The Great Influenza

INTRODUCTION

BRIEF BIOGRAPHY OF JOHN M. BARRY

John M. Barry grew up in Rhode Island, graduated from Brown University, and then moved to Washington, D.C., to begin a career as a freelance writer. He published his first book, a political history called *The Ambition and The Power: A True Story of Washington*, in 1989. For his second book, *The Transformed Cell: Unlocking the Mysteries of Cancer*, he teamed up with co-author Dr. Steven Rosenberg. While Barry's previous books were well-reviewed, he achieved wider recognition with *Rising Tide: The Great Mississippi Flood of 1927 and How it Changed America*, which was first published in 1997 and which experienced a resurgence in popularity after Hurricane Katrina. Today, however, he is best known for *The Great Influenza*, which was first published in 2004 and has been re-published in five new editions, most recently in January 2021 with an afterword that addresses the COVID-19 pandemic.

HISTORICAL CONTEXT

While Barry's book focuses in particular on the year 1918 and its aftermath, his book's scope goes as far back as 600 B.C., when Hippocrates and his followers became perhaps the first humans in recorded history to study medicine. He sketches the entire history of medicine, showing how, though doctors did more harm than good for centuries, their research established the groundwork for key medical breakthroughs in the mid-to-late 19th century. Other plagues and epidemics, particularly the Black Death, which devastated Europe in the Middle Ages, provide a precedent for the 1918 influenza pandemic, and modern scientists studying influenza looked to these past plagues for answers.

RELATED LITERARY WORKS

Though *The Great Influenza* is one of the best-known books today on the 1918 influenza epidemic, other books that have chronicled the pandemic include *Flu* by Gina Kolata, *America's Forgotten Pandemic* by Jared W. Crosby, and *Pandemic 1918* by Catharine Arnold. As Barry notes in his own book, one of the noteworthy features of the 1918 pandemic is that, for the most part, it *doesn't* appear in literature published at the time. Famous early twentieth-century authors like Ernest Hemingway, William Faulkner, and F. Scott Fitzgerald either completely ignore the pandemic in their work or only mention it in passing. Examples of later pandemic fiction include Katherine Anne Porter's short story "Pale Horse, Pale Rider," written in the 1930s, and William Maxwell's novel *They Came Like Swallows*, published in 1937.

KEY FACTS

- **Full Title:** *The Great Influenza: The Story of the Deadliest Pandemic in History*
- **When Written:** Early 2000s
- **Where Written:** Washington, D.C.
- **When Published:** 2004
- **Literary Period:** Contemporary
- **Genre:** History, Nonfiction
- **Setting:** America and Europe in the late 19th to early 20th century
- **Climax:** The pandemic ends.
- **Antagonist:** Nature; President Wilson and other officials who ignored the pandemic
- **Point of View:** 3rd Person

EXTRA CREDIT

Summer Reading. In the summer of 2005, President George W. Bush read *The Great Influenza* and shortly afterwards vowed to prepare the federal government for future pandemics.

History Lessons. When asked at the beginning of the COVID-19 pandemic to summarize the most important lesson from the 1918 influenza pandemic, John M. Barry gave three words of advice: "Tell the truth."

PLOT SUMMARY

In 1918, a deadly influenza virus originated in Haskell County, Kansas, and by the end of the year, it had caused a global pandemic. The pandemic's spread was bolstered by World War I, which saw young men being transported around the world and housed in close quarters, providing ideal conditions for the virus to infect new victims. On the front lines of fighting this pandemic, a new generation of scientists like Paul Lewis led the search for a treatment and a vaccine. While the pandemic came suddenly, these doctors and scientists had been training most of their lives to respond to a crisis just like the influenza pandemic.

The story of modern medicine in the United States largely began in the late 1800s, right around the time when Johns Hopkins University and its medical school were founded. Though the United States saw some medical breakthroughs during the Civil War, in general, medical education in the country lagged far behind European nations, and ambitious U.S.

students frequently went abroad to study medicine. At Johns Hopkins, however, and later at the Rockefeller Institute, some of America's most talented scientists like William Henry Welch and Simon Flexner were given the resources to hire talented teams and build strong institutions from the top down. The result was that American medicine and medical education soon earned its own global reputation—just in time for the 1918 influenza epidemic.

The first outbreak of the deadly influenza virus was likely in Haskell County, Kansas, where country doctor Loring Miner was on the front lines of treating a virus that resembled influenza in some ways, but which was far deadlier than any version of influenza seen before. The deadly virus eventually receded in Kansas, and it didn't become a global pandemic until later that year, in the fall of 1918. World War I in particular helped the virus spread, with deadly outbreaks at tightly packed American military camps and with American troops carrying it over to Europe. Other events that spread the virus included the disastrous Liberty Loan parade in Philadelphia, which was authorized by the city's corrupt public health director, Wilmer Krusen. In some places, the devastation was so bad, particularly among young adults, that people drew comparisons to the **Black Death**.

In general, the American government struggled to respond to the pandemic, when it responded at all. President Woodrow Wilson didn't acknowledge the virus in public statements. In fact, he tasked George Creel with making sure that **the** press only printed "100% American" stories to help whip up domestic support for World War I. This caused confusion and distrust of the government, since many Americans could see clear evidence of the virus's destruction with their own eyes.

In general, scientists were more successful than government officials at responding to the crisis, and they managed to save lives through their recommendations on wearing masks and quarantining. Many researchers worked tirelessly, spending long hours in their laboratories. Despite some promising leads, however, including the discovery of Pfeiffer's bacillus, which seemed like a plausible candidate to be the pathogen causing the influenza pandemic, these investigators were not successful in isolating the pathogen (a necessary step for creating vaccines and cures). Still, research on the virus continued after the war and the pandemic, and ultimately, in the 1930s, a young scientist named Richard Shope finally isolated the pathogen. Shope built on the work of the scientists who came before him, and indeed, those scientists from the 1918 pandemic went on to be recognized as some of the most important figures in early modern medicine.

Later, in 2020, author John M. Barry reflects back on his book, now that COVID-19 has caused a new pandemic in the United States. He concludes that the best lesson government officials can take away from that earlier pandemic is to avoid President Wilson's mistakes and simply tell the truth, because having the public's trust is an essential part of any pandemic recovery plan.

CHARACTERS

MAJOR CHARACTERS

Paul Lewis – Paul Lewis was a former Navy commander and pathologist best known for his work with the Rockefeller Institute. His work with Simon Flexner, Richard Shope, and others played an essential role in helping scientists to understand the influenza epidemic of 1918. Lewis and his peers were particularly influential because the epidemic came during a time that is now recognized as the beginning of modern medicine, and the medical knowledge that came out of the 1918 pandemic continues to be relevant even today. Lewis could be shy in person and never married, but he was particularly known for his skill as a leader and his dedication to the laboratory. During the 1918 influenza pandemic, he spent long hours in his laboratory, hoping to identify the pathogen causing the pandemic, which could help in the creation of a vaccine or cure. Eventually, he helped develop a serum to cure the disease based on Pfeiffer's *B. influenzae*. Though it turned out that *B. influenzae* was only present in some cases, the serum was perhaps the first developed during the pandemic to have a positive effect. After the pandemic, Lewis struggled to produce results in his research and publish meaningful new papers. Eventually, he volunteered to go abroad to Brazil to study yellow fever (since a previous investigator had died in the attempt). Lewis himself, however, soon caught yellow fever, and he died in Brazil in 1929. Lewis was one of the most prominent research scientists during the influenza epidemic, and his life's work shows both the successes and the setbacks that defined early modern medicine's first attempt to combat a pandemic. He represents the value of science, as well as its limitations.

William Henry Welch – William Henry Welch was an influential figure in early modern medicine who was better known for his leadership and his mentorship than for the papers he published. Before and during the 1918 influenza pandemic, he worked closely with other scientists on pathology research, including Franklin Mall, Simon Flexner, and Rufus Cole. Welch is perhaps most associated with Johns Hopkins University, where Welch played a key administrative role in shaping what might be considered the first modern medical school in the United States. Previously, medical education and research in the United States had lagged far behind Europe, and Americans who wanted to study medicine at the highest level had to go abroad to countries like Germany. Beginning in the late 19th century, however, thanks to Johns Hopkins and other schools that followed its model, American medicine finally caught up with the rest of the world. Welch's success at Hopkins made him a national figure in medicine and earned him prestigious awards and positions on boards. He was offered a position as director of the new Rockefeller Institute but turned

it over to Flexner instead. All of these new institutions helped the United States—and the world—mount a more effective response against the 1918 influenza epidemic. When Welch died in 1934, he was one of the most prominent scientists in the world. His long life and career show how important institutions like universities, medical schools, and research institutes are for science and how strong institutions can help foster better education and research.

Simon Flexner – Simon Flexner was chosen by William Henry Welch to be the first director of the Rockefeller Institute, a major institution in American medical research that was founded in the late 19th century with money from John D. Rockefeller. Flexner was a former juvenile delinquent but overcame his troubled background by studying intensely. He made a name for himself early with successful experiments on treating bacterial meningitis; this work would inspire Paul Lewis's important work on influenza during the 1918 pandemic. He was also known for the 1910 "Flexner Report," which offered a harsh assessment of the state of American medical schools, suggesting that many of them would be better off closing down. During the pandemic, Flexner was one of many who tried to develop a successful cure targeting Pfeiffer's *B. influenzae*, but his version wasn't effective. After the pandemic, Flexner tried to help Lewis find his next big research topic, but despite his support, Lewis remained depressed and unproductive. When Lewis died abroad of yellow fever, Flexner wrote the obituary. Flexner represents the extraordinary work ethic of scientists during the 1918 influenza pandemic, and he shows that, while many of the prominent scientists of this era came from privilege, it was also possible for a select few to overcome their backgrounds thanks to the mobility provided by new institutions.

President Woodrow Wilson – Woodrow Wilson was the 28th president of the United States who was perhaps best known for his role in leading the country through World War I. Author John M. Barry criticizes Wilson's leadership during the 1918 pandemic for several reasons. Perhaps Barry's most consistent criticism is that Wilson barely even acknowledged the pandemic, never in public and rarely even in private. Wilson's focus was exclusively on the world war, and he encouraged the censorship of negative news (with the help of George Creel). This included news about the pandemic. Wilson also frequently worked alone, and this ended up having disastrous consequences: Wilson got sick during the middle of the post-World War I peace talks and ended up acting erratically, leading to botched negotiations that laid the groundwork for World War II. Ultimately, the poor leadership of Woodrow Wilson during the pandemic provides a counterpoint to the more effective leadership of the scientists at universities and institutes who played a greater role in combatting the disease despite having less authority. Wilson also represents the dangers of trying to hide the truth.

Richard Shope – Richard Shope was a young scientist who worked with Simon Flexner and Paul Lewis and who was ultimately responsible for identifying the pathogen behind the 1918 influenza epidemic. Though Shope's work wasn't flawless and was perhaps negatively affected by the early death of his mentor Lewis, today scientists agree that Shope discovered a virus that was directly descended from the 1918 influenza virus. Though Shope was too young to be practicing during the 1918 pandemic, his work demonstrated how new generations could build on the work of previous generations in order to make important new discoveries.

Rufus Cole – Rufus Cole was the headstrong first director of the hospital at the Rockefeller Institute, working under Simon Flexner. His revolutionary idea was that the people caring for patients should also be the ones doing research on them, and ultimately his work as director of the hospital helped set a model for clinical research that is still relevant today.

Hippocrates – Hippocrates was an ancient Greek doctor who was born in 460 B.C. and who, with his group of followers, was perhaps the first person in recorded history to seek answers about medicine. His ideas were later refined and codified by Galen. He introduced the four humors theory of medicine (the idea that health was controlled by four fluids: blood, phlegm, bile, and black bile). While humoral theory is discredited today, it influenced medicine for centuries, and Hippocrates' pioneering influence paved the way for future advances.

William Crawford Gorgas – William Crawford Gorgas was the Surgeon General of the Army who was responsible for making decisions about military medicine during World War I. He was a veteran of the Spanish-American War, which saw costly medical mistakes that Gorgas was eager to avoid repeating. Gorgas recognized that cramped army camps were fertile grounds for epidemics, so he created isolated areas for treating infectious diseases. Though Gorgas advocated fiercely for more resources to combat infectious diseases in army camps, many of his superiors ignored his advice, and he ultimately was not able to stop the horrific spread of the 1918 influenza epidemic at army bases.

Richard Pfeiffer – Richard Pfeiffer was a scientist working under Robert Koch who first discovered a bacterium called *Bacillus influenzae*, which seemed at first like it might be the pathogen causing the 1918 influenza epidemic. Pfeiffer's research inspired much of the research that followed during the pandemic, and *B. influenzae* was even nicknamed "Pfeiffer's bacillus" by some. Though ultimately Pfeiffer's *B. influenzae* was not the main pathogen causing the 1918 influenza epidemic, his research was still a major breakthrough.

