

► scholars, is that he did not draw his observations into coherent theory. It's possible he just never got round to it. Harriot spent his adult life in the households of Raleigh and Northumberland. They paid him generously, and all appearances suggest that he was a friend rather than a servant. However, both were players on the volatile political scene, and malicious rumours of atheism and necromancy did the rounds. Soon after James I succeeded Elizabeth I in 1603, Raleigh was convicted of treason, and Northumberland of lesser charges when a cousin was involved in the Gunpowder Plot to murder the king. Both were imprisoned in the Tower of London; Raleigh was executed in 1618.

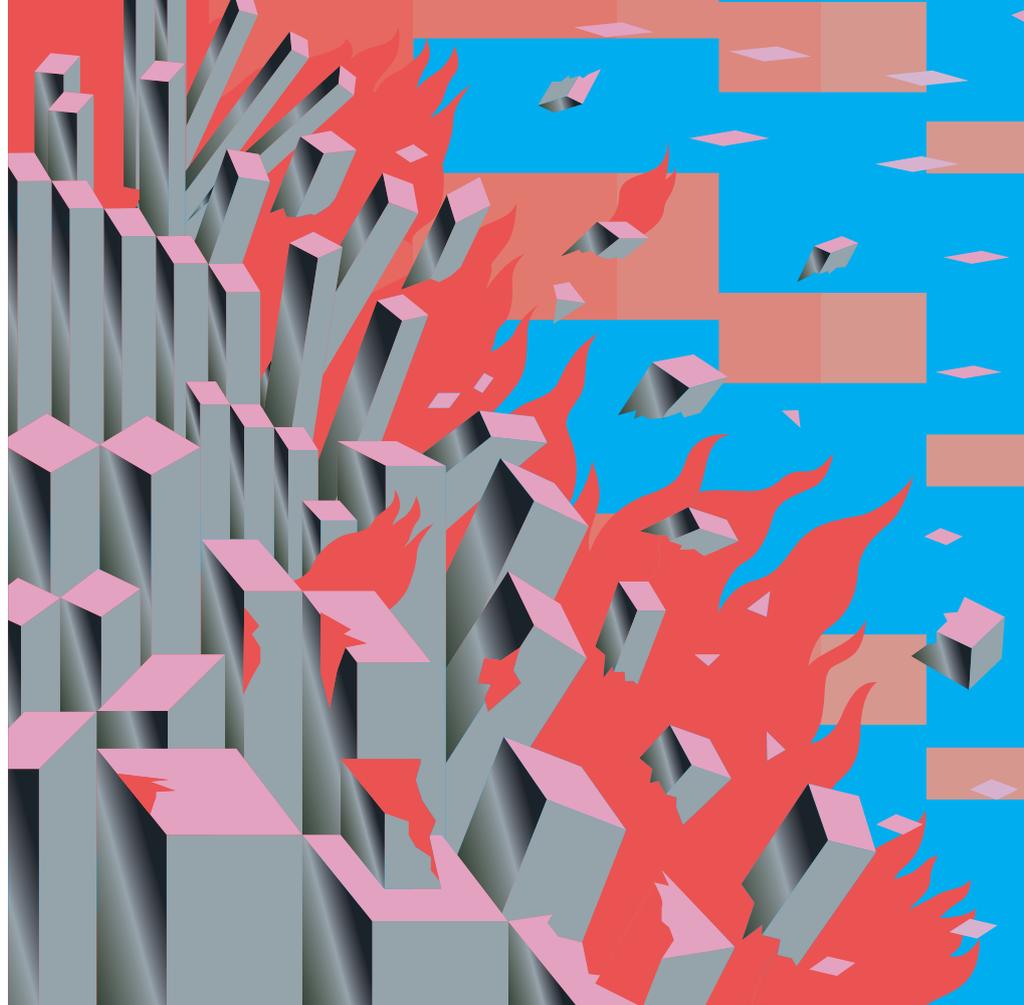
Harriot spent an anxious few weeks in prison because of his association with Northumberland; he might have felt the need to keep his head down over the years. He died aged about 60 from cancer of the nose, possibly caused by his enthusiasm for tobacco after his American adventure.

