The St Louis Red Cross Motor Corps on duty in Missouri during the influenza epidemic that affected one-third of the world's population.

INFLUENZA

A viral world war

Tilli Tansey commends a chronicle tracing the pathways of the 1918 flu pandemic.

The 1918 influenza pandemic probably infected one-third of the world's population at the time — 500 million people. It killed between 50 million and 100 million; by contrast, Second World War deaths numbered around 60 million. Why is this catastrophe not better remembered?

Science journalist Laura Spinney reflects on this conundrum and the nature of historical memory in her impressive *Pale Rider*. She concludes that the pandemic is largely known as small, personal tragedies, not as a collective record. Eschewing a linear narrative, she has modelled her account loosely on Talmudic scholarship, in which layers of commentary are added to a text in expanding circles. The pandemic is central, but intersecting stories radiate out — reflections on medical practice, scientific research, town planning, religious beliefs, political systems, and ideas and practices on disease containment, right up to today's catastrophe modelling amid concerns about AIDS, Zika and Ebola.

One of Spinney's messages is that the pandemic signified failure — on the part of medicine, science, civil and military authorities, governments and society. Collectively, they neither did nor could control or contain the scourge. It is said that the winner writes history, but this disaster had no 'winner' in whose interest a history could be perpetuated.

Pale Rider: The Spanish Flu of 1918 and How it Changed the World

LAURA SPINNEY
Jonathan Cape: 2017.

rural China, the shrine city of Mashhad in Persia, Rio de Janeiro in Brazil. The world became a vast incubator of disease, and the virus spread in waves, the most deadly beginning in mid-1918. Did it jump from a bird or a pig to a human in a crowded rural community in China? Did chemicals used on the Western front, such as mustard gas, trigger a mutation in the virus, which then ran rampant through weakened troops?

Spinney's forensic search for 'patient zero' posits three possibilities: a soldier admitted to a military hospital in France, a peasant labourer in Shanxi or a dirt-poor farmer in Kansas. Tantalizingly, she even speculates

The pandemic reached around the globe, but Africa and Asia suffered disproportionately, with more Kenyans dying than Scots, more Indonesians than Netherlands. Spinney's extensive research has unearthed detailed case studies from Europe's battlefields, the gold mines of South Africa, indigenous communities in

Alaska and Shanxi in rural China, the shrine city of Mashhad in Persia, Rio de Janeiro in Brazil. The world became a vast incubator of disease, and the virus spread in waves, the most deadly beginning in mid-1918. Did it jump from a bird or a pig to a human in a crowded rural community in China? Did chemicals used on the Western front, such as mustard gas, trigger a mutation in the virus, which then ran rampant through weakened troops?

Spinney's forensic search for 'patient zero' posits three possibilities: a soldier admitted to a military hospital in France, a peasant labourer in Shanxi or a dirt-poor farmer in Kansas. Tantalizingly, she even speculates

that all three may be linked — an ill Chinese worker, travelling across North America in the British-run Chinese Labour Corps, infects an army recruit from Kansas on the eve of shipping to the battlefields of France.

One thing that is certain is that the epithet 'Spanish flu' is practically libellous. Censorship in warring nations meant that news of outbreaks in Flanders in early 1918 were suppressed. French physicians referred to it as 'Disease Eleven'. The first widely publicized reports were from neutral Spain in June 1918, especially those of King Alfonso XIII's illness. With no reported antecedents, the flu acquired its inaccurate eponym. And the time-honoured custom of blaming 'the other' spread: in Senegal, the illness was Brazilian flu; Brazil blamed it on the Germans; Poland, on the Bolsheviks; and Persia, on the British.

Set against the devastating backdrop of global contagion, it is individual lives and deaths, discovered in letters, diaries, biographies and memoirs, that epitomize this rich account. Spinney invokes potent images. We encounter doctors trying "like so many Bordeaux wine merchants" to define the subtle changes of a patient's complexion, from healthy pink to morbid blue; and a dying dove fluttering into the hands of the playwright Edmond Rostand, who succumbed three weeks later. We discover strange folk rituals

UNDERWOOD ARCHIVES/GETTY

to ward off epidemics, such as a 'black wedding' in a Jewish graveyard in Odessa. And we're reminded that there is scarcely a cemetery anywhere from the time without a cluster of victims' tombstones.