William Park and Anna Williams – William Park and Anna Williams were a research team of scientists working in New York City. Park was a methodical investigator, known for being precise and careful. While Williams was also a meticulous

scientist, she was more outgoing and a former stunt plane pilot. Together, they worked on isolating Pfeiffer's bacillus (*B. influenzae*). While they made important progress during the pandemic, they struggled to create a cure for influenza, since it turned out that Pfeiffer's bacillus was not the pathogen causing the influenza.

Wilmer Krusen – Wilmer Krusen was public health director of Philadelphia during the 1918 influenza epidemic, a time when politics in the city were known for widespread corruption. Krusen is perhaps best known for his decision to authorize the Liberty Loan parade against the advice of medical advisors, a decision which helped spread deadly influenza throughout the city quickly.

Loring Miner – Loring Miner was the doctor who provided evidence that the 1918 influenza epidemic most likely originated in Haskell County, Kansas. He was a capable country doctor who was on the front lines of the disease in early 1918 (it would not become a major pandemic until later that year, in the fall).

Charles Hagadorn – Charles Hagadorn was an army colonel who was in command of Camp Grant in August 1918. When influenza came to the camp, Hagadorn took some advice from scientists but stopped short of the most extreme measures. Ultimately, many young men died of influenza at Camp Grant, and Hagadorn shot himself.

Ralph Marshall Ward – Ralph Marshall Ward was a doctor turned cattle rancher who lived near the Mexican border and treated many migrants who came across the border to meet him, since he was the only doctor around for miles. He represents how the 1918 pandemic brought out selflessness in some people, even as it brought out the worst in others.

MINOR CHARACTERS

Oswald Avery – Oswald Avery was a dedicated research scientist who worked closely with Rufus Cole at the Rockefeller Institute. Together, they identified four different types of pneumonia and developed a serum that was effective against the first type.

Galen – Galen was an early scientist who lived 600 years after Hippocrates and who used his research on dissecting animals and treating wounded gladiators to expand on the four humors theory, setting a template for medical treatment for the next several centuries.

George Creel – George Creel was the head of President Wilson's Committee on Public information, which censored negative news stories (including stories about the pandemic) and encouraged pro-American propaganda, all with the goal of securing American support for World War I.

John D. Rockefeller – John D. Rockefeller was arguably the wealthiest American to ever live. At the advice of his assistant, Frederick Gates, he created the Rockefeller Institute, which helped support and fund some of the most prominent scientists in early modern American medicine, particularly the scientists who studied the 1918 influenza epidemic.

Frederick Gates – Frederick Gates was a Baptist minister and an assistant to John D. Rockefeller who helped him with both philanthropic and profit-driven ventures. He played a key role in convincing Rockefeller to fund the Rockefeller Institute, which supported American medical research during its early modern period.

Robert Koch – Robert Koch was perhaps best known for creating "Koch's postulate," which was used to determine which microorganism caused a given disease. In 1882, he found the microorganism that caused tuberculosis.

Victor Vaughan – Victor Vaughan was an American doctor and scientist who worked during the 1918 influenza epidemic and who was one of the first to witness the power of the disease at Camp Devens (outside of Boston).

Thomas Huxley – Thomas Huxley was an English scientist who gave a keynote speech at the founding of Johns Hopkins University. His speech was noteworthy for not mentioning God, since many other universities at the time were religiously affiliated. Johns Hopkins's objective was to avoid political or religious affiliations.

John Shaw Billings – John Shaw Billings was the man who assembled the first faculty for the Johns Hopkins medical school and who was responsible for recruiting William Henry Welch to the faculty.

Johns Hopkins – Johns Hopkins was a rich Quaker man who stated in his will that he wanted his wealth to be held in a trust and turned into a university and hospital. After his death, Johns Hopkins University was founded.

Pierre Louis – Pierre Louis was a Parisian scientist who helped introduce the "numerical system" into medicine, which involved using figures taken from body temperature, blood pressure, and other measurable signs.

Rupert Blue – Rupert Blue was Surgeon General during the 1918 influenza pandemic. He was known at the time as a lightweight and is best remembered today for failing to take decisive action.

Frederick Russell – Fredrick Russell was an American army doctor who was among the first to witness the power of the 1918 influenza epidemic at Camp Devens.

Franklin Mall – Franklin Mall was one of the more prominent early faculty members at the medical school at Johns Hopkins University.

TERMS

Antigen – An antigen is anything that binds to a specific antibody or T-cell receptor in the human body (both of which the body uses to identify foreign invaders). Typically, this causes a response from the body's immune system. Viruses are a type of antigen; they take advantage of the body's ability to remember antigens (and so prepare a stronger immune response against them).

Humors – The four humors were four bodily fluids: phlegm, blood, yellow bile, and black bile. According to the humoral theory, first adopted by ancient Greeks, illnesses were caused by imbalances in the humors. This eventually led some doctors to try to correct these imbalances, through methods like bleeding patients. While the four-humor theory guided medicine for centuries, it was ultimately replaced by germ theory in the mid-1800s.

Pathogen – A pathogen is an organism or virus that causes a disease. Finding the pathogen behind the 1918 influenza pandemic was a major goal for scientists from that era, because then it would be possible to target the pathogen with a vaccine or cure.

THEMES

In LitCharts literature guides, each theme gets its own color-coded icon. These icons make it easy to track where the themes occur most prominently throughout the work. If you don't have a color printer, you can still use the icons to track themes in black and white.

LEADERSHIP AND CRISIS

John Barry's *The Great Influenza* is about leadership's ability to change the course of a crisis, both for better and for worse. In 1918, the world faced two related crises: an influenza epidemic that killed staggering numbers of people in a relatively short period of time, and World War I, which was the deadliest conflict that modern Europe had ever seen. Barry argues that much of this destruction, both in the war and in the pandemic, was made worse by bad leadership. For example, he criticizes President Woodrow Wilson for refusing to acknowledge the pandemic in public statements, sowing doubt and confusion as people saw evidence of a **Black Death**-like disease with their own eyes. Moreover, Wilson took a very individualistic approach to international diplomacy, almost single-handedly navigating America's role in the World War I peace negotiations. This backfired when Wilson fell seriously ill, causing him to act erratically and leading to a deeply flawed peace treaty that set the stage for World War II. Other leadership failures happened on a smaller scale but were just as significant. Barry looks in particular at Philadelphia, where widespread political corruption left the city with serious sanitation and overcrowding problems, creating fertile ground for the influenza epidemic.

Still, in spite of the many failures of leadership in 1918, Barry also highlights how some leaders did their best to fight back against the pandemic and the war. He particularly admires the skilled leaders who helped found the Johns Hopkins School of Medicine and who helped transform American medicine into a major global player. Barry portrays the brave administrators and scientists who ran universities and labs in 1918 as the opposite of Wilson and the Philadelphia political machine: instead of working individually or for personal gain, they worked with collaboratively for the benefit of humanity as a whole. In *The Great Influenza*, Barry argues that strong leadership is the best way to combat a crisis, but he makes clear that "strong" doesn't mean dictatorial—the best leaders know how to collaborate and communicate.

TRUTH, FREE PRESS, AND PROPAGANDA

The question of how the truth gets told is at the center of John Barry's *The Great Influenza*. On the one hand, it is a book about extreme distortions of the truth. World War I led to the publication of tremendous amounts of propaganda in **the press** and the censorship of anything that might threaten the war effort—even in countries with a supposedly free press like the United States. The so-called "Spanish influenza" of 1918 didn't originate in Spain or even hit the country with particular ferocity. It just happened that Spanish journalists were some of the only ones to write about the pandemic honestly, because Spain was neutral in World War I (and so there was no government pressure to censor negative news stories). By contrast, American newspapers, at the urging of President Woodrow Wilson and his advisors like George Creel, printed very little about the pandemic, even though it likely originated in Haskell County, Kansas and had major early outbreaks in U.S. Army camps. This decision to hide bad news didn't stop the spread of fear in the U.S.—in fact, it did the opposite, because people could see the devastation of the influenza epidemic with their own eyes, which recalled the **Black Death**. This grim reality led Americans to feel doubt and paranoia when newspapers refused to mention the subject.

Still, while these distortions of the truth were being printed, others sought to illuminate the truth. The influenza epidemic coincided with the early days of modern American medical research, and investigators like Welch, Lewis, Avery, and Cole all worked tirelessly in their labs, seeking to understand influenza and particularly to identify its pathogen, which was the first step toward finding a cure or vaccine. Though the desperate situation meant that they couldn't always be as methodical as they would have been pre-pandemic, they

followed the scientific method and took a hands-on approach to research, overseeing the most important lab work themselves. These investigators learned frightening truths about the influenza virus and its ability to kill, but learning these truths was necessary to help mitigate the pandemic. By presenting scientists' quest for truth alongside politicians' and the media's efforts to cover it up, Barry contends that while the truth is often scary, it is better for society to face it and study it instead of trying to cover it up.

SCIENCE VS. NATURE

The story John Barry tells in *The Great Influenza* is one of humankind's science and technology versus nature's ferocity and adaptability. The influenza virus that tore through the world beginning in 1918 was ultimately an act of nature. Since the ancient Greeks, and probably much earlier, humans have been studying nature. Early observers were hesitant to interfere in nature's processes, often to a fault. Hippocrates, for example, came up with the famous four humors system of medicine (which was used for well over a millennium), even though he never even dissected a body to see what was inside. About 600 years later, one of Hippocrates successors, Galen, improved the four humors theory with his firsthand knowledge of injured gladiators. But he still believed that a doctor shouldn't interfere with nature's processes and that if, for example, a patient had pus, it was a good sign. By the time of the American Civil War, doctors had gone too far in the opposite direction, still taking inspiration from Galen but taking a much more active approach to treatment, deliberately trying to combat nature through a process called "heroic medicine." With a few exceptions, this treatment approach did more harm than good.

The late 19th and early 20th century marked the first time that science was truly effective at controlling nature's diseases, with vaccines and serums causing some previously fearsome diseases like measles to largely die out. The 1918 influenza epidemic demonstrated both the tremendous advancements of medical research as well as its stark limitations. Epidemiology and public health research helped prevent numerous influenza deaths using modern techniques like social distancing and quarantining. At the same time, however, the virus spread rapidly and killed aggressively, and even today, some questions still linger about the nature of the virus. Barry demonstrates in *The Great Influenza* that even the most modern science can't keep up with the power of nature, but he also argues that the scientific method can help humans adapt to nature and blunt the effects of its deadly side.

EDUCATION, RESEARCH, AND INSTITUTIONS

Many of the heroes of John Barry's *The Great Influenza* are not working alone but as part of laboratories, research institutions, and universities. The early part of the book deals with the founding of Johns Hopkins University and the Rockefeller Institute, two institutions that played a key role in the development of modern American medicine. As Barry shows, one of the reasons why American medicine and medical research lagged so far behind European countries (particularly Germany) for much of the 19th century is that the U.S. lacked strong institutions. Medical schools in the U.S., for example, weren't standardized or regulated in any meaningful way, which meant that becoming a licensed doctor was often less about skill or knowledge and more about having enough money to pay tuition. Hopkins aimed to change this, and men like William Henry Welch (the first dean of the medical school) knew that one of the first steps to building strong institutions was hiring capable people to run them. One man he worked with, Simon Flexner, would go on to be the first director of the Rockefeller Institute, which used money from the industrialist John D. Rockefeller to build research labs that would finally give American investigators the resources compete with their European counterparts.

The collaborative, collegial nature of these men and their research contrasts sharply with men like Wilmer Krusen. As head of public health in Philadelphia, Krusen caused one of the worst influenza outbreaks in the nation when he refused to heed experts' warnings about the virus and approved a massive parade that brought many people together in close contact. Even these new American institutions like Hopkins and the Rockefeller Institute weren't enough to stop the influenza pandemic, but the research they produced helped control the spread and helped scientists draw lessons from the pandemic to use against future diseases. Barry argues in *The Great Influenza* that modern medical research is costly and complicated but nonetheless important, so it needs strong institutions to foster it. Moreover, he suggests that these institutions need to recruit talented scientists and administrators who will both manage research and train their successors, allowing the institutions to thrive in the long term.

SYMBOLS

Symbols appear in **teal text** throughout the Summary and Analysis sections of this LitChart.

THE BLACK DEATH

The Black Death—a deadly plague that tore through Europe in the Middle Ages— symbolizes how people understand their present by looking to the past. The Black Death was mentioned frequently by people who lived through the 1918 influenza pandemic. Though no one alive for the 1918 influenza pandemic was alive for the Black

Death, many people knew enough about history to understand roughly what life must have been like during the earlier plague. The Black Death struck at a time when Europe and Asia had recently been linked by new trade routes, and the 1918 influenza epidemic also struck during an era of increased international movement—this time due to World War I. The Black Death, which for many represented a scary but distant past, suddenly became a reality, forcing many people to confront the idea that the past might not be as far off as it seemed. While the specifics of the Black Death, such as the disease that caused it and its lethality, differed greatly from the influenza pandemic, it was still a helpful comparison since so many people were familiar with it. The Black Death shows both how disease has always been a part of human life and how even modern scientific advances are not always enough to hold back the horrors of the past and the power of nature.