The lack of finished work makes evaluating his contribution complex. Arianrhod does not hesitate to call him a genius, and the evidence she presents is impressive. Yet she fully explores his rightful position in the pantheon only in a page-long endnote; I think this short-changes the “general reader” she seeks to enlighten. Some might find her technical passages challenging, although they are necessary to her argument. And it is irksome to see diagrams relating to Harriot's navigational work in an appendix, rather than with the text they illustrate.

Has Arianrhod, as she intended, “put a human face to scientific inquiry in the Elizabethan and Jacobean worlds”? She has revealed a scientific mind, but the face is more elusive: the one supposed portrait of Harriot is of unknown provenance and, because of a discrepancy in dates, some historians doubt it is him.

This black-clad, driven, sceptical man, “contented with a private life for the love of learning” as he wrote to his captors, still declines wholly to step into the light. ■

Georgina Ferry's biography of *Dorothy Crowfoot Hodgkin* will be published in a revised edition this year.
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SOCIETY

How to survive an apocalypse

Richard Rhodes weighs up Jared Diamond's study of national resilience in the face of catastrophe.

The geographer Jared Diamond is the bestselling author of a number of books on the vicissitudes of civilizations. His anchoring perspective, argued across such works as *Collapse* (2005) and *The World Until Yesterday* (2012), is geographic determinism. He sees the environment as fundamentally shaping the founding,

development and challenges of nations and civilizations. “History,” he argued in the 1997 *Guns, Germs, and Steel*, “followed different courses for different peoples because of differences among peoples' environments, not because of biological differences among peoples themselves.” His perspective has been both celebrated for clarifying historical