The pandemic burnt out in 1920, but its impact persisted in communities and nations doubly devastated by war and pestilence. Many governments, shaken by their failure to control it, recognized that infectious disease was not the sole responsibility of the individual. By the mid-1920s, most European countries had established health-care programmes. Germany and Britain expanded their rudimentary pre-war systems. The newly created Soviet Union set up a centralized organization for urban communities, emphasizing public health. US health surveys and morbidity reporting were coordinated by 1925; a National Quarantine Service was established in China in 1930. Laboratory expertise in epidemiology, virology and pharmacology burgeoned. The Rockefeller Foundation in New York City became an important player in international public health, and the Pasteur Institute in Paris established its first overseas branch, in Tehran, to study infectious disease.

Now, with new epidemics exacerbated by rapid and constant international movement of people, animals and virulent organisms, governments are braced for a future flu pandemic. The questions 'when' and 'how big' dominate; bodies such as the World Health Organization and the US Centers for Disease Control and Prevention monitor climate change and disease outbreaks, assess evolving viral strains for potential vaccines and prepare emergency lab networks and surveillance systems. Epidemiological models estimate death tolls of 20 million to 100 million — still terrifying, albeit a lower proportion of the global population than in 1918. Quarantine, prohibition of large gatherings, and mass vaccination will play their part — all lessons learnt a century ago.

Along with exemplary research, Spinney's narrative is packed with fascinating, quirky detail — such as the royal rebranding of the Real Madrid football team as part of a post-flu 'sports for health' movement. US President Donald Trump even makes an appearance: an inheritance from his flu-victim grandfather seeded the family's property empire.

As the centenary of this monumental event approaches, other volumes on the pandemic will undoubtedly appear. *Pale Rider* sets the bar very high. ■

Tilli Tansey is professor of the history of modern medical sciences at Queen Mary, University of London.
e-mail: t.tansey@qmul.ac.uk

LEEMAGE/CORBIS VIA GETTY

The Phaistos disc, discovered in Crete in 1908, remains untranslated.

CRYPTOGRAPHY

The codes that got away

Andrew Robinson takes on a compendium of past and current ciphers ripe for decoding.

The concluding words of *Unsolved!* are a call to action. Craig Bauer, a US mathematician and editor-in-chief of the journal *Cryptologia*, ends his hefty history of cryptography by noting that even as he was compiling the book, "unsolved ciphers from decades, sometimes centuries, in the past were coming to light on a regular basis", along with a plethora of new puzzles. For cryptography fiends, it's a thrown gauntlet.

Unsolved! spans a huge arc of time and space, from Julius Caesar's simple substitution cipher to composer Edward Elgar's 1897 Dorabella Cipher — a still-unsolved letter to Dora Penny, a dedicatee of his *Enigma Variations*. Uncracked ciphers from the twentieth century are associated with the Irish Republican Army, a series of grisly murders in California — and messages 'detected' from Mars.

Bauer's compelling chapter on the medieval Voynich manuscript occupies one-sixth of the book. In his 1967 *The Codebreakers*, cryptography historian David Kahn called the manuscript "the longest, the best known, the most tantalizing, the most heavily attacked, the most resistant, and the most expensive of historical cryptograms". Its weird colour illustrations and indecipherable calligraphy attract 16% of online traffic to the library at Yale University in New Haven, Connecticut, where it is held (A. Robinson *Nature* 539, 28–29;

Unsolved! The History and Mystery of the World's Greatest Ciphers from Ancient Egypt to Online Secret Societies

CRAIG BAUER
Princeton University
Press: 2017.

Bauer offers no theories of his own.)

Unsolved! digs into the riches of ancient Viking, Roman, Greek and Egyptian cryptography. Egyptologists tend to avoid tackling the latter because of its sheer complexity. Bauer reveals how Caesar's cipher worked, substituting each plain-text letter with a letter a fixed number of places away in the alphabet. Inexplicably, however, he relegates to an endnote the undeciphered Phaistos disc found on Crete in 1908 — the only example of its