THE PRESS

The press symbolizes the truth and particularly how, in the years around World War I, the truth was often distorted by government interference. The strange thing about the so-called "Spanish influenza" that became a global pandemic in 1918 was that it didn't originate in Spain or even hit the country with particular ferocity. It became associated with Spain simply because Spain was neutral in World War I and therefore its press had less incentive to cover up bad news and print propaganda, leading to more coverage of the pandemic. In the United States in particular, President Woodrow Wilson and his appointee George Creel kept a tight leash on newspapers, restricting mentions of the pandemic even when people could see clear evidence of the disease around them. The result was that the public began to distrust the government, and this made it even harder to implement successful strategies to combat the pandemic. By showing the dangers of a censored press and of propaganda, author John M. Barry also hopes to highlight the benefits of a free press and highlight how telling the truth can actually be the most effective tactic for government officials, especially during a major public health crisis.

QUOTES

Note: all page numbers for the quotes below refer to the Penguin edition of *The Great Influenza* published in 2005.

Prologue Quotes

❝ The Great War had brought Paul Lewis into the navy in 1918 as a lieutenant commander, but he never seemed quite at ease when in his uniform. It never fit quite right, or to sit quite right, and he was often flustered and failed to respond properly when sailors saluted him.

Related Characters: Paul Lewis

Related Themes:

Page Number: 1

Explanation and Analysis

This quote is the first line of the prologue, and it introduces Paul Lewis, who will be a major player in the events that follow. Perhaps author John M. Barry opens the book with Lewis because Lewis was both an exceptional scientist and a scientist whose experience was typical of the 1918 influenza pandemic. The other way that this opening quote sets the stage for what follows is by introducing World War I (known back then as the Great World War). The war brought changes around the world, and some people, like Lewis in his ill-suited lieutenant commander uniform, weren't entirely ready for the change but nevertheless made the best of their situation. Civilians had to adapt to life during wartime—and during a global pandemic—while scientists faced their own unique challenges.

Lewis in particular seemed uncomfortable when sailors saluted him. This could be taken as a sign that he's uncomfortable with responsibility, but in fact, later events will reveal that Lewis was actually very comfortable acting as a leader in a lab setting. Perhaps Lewis's real discomfort was with being forced into such a public-facing leadership role outside the laboratory. The rest of *The Great Influenza* explores both the ways in which science was its own community as well as the ways it was unavoidably part of a larger society. Barry uses individuals like Paul Lewis as a focal point to illustrate these big issues on a personal level.

Chapter 1 Quotes

❝ On September 12, 1876, the crowed overflowing the auditorium of Baltimore's Academy of Music was in a mood of hopeful excitement, but excitement without frivolity. Indeed, despite an unusual number of women in attendance, many of them from the uppermost reaches of local society, a reporter noted, "There was no display of dress or fashion." For this occasion had serious purpose. It was to mark the launching of the Johns Hopkins University, an institution whose leaders intended not simply to found a new university but to change all of American education; indeed, they sought considerably more than that.

Related Characters: Thomas Huxley (speaker)

Related Themes:

Page Number: 11

Explanation and Analysis

This quote, from the beginning of the first chapter of the book, describes the moment when Johns Hopkins University was preparing to launch. By starting the first chapter here, author John M. Barry suggests that if someone really wants to understand what happened during the 1918 pandemic in the United States, they have to understand the events that led up to it. For Barry, the story of the 1918 pandemic is not just a story of a singular crisis but also the story of how American medicine matured from a global laughingstock to a formidable research powerhouse. At the center of this transformation, according to Barry, was stronger medical education, powered by strong institutions. Hopkins was arguably the first American medical institution to successfully match up with its European counterparts, and it helped start a revolution in medical education that would go on to affect the whole country.

This passage describes an early moment, before Hopkins had achieved any reputation. Though there was excitement and the promise of a better future, many of those in attendance dressed and acted seriously. The contrast between hope and solemnity shows how revolutions often begin in a place of uncertainty and how success is never guaranteed.

❝ Ultimately, then, logic and observation failed to penetrate the workings of the body not because of the power of the Hippocratic hypothesis, the Hippocratic paradigm. Logic and observation failed because neither one tested the hypothesis rigorously.

Once investigators began to apply something akin to the modern scientific method, the old hypothesis collapsed.

Related Characters: Hippocrates, Galen

Related Themes:

Page Number: 24

Explanation and Analysis

This passage comes from a section in chapter 1 that gives a brief overview of the entire history of medicine, from its founding as a discipline up until the founding of Johns Hopkins University. Barry's argument is that, while medicine's long history is important, it was only relatively recently that medicine actually became an effective way to reliably improve and extend people's lives. For many years, doctors actually did more harm than good. While this might sound unbelievable on the surface, Barry delves into the history to show why this was the case.

The big problem with foundational medical figures like Hippocrates was that they placed too much emphasis on pure reason. While reason might sound like a good quality for a doctor to have, Barry argues that the real benefit of the modern scientific method is that it involves hands-on experimentation that goes beyond pure reason. Medical scientists in the past were limited by their resources and too dependent on their predecessors, leading to centuries without meaningful advances in medicine. Although elsewhere Barry praises the communal nature of scientific research, the point of this passage is primarily to highlight how conformity and group thinking can slow progress in the sciences.

Chapter 2 Quotes

❝ Nothing about the boyhood or youth of William Henry Welch suggested his future.

Related Characters: William Henry Welch, Oswald Avery

Related Themes:

Page Number: 36

Explanation and Analysis

This quote, which introduces the major figure in the book, William Henry Welch, starts off by painting a modest portrait of him. Though Welch would go on to become one of the most respected scientists of his era, even at the time, his success could be easy to overlook, given that his record of scientific publications wasn't nearly as impressive as some of his peers. One of the themes Barry will keep coming back to is how traditional markers of success like Nobel Prizes and eminent publication credits often fail to recognize the work of scientists who made truly vital contributions.

By describing William Henry Welch as unassuming, Barry questions what success looks like. Many of the scientists who worked during the 1918 influenza pandemic were not looking for personal fame and devoted most of their time to fairly solitary pursuits in the laboratory. Some, like Lewis, did eventually receive wide recognition for their work, but others, like Oswald Avery, only became footnotes in other peoples' stories, even though their own work was foundational for those who followed them. *The Great*

Influenza explores the question of whose work is remembered by history and whose is forgotten, at times even attempting to rebalance the scales to better reflect the actual course of history.

Chapter 4 Quotes

American medical education needed a revolution. When the Hopkins medical school did at last open in 1893, most American medical schools had still not established any affiliation with either a teaching hospital or university, most faculty salaries were still paid by student fees, and students still often graduated without ever touching a patient.

Related Characters: Johns Hopkins

Related Themes:

Page Number: 65

Explanation and Analysis

This passage describes the state of American medical education in the immediate aftermath of the founding of Johns Hopkins University and, later, its medical school. Throughout the 19th century, American medical schools largely lagged behind their European counterparts, and ambitious American medical students often had to go abroad to get their training. This passage explores some of the reasons why American schools fell behind.

Perhaps the most significant flaw with American medical schools was their financial incentives. When faculty salaries were paid with student fees, this meant that schools had a vested interest in attracting students from wealthy families and little incentive to actually provide these students with a solid education. The lack of affiliation with established universities and hospitals also meant that medical schools were lacking the resources needed to give students a comprehensive education. Ultimately, Barry argues that early American medical schools failed because they were weak institutions and that it would take stronger institutions like Johns Hopkins to lead the way and build a more durable system of medical education in the United States.

Chapter 5 Quotes

The Rockefeller Institute Hospital opened in 1910. By then the best of American medical science and education could compete with the best in the world. But an enormous gap existed in the United States between the best medical practice and the average, and an unbridgeable chasm separated the best from the worst.

Related Characters: Simon Flexner, John D. Rockefeller, Frederick Gates

Related Themes:

Page Number: 82

Explanation and Analysis

This passage describes the founding of the Rockefeller Institute, which, along with Johns Hopkins University, would be one of the leading forces in revolutionizing American medical education and research. Near the beginning of the 20th century, John D. Rockefeller was the richest living American, and his trusted assistant Frederick Gates helped him identify new opportunities for prestige and profit. They arrived at the idea of a medical research institute. Simon Flexner was the first man to lead the institute, and he helped turn it into a powerhouse of global research.

Flexner was himself a sharp critic of American medical education, having released the infamous "Flexner Report," which suggested that most American medical schools would be better off closing down. His report helped spur other organizations like the American Medical Association to adopt higher accreditation standards, which was ultimately the only way to close the gap between the best and worst American medical schools. This passage illustrates how the pioneering leadership of institutions like Johns Hopkins was already having an effect on American medicine, but it also illustrates how change could be gradual and didn't happen all at once.

Chapter 6 Quotes

Haskell County, Kansas, lies west of Dodge City, where cattle drives up from Texas reached a railhead, and belongs geographically to an, in 1918, not far in time from, the truly Wild West. The landscape was and is flat and treeless, and the county was, literally, of the earth.

Related Characters: Loring Miner

Related Themes:

Page Number: 91

Explanation and Analysis

This quote describes the region of Kansas where most contemporary scientists agree that the 1918 influenza virus first emerged. Barry doesn't immediately describe why the area is important, choosing instead to set the stage and develop a sense of place before delving into the science of the pandemic. The idea that Haskell County, Kansas, was like the Wild West and "of the earth" is significant because it evokes a part of the country that was close to nature. Throughout the book, the 1918 influenza virus is frequently treated as a force of nature; it makes sense, then, that such a force of nature would arise from a place that was right on the border between civilization and untamed nature.

In this chapter, Barry looks at the first people to observe the virus—in particular the country doctor Loring Miner—in order to show both how warning signs of the pandemic came early, but also to show how these early signs didn't even come close to suggesting the power of the full pandemic. The story of the 1918 pandemic is ultimately a story about a moment in history when remote locations like Haskell County, Kansas, had finally become so intertwined with major urban centers that the events in one location would inevitably reverberate into others.

Chapter 8 Quotes

❝ In the days before antibiotics, an infection launched a race to the death between the pathogen and the immune system. Sometimes a victim would become desperately ill; then, suddenly and almost miraculously, the fever would break and the victim would recover. This "resolution by crisis" occurred when the immune system barely won the race, when it counterattacked massively and successfully.

But once the body survives an infection, it gains an advantage. For the immune system epitomizes the saying that that which does not kill you makes you stronger.

Related Themes:

Page Number: 36

Explanation and Analysis

This passage briefly describes how a human body responds to infection and why getting sick with a disease reduces the chances of a person catching that same disease again.

Understanding this process is important not only to understand what was happening in the bodies of victims of the 1918 influenza pandemic, but also to understand the research of scientists who were trying to stop the pandemic's spread. What scientists had just begun to understand in the years before 1918 was that you could protect people from an infection by giving them a small, easily survivable dose of a virus that would prime their immune system to protect them from future attacks. This is the principle behind vaccines, and it was immediately successful against some diseases like measles.

The warlike imagery used in this passage is also appropriate, since the 1918 influenza pandemic took place in the shadow of World War I. The pandemic also involved a more metaphorical war between scientists working in labs to find a cure and a virus that was a force of nature. Barry uses this violent language in part to emphasize the stakes—how desperately the body must struggle to combat a serious infection and how heroic and remarkable it is that the human body has such sophisticated defense mechanisms.

Chapter 10 Quotes

❝ In the spring of 1918 death was no stranger to the world. Indeed, by then the bodies of more than five million soldiers had been fed into what was called the "sausage factory" by generals whose stupidity was matched only by their brutality.

Related Themes:

Page Number: 36

Explanation and Analysis

This passage begins a new part of the book by taking stock of the devastation of World War I, which dovetails in interesting ways with the story of the pandemic. The clear parallel between the pandemic and the war is that they both inflicted death and destruction on a mass scale, certainly the greatest scale that anyone alive at the time had ever seen. The difference, however, is that the war was not a force of nature but a decidedly human invention. Barry doesn't mince words, calling the generals in World War I stupid and brutal. Though this might have been a controversial opinion at the time, with the benefit of hindsight—and particularly knowing how World War I set the stage for World War II—today Barry's assessment of World War I as needlessly brutal is a more mainstream opinion.

The senseless violence of World War I makes an interesting comparison with the pandemic, since, although the virus

was undeniably a force of nature, it too was arguably more brutal than it needed to be due to the poor decisions of people in charge. Just as generals focused on short-sighted military objectives, politicians and some public health officials focused on short-sighted political goals, at times even dismissing virus deaths as acceptable sacrifices. Barry explores this topic in order to show how more compassionate leadership could lead to less suffering for everyone.

Chapter 11 Quotes

Wilson had demanded that "the spirit of ruthless brutality. . . enter into the very fibre of national life." To carry out that charge, Creel had wanted to create "one white-hot mass," a mass driven by "deathless determination." He was doing so. This was truly total war, and that totality truly included the medical profession.