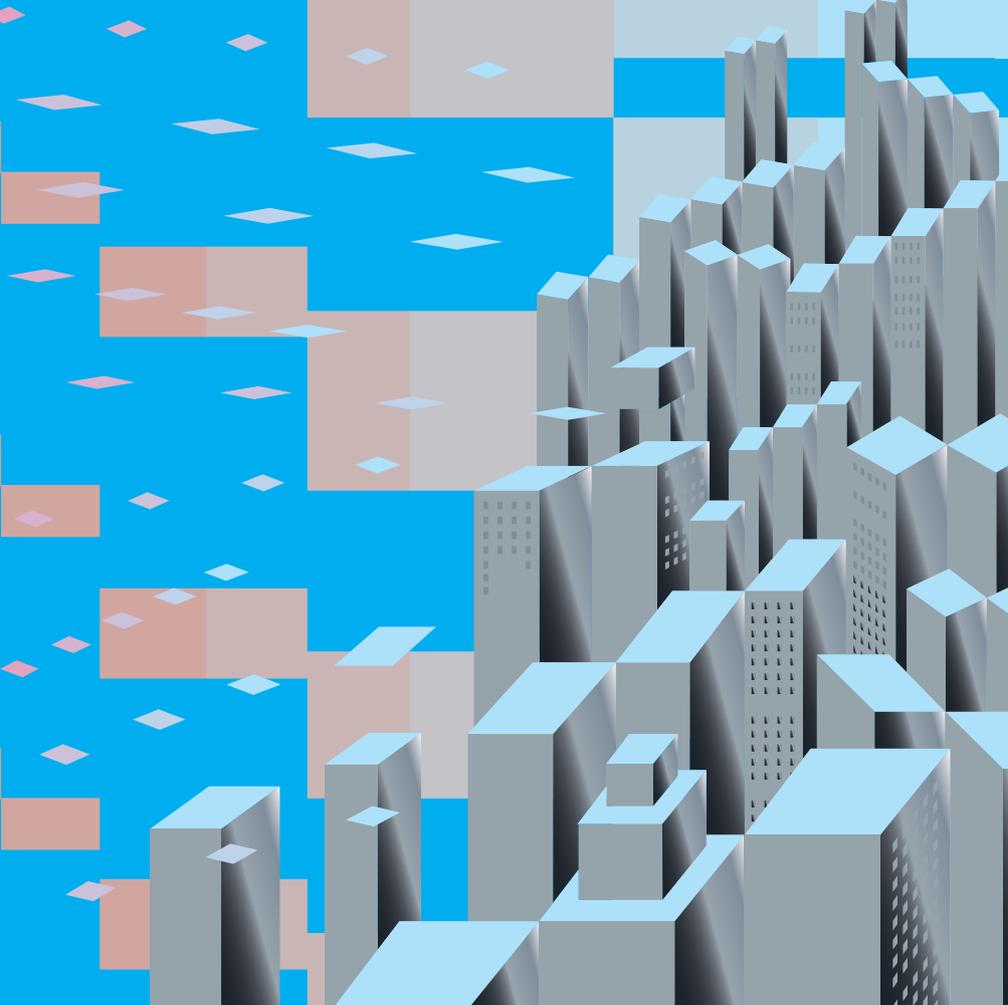
Natural Causes

Barbara Ehrenreich GRANTA (2019)
Our bodies, notes writer Barbara Ehrenreich, are a cellular battleground, where our immune systems can aid the growth of tumours. Attacking the rose-tinted ‘wellness industry’ and advocating a realistic view of death, she will change how you view your own mortality.



Shapeshifters

Gavin Francis WELLCOME COLLECTION (2019)
“To be alive is to be in perpetual metamorphosis.” Physician Gavin Francis tackles bodily transformations that can aid or constrain us — from pregnancy to amputations. With real insight, he intertwines case studies with his amazement at how our bodies surprise us.



hewing close to its economic and foreign policies, despite the resulting dissonance. Finland is not a member of the North Atlantic Treaty Organization, for example; nor was it part of the European Union until 1995, after the Soviet Union was dissolved.

In looking at Japan, Diamond harks back to 1853, when US Navy commodore Matthew C. Perry sailed his warships into Edo Bay, demanding that the country open itself to Western trade. Japan maintained independence, in part, Diamond argues, by acquiring a Westernized facade, while maintaining its traditional values. (In one respect, this may have backfired: Japan's severe restrictions on immigration have left it struggling to sustain a labour force while the population ages and birth rates stay well below replacement levels.)

Comparisons with psychology soon fall by the wayside as Diamond explores crises in Indonesia, Chile, Germany and Australia. The model is, in any case, a poor fit.

My country, the United States, is also Diamond's. I find his assessment of its challenges partly acute and partly eccentric. Diamond acknowledges the country's great natural advantages in climate, geography, population and form of government. He judges its current troubles to be consequences, predominantly, of the venality of US politicians and of a "politically uncompromising" population. He attributes this polarization mostly to the rise in digital communications. A persistent focus on screens, he argues, is producing people who "no longer experience one another as live humans"

Attributing social change one dislikes to new technology is a familiar moral panic. In my house, we call it hell-in-a-handbasket syndrome. Certainly, smartphones and their ilk expose their users to an artificial environment much more pervasively than older communication technologies did. But whether this distributed consciousness is good, bad or simply different remains to be seen, in my view.

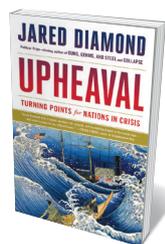
More to the point is Diamond's identification of inequality as a serious problem in the United States. Emmanuel Todd — the French demographer who was almost alone in predicting the collapse of the Soviet Union on the basis of an unprecedented rise in infant mortality — commented more than a decade ago that he saw "the possibility in the medium term of a real Soviet-style crisis in the United States". Increasing financial

complexities and criticized as oversimplified and dated, but he has defended it vigorously.

