

"The Great Influenza: The Epic Story of the Deadliest Plague in History"

John M. Barry, 2005, 546 pages, Penguin Books, \$16.00

Review by Norman M. Goldfarb

"The Great Influenza" tells the gripping story of the 1918 influenza pandemic that may have killed 50 to 100 million people. It's a "heads-up" for the inevitable next influenza or other pandemic. (A pandemic is a widespread epidemic.) This book is hard to put down.

The influenza virus has a number of diabolical properties. For example, its DNA replication is extremely sloppy. Thus, when an infected cell dies and releases 1,000 to 10,000 new viral particles, 99% of the particles include a DNA mutation. As a result, the virus propagates as a "swarm" of related viruses that creates major challenges for the immune system.

The evidence suggests that the 1918 influenza virus originated in Haskell County, Kansas, was transmitted to nearby Fort Funston, and then spread through military forces mobilizing for World War I. It gained the name "Spanish Flu" because Spain was neutral during the war, and thus had a free press; the U.S. and other countries at war prevented dissemination of information about the pandemic, at the cost of millions of lives.

The pandemic first spread in the spring of 1918 in a relatively mild form, but was virulent enough to stop a major German offensive in its tracks and perhaps change the course of the war. After the war, when the victors were negotiating the terms of surrender amongst themselves, U.S. President Woodrow Wilson was the sole voice in favor of lenient terms that would enable Germany and its allies to retain their dignity and economic prosperity. Unfortunately, in the middle of the negotiations, President Wilson contracted influenza, lost his strength of will, and conceded to the more aggressive terms championed by France. Historians generally credit the resulting harsh surrender terms for the rise of Hitler.

During the pandemic, influenza was thought to be a bacterial disease. In a small clinical trial, attempts to infect prisoners in a Navy brig with a filtrate presumably containing just the virus were unsuccessful. (However, one of the investigators contracted influenza and died.) Influenza was not proven to be a virus until 1931.

The pandemic led to two very important scientific discoveries. In 1928, when Alexander Fleming serendipitously discovered the antibiotic properties of penicillin mold, he was attempting to culture *Bacillus influenzae*, thought to be the cause of influenza. *Bacillus influenzae* is notoriously difficult to culture. Fleming was interested in penicillin for its ability to prevent the growth of competing bacteria. *Bacillus influenzae* caused secondary infections, along with pneumococci bacteria. In 1944, Oswald Avery, while investigating an unusual property of pneumococci, proved that DNA conveyed the genetic code. DNA had been discovered in 1860, but nobody knew its function; protein, a more complex structure, was thought to serve the genetic function.

The 1918 pandemic was the most severe of many influenza pandemics. Its disastrous effects highlight deficiencies in our current ability to respond to the inevitable next serious pandemic. Fewer than half of the countries in the world cooperate with the World Health Organization's surveillance system. Large parts of the world where the next pandemic is likely to originate, e.g., China and Vietnam, cooperate only reluctantly. In the United States, half the influenza vaccine is produced overseas, and may not be available in a worldwide

pandemic. Influenza primarily attacks the respiratory system. Mechanical respirators can aid breathing while a patient recovers. The U.S. has about 100,000 mechanical respirators, of which about 75% are in use at any time. A severe pandemic could easily infect over 100 million Americans in a matter of weeks.

The book is available at bookstores.

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