Related Characters: President Woodrow Wilson, George Creel

Related Themes:

Related Symbols:

Page Number: 144

Explanation and Analysis

This passage describes President Woodrow Wilson's policies toward the press during the U.S.'s involvement in World War I. The words Barry quotes here are meant to be shocking: Wilson isn't even trying to hide the fact that he wants the American people to engage in "ruthless brutality." George Creel, as the head of Wilson's Committee on Public Information (which was essentially a wartime censorship board), played a key role in this campaign to promote brutality.

It's possible that Barry uses direct quotes here to highlight how shockingly blunt the era's politicians could be during wartime, although it's also possible that Barry is encouraging the audience to draw comparisons between the past and inflammatory language used by more recent politicians. Later, Barry will argue that Wilson and Creel's censorship was ineffective because it caused people to lose faith in institutions. This not only led to more deaths from the pandemic, but it even slowed down military preparation and production, showing how Wilson's policies were ineffective even at accomplishing their brutal goals for the war.

Chapter 15 Quotes

The 1918 influenza pandemic, like many other influenza pandemics, came in waves. The first spring wave killed few, but the second wave would be lethal.

Related Themes:

Related Symbols:

Page Number: 176

Explanation and Analysis

This quote bluntly and succinctly describes the course of the 1918 influenza pandemic. In a way, Barry's blunt language mirrors the sudden onset of the pandemic itself. Though the pandemic was a horrific event, one that caused some people to make comparisons to the Black Death, Barry sticks to dryly stating the broad facts of history here. Elsewhere in the book, Barry talks about the dangers of newspapers that ran sensationalized stories or that tried to cover up the dangers of the pandemic with silence. Here, Barry attempts to lead by example and do the opposite, calmly restating facts just as they occurred.

The concept of waves is crucial to understanding the 1918 pandemic, since it was not just one long, uninterrupted period of disease. Its spread across the world ebbed and flowed, creating a dynamic situation that changed month to month or even day to day in some places. The waves of the pandemic also relate more broadly to waves that echo through history, as past and future disease outbreaks bear resemblance to the 1918 pandemic while also having their own unique characteristics.

Chapter 16 Quotes

As the virus moved, two parallel struggles emerged.

One encompassed all the nation. Within each city, within each factory, within each family, into each store, onto each farm, along the length of the track of the railroads, along the rivers and roads, deep into the bowels of mines and high along the ridges of the mountains, the virus would find its way. In the next weeks, the virus would test society as a whole and each element within it. Society would have to gather itself to meet this test, or collapse.

The other struggle lay within one tight community of scientists. They—men like Welch, Flexner, Cole, Avery, Lewis, Rosenau—had been drafted against their will into a race.

Related Characters: William Henry Welch, Simon Flexner,

Rufus Cole, Oswald Avery, Paul Lewis

Related Themes:

Page Number: 193

Explanation and Analysis

This passage lays out the stakes and the central struggle that will define the rest of *The Great Influenza* as it covers the heaviest pandemic months. Barry gives a list of scientists who will act as protagonists over the next few chapters, both to recognize their individual challenges and accomplishments and to emphasize how these individuals were united as part of a larger community. In turn, this group of scientists was its own community, while also being inextricably linked to the wider United States and its struggles to deal with the influenza virus.

At stake in this struggle was nothing less than the foundation of society itself. By going from the general level to the specific, Barry shows how this struggle was both a shared one and an individual one. The fact that society didn't collapse under the strain of the influenza pandemic is a sign both of the success of the individuals Barry mentions as well as of humanity's resiliency in general.

Chapter 17 Quotes

❝ The Liberty Loan campaign would raise millions of dollars in Philadelphia alone. The city had a quota to meet. Central to meeting that quota was a parade scheduled for September 28.

Related Characters: President Woodrow Wilson, George Creel

Related Themes:

Related Symbols:

Page Number: 208

Explanation and Analysis

This passage describes the lead-up to the Liberty Loan parade in Philadelphia, which represented a turning point when the influenza pandemic went from a relatively contained problem in military camps to something that was inescapable throughout the city. This passage particularly highlights the role that money played during World War I.

Because financing the war was so expensive, President Woodrow Wilson and his advisors came up with creative ideas to finance it, with one of the most popular options being "Liberty Loans" (a type of government bond). The name "Liberty Loans" tied into the sort of nationalistic, pro-war sentiments that Wilson and his appointee George Creel were trying to foster in the United States—it cast the U.S. involvement in the war as a battle for liberty, and liberty was and is a foundational concept in the U.S. Responsibility for running Liberty Loan campaigns often fell to local officials, with success determined by quotas that increased the pressure on cities. As the events of the next couple chapters show, this government pressure to support the war and raise money at all costs would have disastrous consequences for the pandemic.

Chapter 19 Quotes

❝ Two days after Philadelphia's Liberty Loan parade, Wilmer Krusen had issued that somber statement, that the epidemic in the civilian population "was assuming the type found in naval stations and cantonments."

Related Characters: Wilmer Krusen

Related Themes:

Page Number: 220

Explanation and Analysis

This quote describes the aftermath of the September 1918 Liberty Loan parade in Philadelphia, which most scientists today agree was responsible for spreading the influenza virus throughout the city's civilian population. At the center of this controversy was Wilmer Krusen, a public health official who was part of Philadelphia's notoriously corrupt local politics. Krusen was warned by several of his advisors not to go ahead with the Liberty Loan parade, since it had the potential to spread the influenza virus widely. Krusen ignored their warnings, perhaps hoping to raise enough money to earn some glory for himself. Like many of the ineffective leaders during the 1918 influenza pandemic, Krusen made the mistake of focusing too much on short-term goals without considering longer-term implications.

Ultimately, Krusen's decision to go ahead with the parade caused the virus to spread across Philadelphia and the death rate to skyrocket. Eventually, things reached a point where even Krusen had no choice but to acknowledge the truth. The Liberty Loan Parade story shows not only the lack of responsibility from leaders like Krusen, but also the problems with the incentives set by the leaders working above Krusen in the federal government.

Chapter 20 Quotes

This was influenza, only influenza.

Related Themes:

Related Symbols:

Page Number: 231

Explanation and Analysis

The quote above appears at the beginning of Chapter 20 but is repeated throughout the book in various other contexts. It is a somewhat open-ended quote that lends itself to different interpretations. On the one hand, the quote is literally accurate. The virus that caused the 1918 pandemic was literally an influenza virus. The idea that it was "only" influenza could be a counterargument to exaggerated claims about the virus. For example, though many compared the 1918 influenza virus to the Black Death of the Middle Ages, the disease that caused that prior plague was significantly deadlier.

More often, however, Barry uses the "influenza, only influenza" quote to mimic the talking points of virus deniers and to highlight why these talking points were wrong. The truth is that while the virus really was "only" influenza, "only" influenza was still enough to threaten the very fabric of society. Barry's repetition of the "influenza, only influenza" quote is therefore a mantra with two purposes: first, to dispel hyperbolic, sensational talk about the virus and second, to emphasize how even seemingly small public health issues must be taken seriously, since they have the potential to spiral into big ones.

Chapter 21 Quotes

In 1918 in particular, influenza struck so suddenly that many victims could remember the precise instant they knew they were sick, so suddenly that throughout the world news reports were common of people who toppled off horses, collapsed on the sidewalk.

Related Themes:

Page Number: 241

Explanation and Analysis

This quote takes a street-level view of what it was like when the 1918 influenza virus hit, and it uses surprising imagery to convey just how suddenly the virus could strike. While some historical changes (like the reform of American medical schools) happened gradually, Barry emphasizes that the onset of the virus represented a much more abrupt shift in society. The image of people falling off a horse or collapsing on the sidewalk suggests an abrupt end to the normal functioning of society. It also evokes how quickly the symptoms of the disease could affect an individual.

Barry's choice of imagery, particularly of people falling off horses, perhaps intentionally inspires comparisons to how people would have died on the battlefields of a war. This passage blurs the line between the era's two disasters—the pandemic and World War I—showing how both of them were particularly devasting to young, healthy people who otherwise might have had many more years to live.

Chapter 22 Quotes

Nature chose to rage in 1918, and it chose the form of the influenza virus in which to do it. This meant that nature first crept upon the world in familiar, almost comic, form. It came in masquerade. Then it pulled down its mask and showed its fleshless bone.

Related Characters: William Henry Welch

Related Themes:

Related Symbols:

Page Number: 36

Explanation and Analysis

In this passage, Barry explores how the virus was a force of nature. One of the themes Barry explores throughout the book is the conflict between science and nature—in what ways it's possible for humans to confront nature and in what ways it simply isn't. Barry's choice of words in this passage evokes "The Masque of the Red Death," a story by Edgar Allen Poe that is one of the most famous depictions of a plague in literature. In the story, a group of wealthy people hide away to avoid a deadly disease and throw a masquerade ball to amuse themselves. At this party, a strange figure in red shows up, and soon after people start dying. The story lends itself to many interpretations, but perhaps the most common interpretation is that the story is about the futility of trying to escape death. Barry explores a similar theme of futility here. He isn't diminishing the power of science to forestall disease and death, but simply acknowledging that at least for the present, humanity will never be able to escape the power of nature when it

chooses to rage with a disease.

Chapter 23 Quotes

❝ Lewis knew full well that little of what he was doing was good science. It was all, or nearly all, based on informed guesswork. He only worked harder.

As he worked, the society about him teetered on the edge of collapse.

Related Characters: Paul Lewis, Simon Flexner, Richard Pfeiffer

Related Themes:

Page Number: 287

Explanation and Analysis

This chapter describes Paul Lewis's quest to find the pathogen behind the 1918 influenza virus, as well as what was going on in the world around him while he worked. One of the challenges all scientists faced during the 1918 pandemic was how to balance the demands of good science with the pressure of racing against a deadly disease. Scientists didn't have the luxury of conducting drawn-out or methodical experiments, since they urgently needed a treatment or cure for the disease. This led many like Lewis to adopt a policy of "informed guesswork" more than "good science."

While Barry exposes the flaws of the "informed guesswork" approach to research, he doesn't necessarily condemn the scientists who chose it. Indeed, his accounts of Lewis's deeds are admiring, and it is particularly impressive that Lewis managed to keep working when so much of society around him was on the brink of collapse. While the story of science during the pandemic is a story of flawed experiments and incorrect assumptions, it is ultimately a story of making the best of a terrible situation.

Chapter 26 Quotes

❝ While science was confronting nature, society began to confront the effects of nature. For this went beyond the ability of any individual or group of individuals to respond to. To have any chance in alleviating the devastation of the epidemic required organization, coordination, implementation. It required leadership and it required institutions follow that leadership.

Related Themes:

Page Number: 299

Explanation and Analysis

This quote, which begins the eighth major part of the book, again examines the 1918 influenza pandemic on the broadest, most abstract level. While this approach doesn't convey the specific detail that Barry delves into elsewhere, it does help the audience get a better understanding of the big picture ideas that are important in order to understand the 1918 pandemic. At the heart of the pandemic, and by extension Barry's book, is the conflict between science and nature. Though science can be a tool for humans to study nature, big events like a pandemic suddenly make that relationship much more adversarial. By falling back on big topics like science and nature, Barry connects the pandemic and his book to some of the most fundamental parts of the human experience. This zoomed-out perspective emphasizes how much people have in common and helps reinforce why it is a good idea for scientists, politicians, and regular people to collaborate when it comes to crisis situations like a pandemic.

Chapter 29 Quotes

❝ As terrifying as the disease was, the press made it more so. They terrified by making little of it, for what officials and the press said bore no relationship to what people saw and touched and smelled and endured. People could not trust what they read. Uncertainty follows distrust, fear follows uncertainty, and, under conditions such as these, terror follows fear.

Related Characters: President Woodrow Wilson, George Creel

Related Themes:

Related Symbols:

Page Number: 335

Explanation and Analysis

This passage describes how the press as a whole acted during the 1918 influenza pandemic in the United Sates. Barry depicts a conflict between what people saw and felt around them—the devastation of a pandemic—and the very different things they read about in the papers. Under the direction of President Woodrow Wilson and his chair of the Committee on Public Information, newspapers were

strongly discouraged from covering topics like the influenza pandemic or anything else that might weaken the resolve of a nation at war. Though the press was known for making exaggerated statements about Germany's crimes or the United States' virtues, perhaps its most consequential action was the decision to avoid mentioning the pandemic. Though the stated reason for this was to avoid spreading unnecessary fear, Barry shows how this lack of coverage had the opposite effect and actually fostered more fear. Barry uses this quote to explore the dangers of what happens when a free press is censored and made to fit with a specific agenda.

Chapter 31 Quotes

Vaughan believed that the influenza virus came close to threatening the existence of civilization. In fact, some diseases depend upon civilization for their own existence.