Upheaval, then, is something of a curiosity. Diamond says that his wife, psychologist Marie Cohen, suggested the idea: compare nations in upheaval with individuals in crisis. Do nations go through similar stages of challenge, disturbance and even breakdown to emerge, if successful, selectively changed? What factors influence that failure or success?

Normally confident of his methodology, Diamond proposes this comparison with caution. He writes that he set out to investigate seven modern nations — Finland, Japan, Chile, Indonesia, Germany, Australia and the United States — because he happens to have "much personal experience" of them. He acknowledges, however, that a sample of seven is inadequate for drawing statistically significant conclusions, and so proposes a "narrative exploration" that he hopes will "stimulate quantitative testing".

Diamond's caveats limit him to an



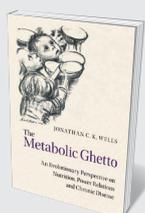
Upheaval: Turning Points for Nations in Crisis

JARED DIAMOND
Little, Brown (2019)

informed but speculative discussion of how his seven nations struggle, or struggled, with crises profound or wide-ranging enough to potentially destroy them. These range from climate-change impacts and advanced technology to geopolitical pressures and nuclear weaponry.

Thus, Finland fought the Soviet Union in 1939–40

and aligned with Germany against the common foe in 1941–44, sacrificing some 100,000 soldiers, rather than allow itself to be absorbed into the Soviet Union as Latvia, Lithuania and Estonia had been. It then found accommodation with its Eastern neighbour by treating it with respect and



The Metabolic Ghetto

Jonathan C. K. Wells CAMBRIDGE UNIV. PRESS (2019)
Power relations in society affect human health. Here, child-nutrition specialist Jonathan Wells draws on fields such as biomedicine, evolutionary biology and epidemiology to illuminate the socio-economic and historical factors behind chronic conditions such as obesity.



The Order of Time

Carlo Rovelli PENGUIN (2019)
Physicist Carlo Rovelli elegantly dismantles our understanding of time as a flow from past to future. He argues that there is a multitude of times, and that the present is only localized. Ultimately, he says, our concept of time is as much about us as about the cosmos.

inequality, and the despair of unmet expectations that it has induced in many white Americans, is almost certainly behind the opioid crisis in small towns and rural areas. There, life expectancy is declining much as it did in the final years of the Soviet Union, where rising alcohol addiction took a grim toll.

Inequality is even more serious for African Americans, for whom neglect and mistreatment in medical care, education, housing and criminal remand have resulted in an average lifespan half a decade shorter than that of white people in the United States, although the gap is closing.

Among the biggest global problems Diamond mentions are the risk of nuclear war and the fact of climate change. Here, his answers are conventional. No one knows what to do about nuclear weapons, maintained as they are under the pretence that they deter the very disaster they are designed to produce. On climate change, Diamond recognizes the double challenge of reducing greenhouse-gas production while meeting the rising expectations of the developing world. But he fails to recognize that substituting renewable energy for fossil fuels without a major expansion of nuclear power will merely decarbonize the existing supply. Without nuclear power, the doubling of demand projected for the developing world in the next 30 years will be met mainly through coal — or, at best, natural gas, which produces fully half as much carbon dioxide as coal when it burns.

Diamond's historical analyses hold up better than do his contemporary assessments. Energy from fossil fuels supported the West's transformation from subsistence to long-term prosperity; today, it threatens to cook our goose. The nation-state system, embedded in international anarchy, has never dealt well with global threats. So far, the response has mostly been denial and timidity: tragedy of the commons indeed.

I read *Upheaval* with appreciation for its historical sweep and its generally informed speculation. If the world is going to hell in a handbasket, Diamond has not given up hope that we can change course. ■

Richard Rhodes's latest book is *Energy: A Human History*.

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MEDICINE

Sorrows of psychiatry

Alison Abbott probes a history on the fraught nexus of mental illness and biology.

