saint-Domingue (now Haiti). His eastern ambitions were thwarted by dysentery and typhus. (The typhus epidemic that ravaged the Grande Armée during its retreat from Moscow might have prompted an unparalleled die-off by some measurements, as Snowden claims. But it was surely not in terms of "deaths per capita".)

SECURITY THREAT

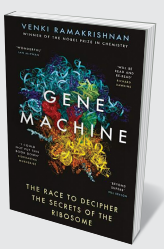
An odd omission from the book is the 1918 'Spanish' influenza pandemic, which overlapped with the First World War and is estimated to have killed between 50 million and 100 million people. Snowden might have felt that it garnered enough attention around its centenary. But a future flu pandemic is currently ranked among the leading threats to global security, and there has been surprisingly little research on the long-term consequences of the 1918 catastrophe. Furthermore, it might have been interesting to explore the possible links between that pandemic and the ongoing epidemic of AIDS in South Africa, which the book does cover.

There is evidence that white scapegoating of black South Africans in 1918 precipitated the first legislative steps towards apartheid. As Snowden discusses, by restricting the land available to people of colour, apartheid accelerated the growth of a migrant labour system that divided black families. It also encouraged new forms of social and sexual behaviour. Both developments, in turn, hastened the spread of AIDS once it arrived. Young men growing up away from their families, for instance, often developed standards of masculinity that promoted sexual conquest and violence; South Africa now has one of the highest rates of rape in the world (K. Naidoo *S. Afr. Med. J.* **103**, 210–211; 2013). The crowning tragedy of these depressing events was President Thabo Mbeki's endorsement, from 1999, of a US AIDS denialist's theory that the disease is not caused by the HIV virus. That resulted in the avoidable deaths of an estimated half a million South Africans.

In the twenty-first century, we seem to be repeating many of the mistakes that triggered or exacerbated epidemics in the past. That is presumably why Snowden refers ominously to this century's first major epidemics, of



Wizards, Aliens and Starships
Charles L. Adler PRINCETON UNIV. PRESS *(2019)*
Physicist Charles Adler tracks his own field and maths through science-fiction tropes to separate the plausible from the impossible. The shape-shifting transfiguration spells in J. K. Rowling's Harry Potter series, for instance, pose problems related to conservation of mass.



Gene Machine
Venki Ramakrishnan ONEWORLD *(2019)*
This scientific memoir by UK Nobel laureate and Royal Society president Venki Ramakrishnan is invitingly witty. He gives a frank account of the race to demystify the ribosome (the cell's protein factory), and the highs and frustrations of scientific success (see G. Ferry *Nature* **561**, 32; 2018).

SARS and Ebola, as "dress rehearsals". Although many people espouse health care for all, our globalized economic system militates against it — because profits are rarely invested where they were extracted — and we still seem to think that borders will keep disease out, even though they never have. Since Snowden completed his book, the administration of US President Donald Trump has announced that an immigrant's chances of getting permanent residence will now be linked to the burden they put on the public purse — including health-care costs. That makes it more likely that recent arrivals will avoid doctors, and infectious diseases will go undetected.

The starkest reminder that the battle is not won, however, is that only one infectious disease has been eradicated globally: smallpox. Others that those optimists of the 1960s thought would have vanished by now have been hard to dislodge — and could easily flare up again. The strife-ridden Democratic Republic of the Congo is harbouring more than Ebola. There is also a measles outbreak, and a circulating strain of polio that mutated from the live, weakened one in the oral vaccine. There have been successful local disease eradications, but they often came at a price. A sustained campaign of DDT application helped eliminate malaria from the Italian island of Sardinia by 1952, for example, but in 2001, the pesticide was banned globally under the Stockholm Convention, after it was found to be dangerous to wildlife and the environment.

For Snowden, the lesson from more than 50 years of such experiments — successes and failures — is that eradication is most likely to work when doctors, politicians, drugmakers, the media and citizens work together. *Salus populi suprema lex*, he reminds us: public health must be the highest law. He has preached that message to generations of Yale undergraduates, and repeats it in this book. The risk is only that he is preaching to the converted. ■

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HISTORY OF TECHNOLOGY

Shadowed light

David E. Nye examines volumes on the complex history of lighting technologies and a great inventor.

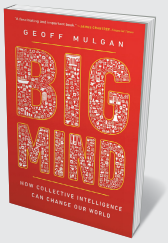
Beyond steam engines and power looms, the Industrial Revolution spawned innovation in artificial lighting — for city streets, lighthouses, railway carriages and mills. Incremental improvements, from whale oil to gas, kerosene and electric carbon-arc technology, culminated in 1879 in a practical incandescent light bulb created by prolific US inventor Thomas Edison. These advances were no straightforward march of progress, as two books — Jeremy Zallen's *American Lucifers*, and *Edison* by the late Edmund Morris — reveal.

American Lucifers begins a century before Edison's birth, in 1750. Zallen, a historian, explores the human costs of artificial lighting from then until 1890, concentrating on people producing and using fuel in the United States, and their links to South America, Britain and the Caribbean. Viewing energy in terms of class, he examines the fate of whalers, enslaved people distilling pine resin to make turpentine, children in match factories, petroleum refiners and miners of coal and copper.

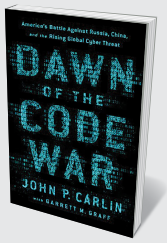
The international networks he examines are convoluted. Jewish candle-makers in

American Lucifers: The Dark History of Artificial Light, 1750-1865
JEREMY ZALLEN
Univ. North Carolina Press (2019)

Edison
EDMUND MORRIS
Random House (2019)



Big Mind
Geoff Mulgan PRINCETON UNIV. PRESS *(2019)*
Innovation specialist Geoff Mulgan's timely work draws on philosophy and computer science to explore collective intelligence: how combining human and technical abilities could help to tackle everyday problems, along with large-scale challenges in public health and climate change.



Dawn of The Code War
John P. Carlin & Garrett M. Graff PUBLICAFFAIRS *(2019)*
This cautionary insider story by security strategist John Carlin and journalist Garrett Graff examines targeting of US interests in cyberspace. From election hacking to terrorist recruitment, they provide legal insight into the risky situation facing the United States online.