Related Characters: Victor Vaughan

Related Themes:

Page Number: 369

Explanation and Analysis

This quote, which begins the ninth and penultimate part of the book, explores the relationship between disease and civilization itself. Victor Vaughan was an investigator on the front lines of looking for a cure or vaccine for the 1918 influenza pandemic. Based on the destruction Vaughan saw from the disease's rapid spread (combined with the destruction caused elsewhere by the war), it's easy to see why Vaughan made the dramatic claim that society itself was on the brink. In fact, however, the relationship between humans and disease isn't entirely adversarial—without humans, many diseases have nowhere to go, meaning that to wipe out humanity would be self-destructive for the disease as well. In fact, influenza isn't a disease that needs humans—it can survive in other animals as well—but regardless, the 1918 pandemic represented a deeply intertwined relationship between disease and humanity. Barry seems to question whether disease is a necessary cost associated with civilized society or whether society may one day be "civilized" enough to do away with disease entirely.

Chapter 32 Quotes

The overwhelming majority of victims, especially in the Western world, recovered quickly and fully. This was, after all, only influenza.

But the virus sometimes caused one final complication, one final sequela. The influenza virus affected the brain and nervous system.

Related Themes:

Related Symbols:

Page Number: 378

Explanation and Analysis

In this quote, Barry discusses the long aftermath of the influenza epidemic. He repeats an old quote that he has repeated in previous chapters, referring to the disease as "only influenza." While the 1918 influenza pandemic left several metaphorical scars on society, it also left some very physical reminders of its presence in people who suffered from strange, difficult-to-explain neural symptoms. This was not something like post-traumatic stress disorder, but a result of physical attacks on victims' brains that caused long-lasting—sometimes lifelong—problems.

Due to the timing of his book, Barry couldn't have known about Long COVID (a cluster of symptoms like fatigue and "brain fog" that linger in people who recover from COVID-19 infection) when he first wrote this passage. Still, it may make sense to draw parallels between Long COVID and the after-effects of the 1918 influenza pandemic, since both diseases are respiratory and may have affected the body in similar ways. The existence of Long COVID during the current pandemic highlights yet again how patterns in the past often repeat themselves in slightly modified form in the present.

Chapter 34 Quotes

By World War I, the revolution in American medicine led by William Welch had triumphed. That revolution had radically transformed American medicine, forcing its teaching, research, art, and practice through the filter of science.

Related Characters: William Henry Welch

Related Themes:

Page Number: 36

Explanation and Analysis

After several chapters focusing on the failure and struggles of the U.S. during the 1918 influenza pandemic, Barry begins the final part of the book by focusing instead on the triumphs of the era. In spite of enormous pressure and frequent setbacks, the investigators working through the 1918 pandemic accomplished great things. In particular, their work helped to standardize and modernize some of the United States' institutions, including medical schools, hospitals, and research institutes, as well as military camps. Welch in particular represents this triumph because he played a key administrative role in organizing the efforts of some of the era's most successful scientists. His success and recognition emphasize how the early 20th century wasn't an era of renegade researchers pursuing their own agendas, but in fact a time of greater unity and communication than perhaps any previous era of science. Barry's quote emphasizes that medicine isn't just a discipline for research but also an art that must be taught and practiced in the real world.

Chapter 35 Quotes

❝ The greatest questions remained the simplest ones: What caused influenza? What was the pathogen? Was Pfeiffer right when he identified a cause and named it *Bacillus influenzae*? And if he was not right, then what did cause it? What was the killer?

Related Characters: Richard Pfeiffer, Richard Shope, Paul Lewis

Related Themes:

Page Number: 411

Explanation and Analysis

This quote comes after the 1918 pandemic has mostly ended and the world had begun to go back to normal. Though the immediate danger had passed, some basic and fundamental questions remained. Most important among these questions: what was the pathogen that caused the 1918 pandemic? Though it might seem like a simple question, in fact it would take decades after the pandemic before anyone arrived at a solution. While Pfeiffer's bacillus did have some relation to the pandemic, ultimately it was a false lead— not the pathogen responsible for causing the disease.

In the end, the discovery of the pathogen was almost anti-climactic. A young scientist named Richard Shope discovered the pathogen by expanding on the work of Paul Lewis. While Shope deserved credit for his groundbreaking discovery, Barry tries to put everything in context, showing how Shope's breakthrough wasn't a spectacular shift but in fact simply the culmination of years of work by a previous generation of investigators. Barry shows how good science is a conversation between generations and how the successes (and failures) of one generation can often lay the groundwork for the big discoveries of the next generation.

Afterword Quotes

❝ So the final lesson of 1918, a simple one yet most difficult to execute, is that those who occupy positions of authority must retain the public's trust. The way to do that is to distort nothing, to put the best face on nothing, to try to manipulate no one.

Related Themes:

Related Symbols:

Page Number: 472

Explanation and Analysis

These quotes are the very last words of the book, coming from a new epilogue to the fifth edition that author John M. Barry wrote in January 2021. Given that this was the first new edition of *The Great Influenza* to be published since the start of the COVID-19 pandemic, it makes sense that Barry would take the opportunity to draw parallels between the events of the 1918 influenza pandemic and the present day.

In fact, Barry's recommendations for COVID-19 are not radically different from the themes he covers earlier in the book. Just as Barry criticized the press during 1918 for distorting the truth, he warns today that the best way to be an effective policy leader is to earn the public's trust and tell the truth. Though Barry's message could be construed as a criticism of the U.S. federal government and its lack of transparency on COVID, it is also more broadly a plea for honesty in politics and a reiteration of the themes that run through Barry's coverage of the 1918 influenza epidemic.

SUMMARY AND ANALYSIS

The color-coded icons under each analysis entry make it easy to track where the themes occur most prominently throughout the work. Each icon corresponds to one of the themes explained in the Themes section of this LitChart.

PROLOGUE

In 1918, Paul Lewis was a lieutenant commander in the navy in the Great War (later known as World War I), as well as a scientist. He was socially awkward but brave in battle. Despite his bravery, however, he had never seen anything like the deadly illness that was tearing through navy hospital wards. He'd been called in to solve the mystery of the illness.

The book opens by focusing on Paul Lewis—one of the scientists leading the battle against the 1918 influenza pandemic—highlighting both that the book will be about science but also that it will focus on individuals' personal stories. The image of Paul Lewis in military gear helps draw a comparison between the literal war going on in 1918 (World War I) and the metaphorical war between science and nature that occurred during the 1918 influenza pandemic.

Before this, Lewis had worked as a mentor under the man who proved that a virus caused polio, and his reputation in science only continued to grow after that. This is why he was called to look at the sailors in the hospital wards, who were coughing up blood and delirious. One of the characteristic symptoms was skin turning unusual colors, sometimes to the point that it wasn't possible to determine a sailor's race.

Lewis got his education both through formal training and through other events that shaped his view of science. Lewis benefited greatly from a mentor, and this foreshadows the role that strong institutions, like universities, will play later in the book.

Lewis was confused by the sick men he saw and afraid of the disease's potential for harm. Despite attempts to isolate the disease by quarantining sailors, it had been spreading rapidly. Lewis took blood, urine, and saliva samples from the sailors, hoping to find the pathogen causing the disease and eventually make a cure or vaccine for it. He remained unsure what the disease was, but he guessed it was influenza, albeit an influenza unlike any that came before.

The description of Lewis's attempts to investigate the disease show how Lewis understands modern scientific principles while also highlighting how much less equipment and knowledge doctors had in the early 20th century compared to today. Techniques like quarantining and taking bodily fluid samples are still used today, even though many other aspects of medicine have changed dramatically.

In fact, Lewis was correct. The influenza virus that emerged in 1918 (likely in the U.S.) and began to fade in 1920 killed more people than any other outbreak of disease thus far. While the **Black Death** in the 1300s killed a much larger share of the population, in raw numbers the early 1900s influenza pandemic was deadlier. Low estimates put the pandemic's death toll at 21 million, based on a study of the disease done at the time, but a more modern estimate suggests the death toll was at least 50 million, perhaps as many as 100 million.

Barry provides statistics to help emphasize the scale of the 1918 pandemic. These numbers only tell half the story, though, and the rest of the book will deal more with how people felt as they were living through the influenza pandemic. Both now and in 1918, the Black Death is one of the first things people think of when they think of deadly pandemics. The comparison in this passage makes it clear that although the 1918 influenza pandemic was far from the first disease outbreak to plague humanity, it was unique because of how contagious the virus was.

Beyond the sheer death count, the notable thing about the influenza pandemic was that roughly half the people who died were in their twenties and thirties (as opposed to elderly and infants, who are more likely to be killed by normal variants of the flu). At the upper end of the death toll, this would mean that 8 to 10 percent of all young adults alive at the time were killed by the virus, with most of those deaths occurring in a 24-week period after September 1918.

Diseases rarely affect young adults as severely as they affect older people and infants, so the fact that people in their twenties and thirties were dying of influenza was one of the things that made this virus unique. Though it was not nearly as deadly as the Black Death to the people who caught it, it nevertheless took a serious toll on the world population because it affected so many people who might have otherwise lived long lives.

In spite of all the death and destruction, the story of the 1918 influenza virus is also a story of science and discovery. The science behind today's medicine was in its early stages, and researchers were prepared for the pandemic, at least as much as anyone could be.

Though the first edition of this book was written well before the COVID-19 pandemic, one of the author's goals was to show how leaders can rely on science to combat future pandemics, which is why there are hopeful anecdotes about progress interspersed with the book's otherwise dark subject matter.

The story actually begins before 1918. Even today, medicine may never be "fully" a science, because of idiosyncrasies of individual patients and doctors. But in the decades leading up to World War I, there were major developments in medical science. As late as 1900, it was actually harder to get into an American college than an American medical school, with many medical schools accepting any man (not women) who could pay tuition and only 20 percent requiring a high school diploma.

Understanding the 1918 influenza pandemic is only possible if one understands the history up to that point. Both the successes and the failures of the U.S. response to the virus were often rooted in events that occurred long before World War I ever began. An example of this idea is that before the early 20th century, most American medical schools were woefully inadequate at preparing their students to become doctors.

Shortly before World War I began, however, a transformation came in American medicine. A new generation of scientists, like Paul Lewis and his peers, had been trained specifically to prepare for the next pandemic. Ultimately, the medical knowledge that came out of the influenza pandemic would point directly to medicine's future, having relevance even today.

Again, Barry balances out a story of failure (the state of early American medical schools) by providing a more hopeful example. What distinguishes Lewis is not just his own intelligence but the fact that he was among the first to benefit from training and institutions that previous medical scientists, particularly in the U.S., never had.

CHAPTER 1

On September 12, 1872, people gathered for the launch of Johns Hopkins University, an institution where the leaders had the lofty goal of changing American education. Thomas H. Huxley was an English scientist and the keynote speaker.

Barry foregrounds the role of Johns Hopkins University in changing American medical education in order to show why it is important for people to found and maintain strong educational institutions. High-quality education and training will be of critical importance during crises like the 1918 pandemic.

In many ways, the United States was in conflict. The day of Johns Hopkins's launch, the front pages of **the press** were decrying the "hostile Sioux" for "massacring" General Custer. Meanwhile, in the South, white Democrats and former Confederates were revolting against Reconstruction by intimidating, torturing, and murdering Republicans and Black people, in part to influence elections.

The conflicts mentioned in this passage help establish the historical period. Today, European settlers' treatment of Native Americans is often considered a genocide, but phrases like "hostile Sioux" suggest that newspapers (and the American public) viewed Native Americans as the aggressors. At the same time, the idea of a nation in crisis, with people split between political parties, is still relevant in the modern day.

The 1872 presidential election almost caused a crisis with the Democrat Samuel Tilden winning the popular vote but the Republican Rutherford B. Hayes taking office after Republicans threw out results in three Southern states. As part of the compromise, Republicans also withdrew federal troops from the South, removing protections for Black residents.

When Barry initially wrote this book, George W. Bush had also recently won a U.S. presidential election while losing the popular vote, and subsequent editions came out after a similar situation occurred with Donald Trump. As such, there's an implication that past events can echo into the present.

Meanwhile, a much quieter but still significant war between science and tradition was happening at Hopkins. Huxley was a big believer in human reason and a major advocate for the theory of evolution. That day at Hopkins, he lectured about how Hopkins would provide education free from political or religious "sectarianism." By modern standards, the speech was tame, but at a time when most universities had strong religious connections, it was revolutionary that Huxley didn't say the word God once in his speech.

Huxley plays only a small role in the story, but his ideals represent the same ideals that many of the scientists who worked through the 1918 pandemic shared. The fact that Huxley wanted Hopkins to be free of "sectarianism"—that is, affiliation with a particular religion or political party—suggests that creating a clear divide between personal opinions and scientific truth was becoming an increasingly important (though still radical) principle at this time.

Both today and in the early days of medical science, two of the most important scientific questions are and were "What can I know?" and "How can I know it?" Unlike religion and philosophy, science is less concerned with the question of "Why?" In science, methodology is often most important of all. Thomas Kuhn, for example, advanced a well-known theory about how the prevailing "paradigm" at any given time often creates mental obstacles to discovering (and funding) new ideas.

Barry gives a brief overview of the history of medical science, since these developments provide important context about what transpired in the modern period. The scientific method played a crucial role in investigating and combating the 1918 influenza pandemic, and so Barry shows how scientists arrived at the idea of a scientific method in the first place.