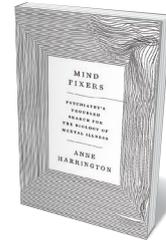
In January 1973, *Science* published an article called 'On being sane in insane places'. The author, psychologist David Rosenhan, described how he and seven other healthy people had reported themselves to a dozen psychiatric hospitals, claiming to hear voices uttering odd words such as 'thud' or 'hollow' — a symptom never reported in the clinical literature. Each person was diagnosed with either schizophrenia or manic-depressive psychosis, and admitted; once inside, they stopped the performance. They were released after an average of 19 days with diagnoses of 'schizophrenia in remission' (D. L. Rosenhan *Science* 179, 250–258; 1973).

One research and teaching hospital, hearing about the study, declared that its own staff could never be so deceived. It challenged Rosenhan to send it pseudopatients. He agreed, but never did. Nonetheless, the hospital claimed to have identified 41 of them.

Psychiatric hospitals, it seemed, could recognize neither healthy people nor those with mental illnesses. Rosenhan's study exemplifies much of what went wrong in twentieth-century psychiatry, as biologists, psychoanalysts and sociologists struggled for supremacy. Science historian Anne Harrington takes us through the painful history of that struggle in the enthralling *Mind Fixers*, which focuses particularly on the United States.

She reveals the shameless hubris of many of the prominent battlers. She fails, however, to acknowledge promising approaches in biological psychiatry, particularly very new insights about brain circuitry as a potential target for treatment. Many neuroscientists today are very aware of past mistakes in overclaiming the power of theories and drugs. In my opinion, Harrington's omission weakens the case for her pessimistic conclusion.

She begins in mid-nineteenth-century Europe, with a new experiment to give people with psychosis rest and care, with no



Mind Fixers: Psychiatry's Troubled Search for the Biology of Mental Illness
ANNE HARRINGTON
W. W. Norton (2019)

restraint, rather than the standard brutality and neglect of the conventional 'lunatic asylum'. It visibly failed.

By the 1870s, asylums had become overpopulated, and gave up all pretence of being therapeutic. They began to supply post-mortem brains to any scientist wishing to investigate a possible anatomical basis for mental disorders.

These turned out to be unrevealing. Harrington describes how the failure encouraged Sigmund Freud to turn away from neuroanatomy in the 1890s to develop his theory that mental disorder is rooted in biography — specifically, early-childhood sexual fantasies. These, Freud thought, needed only to be drawn out by intense psychoanalysis to achieve a cure.

At the same time, Harrington shows, the German psychiatrist Emil Kraepelin began a large-scale, systematic survey to categorize symptoms such as hallucinations or extreme moods. Without proper diagnostic criteria, he reasoned, clinical science would never make progress. In 1899, he published the sixth edition of his influential textbook *Compendium of Psychiatry*, which distinguishes disorders — particularly, psychoses such as schizophrenia and affective disorders including manic depression, now known as bipolar disorder. (Kraepelin was also interested in eugenics, like many intellectuals of the time.)

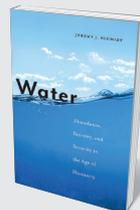
In the following decades, biologists and Freudians cut separate paths, for good or ill. Certain discoveries, such as the findings in 1897 and 1913 confirming that syphilis causes late-onset psychosis, bolstered biologists' view that mental disorders were brain-based. Some



The Value of Everything

Mariana Mazzucato PENGUIN (2019)

A crisis faces capitalism, argues economist Mariana Mazzucato. She reveals that we value those who extract wealth over those who create it. Noting that the debate is economic, social and political, she pinpoints the urgent need to reform how we define value in a fast-changing world.



Water

Jeremy J. Schmidt NEW YORK UNIV. PRESS (2019)

Humans both consume too much water and fail to benefit from it equitably. Geographer Jeremy Schmidt's multidisciplinary study shows how historical US approaches to water management have gained global reach, leading to problematic biases. [Mary Craig](#)