Though the scientific method is well-known today, not everyone who has investigated nature has used it. While reason has guided science for millennia, in the case of medical science, reason actually hindered progress in some ways. The failures of early medicine can't be blamed on religion or superstition but on an overreliance on pure reason.

Despite the importance of the scientific method, Barry notes that it is not the only way of investigating nature. The idea that reason can actually hinder medical science is central to the book, since it demonstrates that real medical science isn't like a simple math equation to solve but, in fact, something with so many variables that it can resemble an art.

Hippocrates, born around 460 B.C., was part of a school of ancient Greeks who were looking for answers about medicine. They observed nature but didn't disturb it—they never would've considered dissecting a human body. The Hippocratic texts (named after Hippocrates but written by a group of people) introduced the concept of four bodily fluids, aka "humors": blood, phlegm, bile, and black bile.

The four humors were a cornerstone not only of medicine but also of culture and literature, with frequent references to them in Chaucer and Shakespeare's writing. To an outsider, it might seem impossible that a scientifically inaccurate idea like this could live on for so many centuries. This is why Barry included the earlier paragraph about how a single-minded focus on reason can be detrimental to medical research, since it helps explain why the four humors theory endured for so long.

The four humors theory of medicine seemed to make sense from a logical perspective. For example, coughs are caused by phlegm flowing to the chest. It also matched up nicely with the way the Greeks saw nature (four seasons, four elements, etc.).

Though the four humors theory has been disproven, Barry tries to portray it in a way that shows how logical it must have seemed to people living in the past.

It took about 600 years for medicine's next big advance. A man named Galen helped to make the four humors theory more systematic, augmenting his research with animal dissections and inspections of wounded gladiators. Galen's work went on to influence both Western and Islamic medicine for nearly 1,500 years.

Though Hippocrates is by far the best-known of the first medical investigators, Barry shows that he wasn't alone and that, in fact, it took successors like Galen to help standardize and popularize ancient theories like the four humors. A very similar process will play out with the 1918 pandemic and its aftermath.

One of Galen's central ideas was that illness was the result of imbalance in the body. The way to cure this imbalance, according to him, was to flush it out, whether by sweating, urinating, vomiting, or even bleeding.

Galen's ideas reflect the wisdom of someone who's thinking logically but who hasn't applied the rigor of the scientific method to his logic. This lack of rigor leads to "solutions" that in many cases actually make the problem worse.

Another major part of Galen's theory was the idea that natural processes should not be interfered with. Pus, for example, was considered a natural part of healing and even referred to as "laudable pus." Surgery was also considered an intrusive interference in nature's process.

Again, Galen's theories make a certain logical sense, but the results he arrived at were the exact opposite of what was actually happening (since pus is, in fact, a sign of infection rather than healing). This reinforces the idea that pure logic has its limits.

Other medical theories did exist outside of the Hippocratic-Galenic tradition. Paracelsus, Vesalius, and Fracastorius were three men from the early 1500s who played a role in challenging old ideas about the theory of medicine, although they had little immediate impact on the actual practice of medicine. Their work, however, laid the groundwork for others around the world to challenge medical tradition.

While it's often only the biggest names that survive through history (like Hippocrates), in fact these big names were often working with colleagues and successors who made their own important contributions. This focus on metaphorical schools of medicine in the past connects to the importance of literal schools of medicine in more recent history.

Ultimately, these challenges to the Hippocratic-Galenic tradition culminated in the new concept of "heroic medicine," of which the late 18th-century American scientist Benjamin Rush was a major advocate. Heroic medicine involved doctors taking a more proactive approach to treatment.

What distinguished "heroic medicine" from what came before it was that doctors were more willing to get their hands dirty and be active. While in many cases, they ended up making things worse for patients, Barry implies that this curiosity and initiative was a necessary step in medicine's development and something that was missing from earlier medical education.

Why did reason work for solving Newtonian physics but not for medicine? Partially, it's because the Hippocratic-Galenic tradition really did seem to work. In some rare cases, bleeding (today called "phlebotomy") actually is an effective treatment. Even in cases when bleeding didn't work, it might have looked like it worked, particularly because blood loss sometimes causes a euphoric feeling. The intricacies of the doctor-patient relationship also caused complications, since most doctors usually felt it was better to do something than nothing, even if there was little evidence for a treatment's effectiveness.

This passage details how complicated it is to assess progress in medicine, which helps illustrate why doctors in the past struggled to make advances and often relied on treatments that have since been proven ineffective. Unlike many other people working in the sciences, doctors often interact directly with regular people as patients, and the emotions and personal investment involved complicate both treatment and research.

Another explanation for reason's failure in medicine is that biology is much more chaotic than mathematics. It took the application of the modern scientific method to get rid of the old Hippocratic paradigm.

This passage circles back to the idea of paradigms to show how new techniques and methods in science are often a result or reflection of the times in which they arose.

In the year 1800, medicine still largely followed the Hippocratic-Galenic tradition and was considered one of the least prestigious sciences. Over the course of that century, however, classical medicine began to give way to the more effective modern medicine. Scientists like the Parisian Pierre Louis conducted autopsies and learned that diseases invade the body as a separate entity and aren't just a corruption of something inside. Louis also helped introduce the "numerical system," which involves using stethoscopes, checking body temperature, checking blood pressure, and making other measurements.

Stethoscopes and blood pressure tests are common in doctor's office visits today; as such, their introduction in the early 19th century foreshadows how medical science was maturing into its modern form. The autopsies that Louis performed show that he was moving past the realm of theory and pure reason and into a more active role. His focus on the physical helped apply the scientific method to medicine and focus on what makes medicine unique as a discipline.

Medicine also began borrowing from other sciences, including physics and chemistry. Though little of this new knowledge was applied directly to treating diseases at first, it built a foundation for later advances. At times, however, pseudoscience also flourished, and anti-elitism (fostered by people like President Andrew Jackson) led some to question physicians' wisdom. Loose requirements for claiming the title "doctor" helped reinforce the skepticism (since it meant that many "doctors" were unqualified).

While Barry emphasizes the unique aspects of medical science, he also shows how it developed in conjunction with other sciences and how these different disciplines connect to one another. His mention of pseudoscience and anti-elitism has modern-day resonance—at the time of the book's first publication, there were whole industries devoted to unscientific home remedies. Moreover, in the epilogue, Barry touches on how these unscientific ideas apply to the COVID-19 pandemic.

Around the time of the Civil War, American medicine moved forward a little and gained some esteem. The discovery and use of anesthesia was a genuine advancement, and the Civil War helped American surgeons learn more about anatomy. Still, infectious diseases remained a problem, and the treatments of heroic medicine weren't very effective against them.

Though the book examines medical history through a critical lens, this passage acknowledges that methods now seen as antiquated did sometimes lead to surprising successes. At the same time, however, these successes were not enough to offset the fundamental problems with the practice of heroic medicine.

In the aftermath of the Civil War, physicians had discovered that some drugs (like quinine, digitalis, and opium) provided benefits, but they prescribed them indiscriminately, including for many diseases where they weren't effective.

This passage shows what happens when doctors experiment without following the rigor of the scientific method. Though they often reach surprising discoveries, it is difficult to reproduce the results and determine what really led to them.

By the 1870s, European medical schools were state-funded and gave rigorous scientific training. By contrast, most American schools were owned by faculty who made money through tuition—meaning that often, the only requirement for entry was being able to pay student fees.

The fact that European schools were state-funded means that they received strong support from the government. By contrast, Barry suggests that one of the reasons why 19th-century American medical schools were so unsophisticated was that they had little government leadership or support, and they often prioritized short-term profits over fostering high-quality, lasting institutions. Moreover, the fact that there were few barriers to entry means that American doctors were likely less skilled and qualified than European doctors at this time.

The best medical research in the U.S. in the late 1800s was generally done by people working outside institutions. Many looked to Europe since they couldn't get institutional support in the U.S.

This passage suggests that even without strong support, some doctors found a way to thrive. In this case, the poor state of medical education in the U.S. forced promising students who could afford it to travel abroad to Europe.

In 1873, however, Johns Hopkins (the man) died and left behind a trust to found a university and hospital. The Quaker trustees of Hopkins's estate moved fast. They wanted to revolutionize American medical education by looking at European models. Johns Hopkins University opened in 1876, with its medical school opening in 1893, just in time to prepare American medical science for the influenza outbreak of World War I.

Though Hopkins wasn't alive for the opening of the university that bears his name, his role in medical history was essential. The founding of Johns Hopkins University was rooted in the idea that providing enough resources to talented people can help them build schools and institutions that have a major impact on training new generations of scientists.

CHAPTER 2

At his 80th birthday celebration in 1930, William Henry Welch was perhaps the most influential scientist in the world, though nothing in his youth ever suggested he would be remarkable. By traditional metrics of academic success, like papers published, he wasn't exceptional by any means. Still, he led a movement that created one of the greatest scientific medical enterprises of all time, and for that, his peers all recognized him.

Welch's situation prompts questions about what success actually means in the sciences. The fact that Welch wasn't particularly successful by many metrics of academic or professional achievement suggests not that Welch was incompetent, but that traditional methods of measuring scientific achievement might be too limited to really quantify a person's impact on science.

Born in Connecticut in 1850, Welch was exposed to medicine early through his father, uncles, great-uncle, and grandfather, who were all physicians. Welch himself initially had no desire to follow in their footsteps. At age 15, he committed himself to God, and soon after he attended Yale, where he graduated third in his class and was part of the Skull and Bones secret society. Despite his devotion to science, Welch rejected the personal God favored by some Transcendentalists and Unitarians, instead focusing on the truth revealed in scripture.

The Transcendentalists and the Unitarians were both part of religious and philosophical movements that proposed that everything in the universe is connected. This idea appealed to many scientists in the 1800s, and Welch's rejection of this somewhat new idea suggests that he was more traditional than some of his contemporaries, particularly on the issue of religion.

Eventually, Welch went to medical school at the College of Physicians and Surgeons in New York City (which will later become part of Columbia University). One of the unique elements about the school at the time was that it allowed students to examine cadavers.

The book again mentions cadavers because they represent the more rigorous, hands-on approach of modern medicine, as opposed to the more abstract, reason-based medicine of Hippocrates and his followers.

Welch graduated medical school and began building a reputation for himself, though big gaps in his knowledge remained. Like many American physicians seeking to learn more, Welch studied abroad in Europe, specifically Germany, where a lot of the best medical science of the era was being done.

Though Welch was intelligent from the start, even he struggled with the American medical education system's limitations. His experience of going to Germany reflects is one that many of his colleagues had as well.

While many physicians who came to Germany wanted to learn how to better treat patients, Welch was particularly interested in learning lab science. His beliefs shifted, and he became a major proponent of Darwinism, believing it aligned with his faith.

In many cases, Darwinism is a symbol for the beginning of modern science, and Welch's embrace of it shows that he was increasingly engaging with what would become modern science.

In 1877, Daniel Gilman at Johns Hopkins began making plans to assemble the greatest medical school faculty in the United States, capable of rivaling even European schools. He entrusted the search to a man named Dr. John Shaw Billings. A key pillar of their plan was a library, including a collection of specimens. Billings built a comprehensive library that eventually grew into today's National Library of Medicine.

Billings's search for a competent staff suggests that groups and institutions are important, but also that institutions tend to be made up of individuals who have their own important skills and unique life stories that they bring with them.

Billings, while traveling abroad to find candidates for Hopkins faculty, first met Welch in a German beer hall. He knew Welch only by reputation, but after speaking with him, he decided Welch should be one of the first people they hired.

The meeting between Billings and Welch emphasizes the social nature of how science was conducted. In this sense, reputation and connections played a role in research.

Hopkins was slow to start, however, beginning as just a graduate school with no undergraduates or medical school. Meanwhile, in 1878, Welch came back to New York with the intent of teaching a course of laboratory science, but he had a hard time finding a willing institution and began to despair. Eventually he started teaching at Bellevue, a not very prestigious medical school with almost nothing in the way of laboratory equipment.

This passage highlights how change often happens slowly, particularly when it's a change as large as the medical revolution that would eventually happen at Johns Hopkins University. Even Welch, who had a global reputation at this point, struggled at first to get the financial and institutional backing he needed to prosper.

CHAPTER 3

At Bellevue, Welch's course became very popular, attracting medical students from schools across New York City. His success inspired similar classes at other medical schools, but Welch still struggled to make a living.

The fact that Welch's class succeeded even when he didn't have many resources to work with emphasizes that sometimes, the most important resource in the classroom is simply a good teacher.

Germ theory was ultimately what offered a path forward against infectious diseases. It overcame rival theories like "miasma theory" and "filth theory," both of which more or less suggested that disease came from some sort of impurity in the environment. One of the biggest victories for germ theory over competing theories was in 1860, when Louis Pasteur proved that living organisms caused fermentation.

Like the four humors theory, miasma theory and filth theory make a certain amount of logical sense, but they don't accurately describe how disease affects the human body. The hallmark of correct theories, like germ theory, is that they have practical applications with proven results, as is the case here with Louis Pasteur's work.

One of germ theory's most persuasive advocates was Robert Koch, who proposed "Koch's postulates." These postulates were used to determine if a microorganism causes a given disease. In 1882, Koch discovered the microorganism behind tuberculosis, one of the deadliest diseases at the time.

Koch's work with tuberculosis in many ways sets the groundwork for later investigations into influenza, since both are respiratory diseases. Though Koch found the microorganism behind tuberculosis, finding the pathogen behind the 1918 influenza pandemic will prove to be much harder.

Cholera epidemics swept through the U.S. and Europe in the 18th century. In 1883, news broke about a new epidemic in Egypt that threatened Europe, so Koch went down to investigate. He was able to isolate the cholera bacillus and turn his theories into hard facts. Some experts still resisted germ theory, but it was on its way to widespread acceptance.

As with Pasteur, Koch proved the value of his theory by showing that it had actual, predictable applications for the real world. The concept of breaking things down to a single variable to test—in this case, isolating the cholera bacillus—is an essential part of the scientific method.

In 1884, despite offers from Bellevue to stay on the faculty, Welch finally got his offer to come to Hopkins and accepted it. He was 34 and tasked with changing American medicine forever. Hopkins continued to assemble a faculty of people like Welch, including Franklin Mall.

For a doctor and for someone in academia, 34 was (and still is) a relatively young age to take on a major leadership role. The fact that Welch had already built such a name for himself emphasizes how extraordinary his career was.

Mall was another American doctor educated in Germany. At the University of Chicago, he had $4 million (a huge amount of money at the time) and was trying to build his own institution like Welch was. Mall tried to get Welch to come to Chicago, but when Welch declined, Mall was ultimately so interested in working with Welch that he came to Hopkins.

The fact that Mall came to Hopkins because of Welch again emphasizes the role that personal relationships and connections played in science. Barry details these scientists' lives not only to fill out their stories, but because in many cases, these biographical details have a direct impact on their scientific achievements.

Welch's early days in the lab at Hopkins were unexceptional, and he failed to make any major discoveries. One of Welch's real talents was his judgement: his ability to see the most important points when reading a paper or meeting a new person. His other main talent was his ability to inspire those around him. He had a positive attitude and a teacher's spirit, which encouraged those around him to achieve great things. He remained distant and sometimes mysterious to his students, although for the most part they liked him.

This passage again examines what success means in science and how Welch's experiences didn't necessarily conform to how success is typically defined. Welch's biggest successes were largely interpersonal and organizational, and while this impact is harder to quantify than a publication history, it's implied that it's no less important in determining scientific achievement.


CHAPTER 4

The Johns Hopkins School of Medicine finally opened in 1893, seeking to revolutionize American medicine. One notable feature was that the institution itself paid faculty salaries, not student fees. It made its impact quickly, and of the first four Americans to receive a Nobel Prize in Physiology or Medicine, three went to Hopkins and one had studied in Europe.

The flow of money is an important part of the story of science's development. Here, Johns Hopkins distinguishes itself by creating a payment structure that incentivizes the institution to invest in the best students rather than only recruiting the richest ones.

Welch was behind many of Hopkins' early achievements. He became a national figure, serving on prestigious scientific board positions. In particular, he did two noteworthy things: first, he helped reform medical education, not just at Hopkins but at schools that followed Hopkins' example. Second, he directed tens of millions of dollars into lab research.

This passage reiterates the two things that most scientists need: money and institutional support. Welch was an expert in providing these resources for his colleagues and protégés, and this was what won him such widespread admiration.


Unlike Europe, in the U.S. medical research didn't have government monetary support or wealthy patrons. The greater monetary support in Europe had led to a golden age of medical discoveries, including vaccines against major diseases like anthrax and typhoid. In addition to vaccines, European scientists also looked for ways to help people who were already sick. This led to the discovery of cure for the deadly childhood disease diphtheria, arguably the first major cure ever discovered. When the diphtheria antitoxin was distributed, fatality rates fell almost two thirds.

The book highlights the importance of men like Welch by showing how they were filling a leadership vacuum created by the U.S. government's reluctance to support medical education as proactively as European governments did. While the book presents Welch's work in a positive light, the book advocates for governments to get more involved as well, showing here how European government involvement had a beneficial impact on diphtheria.

Frederick Gates was a Baptist minister and an assistant to John D. Rockefeller who theoretically only managed his philanthropic endeavors but who also sometimes helped Rockefeller make a profit. Gates found a medical textbook written by William Osler. Reading the book convinced Gates that there was a lot of unrealized potential in the medical field.

Gates and Rockefeller are not scientists by any means—in Barry's portrayal, they almost seem to found the Rockefeller Institute on a whim, since they apparently get the idea for a multimillion-dollar institution from reading a single textbook. Ultimately, however, this whim is enough, since they wisely leave running the institute to more capable scientists.

Rockefeller launched the Rockefeller Institute for Medical research. Welch turned down an offer to head, suggesting that Simon Flexner run it instead. Still, Welch remained very involved with the institute's launch.

Here, Welch demonstrates both the wisdom of knowing his own limits and generosity towards his colleagues—important traits that helped make him such a successful leader.

Flexner was a former juvenile delinquent who eventually got his medical degree. Insecure about his background, Flexner read a lot to make up for gaps in his knowledge.

Most of the people profiled in this book came from privileged backgrounds, so Flexner's history as a juvenile delinquent makes him stand out. It suggests that in rare cases, strong institutions help foster social mobility.

One of Flexner's early successes was an experiment where he helped cut down the death rate for patients with bacterial meningitis. This brought a lot of publicity, both to him and to the Rockefeller Institute where he worked. Flexner was a capable leader with a talent for tackling big problems, and some of the undergraduates that worked with him would go on to win Nobel Prizes.

As medical science matured, success was increasingly measured by objective standards, like how much a given treatment cut down the death rate for a disease. Flexner's meningitis experiments prove that despite his rough background (or perhaps in some ways because of it), he possessed the clear thinking needed to solve difficult medical problems.

Even before the Rockefeller Institute's success, America's medical science was finally beginning to get a better reputation abroad. Though there were still disagreements among prominent scientists, the groundwork was in place for U.S. medicine to become a global leader.

Barry takes stock of where American medical education was by the late 19th century. Though Johns Hopkins and the Rockefeller Institute are a focal point of the book, Barry acknowledges that the revolution in U.S. medicine was taking place on a larger scale and can't be fully attributed to any one person or institution.

CHAPTER 5

The founders of the Rockefeller Institute had a goal: no patient there would pay for treatment, but they would only accept patients suffering from the specific diseases being studied. Rufus Cole, the hospital's headstrong first director, had his own plan. He wanted to make sure that the people caring for patients were also the ones doing research on them. This meant physicians treating patients had to do rigorous disease research that was different from the pure laboratory research going on elsewhere in the institute. This set the model still followed today for clinical research.

Unlike Hippocrates and other medical scientists who relied primarily on pure reason, Rufus Cole created a program where doctors were directly involved in both research and patient treatment. This elimination of boundaries suggests that modern doctors like Cole were beginning to better understand how medicine really worked and how earlier distinctions between research and treatment were often arbitrary.

The hospital of the Rockefeller Institute opened in 1910. Though medical science had improved in the U.S., there was still a large gap between the best (which could compete with Europe) and the average (which was still subpar). Reforming medical education was slow, even at elite schools, and reaching practicing doctors was even harder. The American Medical Association (AMA) put out a report condemning the practices of the worst schools, where many students graduated without ever seeing a cadaver. This report inspired reform, and many schools changed entrance requirements to mandate some college education.

Again, the fact that students graduated without seeing a cadaver shows how old systems of medical education focused too much on theory and not enough on practical skills. In addition to the Rockefeller Institute, the American Medical Association was another strong institution that represented how standardization and cooperation helped medicine to grow and reform at the beginning of its modern period.

In 1910, Flexner put out his own "Flexner Report," which was even harsher, suggesting that over 120 of the 150 or so medical schools should be closed. In some ways, his report reflected the values of the Progressive Era, a period of time marked by increasing rationalization in the U.S., not just in the sciences, but also in businesses, which were trying to apply "scientific" values to management. Flexner's report caused a sensation, allowing the AMA to begin rating schools; schools with bad "Class C" ratings quickly lost licensing recognition and had to close.

Barry mentions the Progressive Era to show how, while Simon Flexner's report was a noteworthy event in the medical community, it was also part of larger historical trends in the United States. The Flexner Report showed how one individual can make a difference, while simultaneously highlighting the need for broader, structural reform.

By the 1920s, over 100 medical schools had closed or merged, and the number of medical students went down too, even as the population rose. For the schools that did survive, Hopkins was the model. Ironically, even though the Rockefeller Foundation remained the single largest donor to medical research, John D. Rockefeller continued to see a homeopathic physician.

The fact that John D. Rockefeller continued to see a homeopathic doctor (whose practices aren't based on rigorous scientific standards) suggests that he was more interested in the personal benefits of institutional patronage than in the benefits of science. Nevertheless, his institute produced world-class research, showing how sometimes the motivations behind medical research could be surprisingly complicated.

Just before the U.S.'s entry into World War I, Welch had a goal. He wanted a separate school to study public health in a scientific way. Though he faced some resistance, particularly since Baltimore wasn't known for much in medicine outside of Hopkins, in 1918, the Johns Hopkins School of Hygiene and Public Health opened. Welch resigned as a professor at the med school to become the public health school's dean. One of the school's most important functions was studying epidemics, and it would soon face a major test.

The creation of public health as a discipline showed once again that doctors and investigators were beginning to look at medicine not as some discipline to be studied in a vacuum, but as a vital part of human society with connections to other disciplines, like politics and sociology. Perhaps more than anything else in medicine, epidemics highlight how all these different disciplines are connected, so Welch's decision to focus on public health was very forward-thinking.

CHAPTER 6

In 1918 in Haskell County, Kansas, everything was flat, and farmers lived close with their livestock. It was a place of extremes: hot summers, cold winters, and driving rains. It was here, according to epidemiological evidence, that a new influenza virus originated.

The extreme weather of Haskell County, Kansas, foreshadows how the county would become the birthplace of perhaps the most extreme version of influenza that the world had seen until that point.

Dr. Loring Miner, who provided the evidence that the virus originated in Haskell, was a strange man. He was big and gruff, but in spite of his rough manners, he was a capable country doctor, with a practice that spanned hundreds of miles. One day, he started seeing several patients with influenza-like symptoms that were unusually intense—even deadly.

Though Loring Miner didn't have the same credentials as some of the Hopkins-affiliated doctors, he had a similar competence, which was based on his willingness to get hands-on with treatment. Barry criticizes how medical schools used to only attract the wealthiest students, and one of the consequences of this is that "country doctors" like Loring Miner were underrepresented at elite schools, despite their undeniable skill.

Miner devoted all his energy to studying and combating the strange new disease. Though at first the disease overwhelmed him with new patients, it mysteriously disappeared a couple months later. Miner was still concerned, since there was no good way to track influenza (since public health agencies didn't consider it notable enough to be "reportable"), but he was mostly alone, particularly since the war was dominating the news.

Despite Miner's devotion and skill, he was unable to do much about the influenza pandemic because he didn't have support from public health agencies or the press. His situation directly highlights a case where stronger institutional support, at an earlier stage, could have reduced the severity of a future crisis.

Camp Funston was a military camp near the Kansas river. It was thrown together out of necessity in 1917, to train new young soldiers for World War I. Some of the young men at the camp were originally from Haskell County. On March 4, a private at the camp was reported ill with influenza. Within three weeks, 1,100 soldiers would be sick, with roughly 20 percent hospitalized and 38 dead (a low number compared to the virus in other places).

Military camps were one of the major sources of devastation during the 1918 influenza pandemic, and in some ways, the same flaws that caused young soldiers to die in battle were also what caused them to die of disease. In particular, bureaucracy and the arrogance of leaders who ignored expert advisors were major factors that contributed to the spread of disease in army camps; similar factors could also be said to have contributed to soldier deaths in battle.

CHAPTER 7

It isn't possible to prove beyond doubt that the 1918 influenza pandemic originated in Haskell County, Kansas—it might have originated as far away as France or China. But Camp Funston seems to have been the first major U.S. outbreak, and it would therefore make sense that the epidemic in Haskell was related.

Good science often involves acknowledging that absolute certainty is impossible. Barry indicates that he is telling a story that the best available evidence seems to support, but like the scientists he is profiling, he acknowledges that sometimes there simply isn't enough evidence to make definitive statements.

Unlike bacteria, viruses are not alive, and many have wondered why they even exist. The most widely accepted theory is that viruses began as complex living cells and devolved into something simpler. A virus's only function is to replicate itself, but it can only do so by invading cells from organisms.

Like the weather or tectonic plates, viruses are not quite alive, yet they act with a complexity that makes them similar to living things. This is an important point, since Barry often frames the story of the 1918 pandemic as one of science (and humanity) vs. nature.

Most organisms have genes stretched out in DNA (deoxyribonucleic acid), but viruses encode their genes in RNA (ribonucleic acid), which is simpler. Genes are basically just "software" that tell a cell what to do. When a virus invades a cell, it forces its own genes into it, so that the cell begins making new viruses. Despite their simplicity of purpose, viruses also have an elegant complexity to them. Their specific form allows them to bind to specific parts of the DNA.

Because a virus was at the center of the 1918 influenza pandemic, it is important to have a basic understanding of how viruses work. The contrast between the seeming simplicity of viruses compared to their elegant complexity shows how many things in nature are made up of simple building blocks, yet have complex functions.

There are three types of influenza viruses: A, B, and C. C rarely affects humans, B can cause disease but not epidemics, and A is the type behind epidemics and pandemics. Most influenzas originate in animals like birds, and even if they infect a person, they can't spread person to person. However, in rare cases, sometimes a new influenza variant does adapt to humans, and this can cause a pandemic.

Part of the reason why Barry includes this context about the influenza virus is that it is still relevant to public health today. Even before COVID-19, there was widespread concern among epidemiologists about what would happen when an animal-borne virus adapted to humans, and Barry wanted public health officials to take this threat seriously.

Pandemics typically happen in waves, and when all the waves are combined, the morbidity (the number of people who get sick) is often over 50 percent. While influenza is sometimes lumped together with coronaviruses, parainfluenza viruses, and some other seasonal viruses as "the flu," influenza is a specific disease and not just a bad cold. It directly attacks the respiratory system, with the other symptoms like muscle aches and headaches being an indirect consequence. When influenza penetrates deep into the lungs, it can have serious complications.

In common speech, there is often little need to distinguish between "the flu" or simply a bad cold, since the results are functionally the same. For a scientist, however, small differences like this are of vital importance to research. While Barry doesn't use language as technical as what a scientist might use, he introduces finer distinctions in language in order to show how and why scientists use such detailed systems of classification.

Even mild strains of influenza often kill, simply because of how widespread the outbreaks are. Even without an epidemic, influenza kills 3,000 to 56,000 Americans a year. Throughout history there have typically been several influenza pandemics per century.

Though the influenza pandemic of 1918 was exceptional, in many ways it was just a more extreme version of something that was always happening. In consequence, the lessons from the influenza pandemic don't just apply to crisis situations but even to everyday life.

Because influenza is an RNA virus like HIV and coronavirus, it can mutate very quickly. When it infects a cell and causes new viruses to burst out, 99 percent of those new viruses are so mutated that they are too defective to infect another cell. Still, because one cell can produce 100,000 to 1,000,000 new viruses, there are plenty of new viruses that can infect new cells. This is how a drug-resisting mutation can emerge in a few days.

The numbers provided here demonstrate both how rare it is that viruses successfully mutate, but also how viruses are so plentiful that successful mutations are virtually guaranteed to happen at some point. Understanding these issues of scale and probability are crucial to understanding a pandemic.

CHAPTER 8

The body's immune system is a complex system that needs to be able to determine "self" from "nonself" in order to keep out harmful invaders. When an immune system attacks foreign invaders with white blood (which defend the body by killing unknown antigens), it's called an "immune response."

Though pandemics are often viewed from a zoomed-out public health perspective, it is also important to understand what's happening at the zoomed-in, microscopic level of an individual's body. While Barry minimizes the use of scientific jargon, some terms like "antigen" and "pathogen" are so central to the story and to scientific history that they must be defined.

Before antibiotics, it used to be a race to the death between pathogens and the immune system. Once someone survives an infection, however, their immune system is better prepared against future infections, since specialized white blood cells ("memory T cells") remember the shape of antigen attackers, allowing them to respond quicker. Similarly, vaccines also alert the body in advance about specific antigens.

Even when Barry first wrote the book, misinformation about vaccines was common, and the issue has arguably become even more widespread since the start of the COVID-19 pandemic. Because Barry writes elsewhere about how he believes in free press and the value of the truth, he likely believes that providing a clear explanation of how vaccines work (and how vaccines relate to typical immune system functions) is the best way to communicate with his audience.

Influenza, however, can sometimes evade the immune system. Unlike measles, which has a virus that mutates so slowly that most people can only get it once, influenza mutates so fast that sometimes it can evade the immune system because the body doesn't recognize the new variant. This process of mutation is called "antigen drift," and the greater the antigen drift, the less effective the immune system will be in responding. Antigen drift is what can create epidemics but does not cause great pandemics.

The previous description of the immune system raises a question: if the body "remembers" diseases, why do people seem to keep getting the same colds? While "reason" might suggest that people would stop getting colds after a certain age, in fact, a more scientific approach shows that there is actually a good reason why some viruses are able to evade the immune system's memory.

When a more radical change occurs in the gene coding of a virus, this is called "antigen shift" (not "drift"). For example, when a virus that normally affects birds suddenly infects humans, this is an antigen shift. This shift led to major pandemics even before modern transportation connected people around the world instantly, with some historians concluding that the pandemics of the 15th and 16th centuries may have been influenza. Other mass epidemics, like the one in 1688, were undoubtedly influenza.

While the 1918 influenza pandemic was in many ways an unprecedented event, it also followed a pattern from history. Barry brings this up not only to provide context for 1918, but perhaps also as a way of suggesting that today's public health officials shouldn't get complacent, since there is ample historical evidence about how diseases can mutate and spread rapidly.

More recently, influenzas like so-called "avian flu" and "swine flu" are antigen shifts that have threatened global pandemics but so far remained contained. Not all pandemics are lethal. Of the three major influenza outbreaks in the 20th century (in 1918, 1957, and 1968), the 1918 and 1957 outbreaks were deadly, but the 1968 one had a fairly low mortality.

While The Great Influenza *is a historical book, the mentions of recent "swine flu" and "avian flu" make it clear that the issues covered in the book aren't limited to the past, and that the lessons of the 1918 pandemic will be particularly important to public health officials who hope to combat inevitable mass outbreaks in the future.*

CHAPTER 9

By spring of 1918, five million soldiers had already died in World War I. Europe was weary of war, but some French- and English-sympathizing Americans still saw the war as glorious and pressured President Woodrow Wilson to enter it. Wilson resisted, even after Germany began unrestricted submarine warfare (including against U.S. vessels, in order to starve out Britain and France).

Though some might regard U.S. involvement in World War I as inevitable, Barry and other historians have shown that in fact there was a lot of disagreement about whether the U.S. should get involved and to what extent. Wilson's initial resistance was noteworthy, since he later became one of the war's biggest proponents.

Finally however, the interception of the Zimmerman note caused Wilson to go to war. The Zimmerman note was a message from Germany asking Mexico if it would be an ally in the event of a war between Germany and the U.S. In exchange, Mexico would get to reconquer parts of New Mexico, Texas, and Arizona. Despite initial reluctance, now Wilson embraced the war with Crusader-like zeal.

Wilson's politically-motivated zealotry represents the opposite of open-minded scientific inquiry. While religion itself is not necessarily anti-scientific, Thomas Huxley's speech at the founding of Johns Hopkins made it clear how too much emphasis on ideology or partisanship could stifle important education, and that theme returns here in a different context.

Wilson imposed harsh measures to enforce loyalty in the United States (in part because German-Americans were the largest ethnic group). Laws like the Espionage Act and Sedition Act went as far as legalizing censorship of **the press**. Teaching German was outlawed, and sauerkraut was renamed "Liberty cabbage." Wilson threatened dissenters with imprisonment, and the government took over manufacturing to devote everything to war.

For Barry's first audience in 2004, mention of "Liberty cabbage" almost certainly evoked comparisons to "freedom fries" (a movement in the U.S. to rename "French fries" because of France's opposition to the U.S. invasion of Iraq). Barry shows how such nationalistic movements were not new and how current events are often just an echo of things that happened in the past.

George Creel was named head of the Committee on Public Information (CPI), where he began demanding "100% Americanism" from **the press** and encouraging them to print increasingly unsubtle propaganda. Elsewhere, Wilson banned songs that weren't sufficiently patriotic.

Again, the "100% Americanism" of the press under George Creel likely caused many in Barry's first audience to draw comparisons to the nationalism common in the U.S. press after 9/11 and during the invasion of Iraq. Around the time Barry wrote in 2004, U.S. radio stations were also playing more patriotic songs. Barry demonstrates how many things actually had not changed in U.S. life since 1918.

One of the side effects of Wilson's repressive measures was that they eventually intensified the effects of the influenza pandemic. Another outcome of his policies, however, was the rise of the American Red Cross, which was created in the late 19th century to help the nation in times of crisis. By 1918, 30 million Americans (out of a population of 105 million) were active Red Cross supporters.

Though Barry criticizes many of Wilson's actions, particularly when it comes to restricting the free press, he also acknowledges successes during the 1918 pandemic, particularly the work of the Red Cross. Though Barry argues that leadership plays a crucial role during public health emergencies, he also acknowledges that sometimes it's difficult to give credit or assign blame to individuals, especially for mass movements like the Red Cross that sometimes gain strength from questionable policies.

The war consumed all aspects of American life. The draft was expanded to include all men between 21 and 45. While the American army began in Europe with a small force, it scaled up quickly, sending millions of young men abroad to barracks where they stayed in tight quarters.

Today, 45 is well over the draft age in the U.S., so the fact that men up to age 45 could be drafted helps modern readers understand just how widely Wilson and others sought to involve large swathes of Americans in the war effort.

CHAPTER 10

Back when the U.S. was still neutral in the war, William Welch and others watched from abroad, observing the way technology had transformed the conflict into the first truly scientific war. This new recognition of science's importance allowed Welch, with the approval of President Wilson, to create a medical section of a National Research Council dedicated to war-related scientific research.

Though in some ways the war was a distraction from the pandemic, particularly when it came to news coverage, in some ways it also helped divert more resources toward scientific efforts. This again reinforces the idea that medicine isn't an isolated discipline but is in fact deeply interconnected with other disciplines when it comes to public health.

Even before World War I, it was well-known that epidemic disease killed more people than combat. Recent wars, like the Spanish-American War and the Boer Wars (around the turn of the 20th century), had proven this. For the upcoming war, Surgeon General of the Army William Crawford Gorgas would be the one responsible for making decisions about military medicine. As a Spanish-American War veteran, he wanted to make sure not to repeat that war's deadly medical mistakes.

Though Gorgas did not succeed in preventing the pandemic, he was able to do some good to slow the spread. Perhaps his most important skill was his ability to learn from the past. Previous wars provided ample evidence of what diseases could do, and in theory generals and other leaders should have been well prepared; in practice, however, these important concerns were usually delegated to specialists like Gorgas, whose advice was often ignored.

Venereal disease in particular was a problem, and local governments across the U.S. used this a pretext to shut down red-light districts.

Though strong leadership is often needed during wars and pandemics, both of these crises often provide governments with convenient excuses to do other things in the name of national security.

Leading up to the war, the U.S. military didn't have nearly enough medical personnel, and it particularly lacked nurses. Gorgas tried to create a corps of "practical nurses" who were not fully educated and trained like "graduate nurses." The head of the Army Nurse Corps resisted the idea, insisting that it threatened professional nurses. Eventually, she reversed her position, but her colleagues still rejected the idea of practical nurses.

Unlike some of the other issues presented in The Great Influenza, *where scientific ideas are often pitted against unscientific ones, the issue of nurses didn't have clearly defined sides. On the one hand, nurses filled an important role and needed specialized training in order to be effective; on the other hand, however, the scope of the pandemic made nurses crucial, and there weren't enough of them to go around.*

CHAPTER 11

As 1917 went on, President Wilson began urging the nation toward total war, and this included the medical profession. One prominent medical journal suggested killing wounded enemies discovered in trenches, although Gorgas disagreed.

Gorgas's refusal to go along with the total war rhetoric of some other doctors suggests that truly dedicated physicians don't simply align themselves with individual countries but instead are interested in the greater good of humanity.

By late 1917, the U.S. army had millions of soldiers, and young men from around the country were packed together in close quarters. Gorgas feared what a mass epidemic could do. By this point, medical science had managed to defeat or severely diminish diseases like typhoid and tetanus, so it seemed like it had the potential to go even further. Gorgas created a special unit in the camp for preventing infectious disease. Gorgas's colleagues warned about a potential pneumonia outbreak, but his superiors ignored the warning.

Though pandemics often seem to be events that come out of nowhere, here Barry shows that in fact, there were plenty of physicians like Gorgas who were preparing for the possibility of a pandemic. While it is perhaps easier to identify such figures in hindsight, Barry argued previously that there was ample past precedent for epidemics during wars, meaning Gorgas isn't particularly radical, just practical.

The winter of 1917–1918 was the coldest ever recorded east of the Rocky Mountains. Because of the cramped conditions and cold winter, a measles outbreak spread through the army camps, often traveling from camp to camp as infected soldiers moved.

The fact that the measles outbreak occurred at the same time as the coldest winter ever recorded in the region seems to suggest that forces of nature work in tandem and that the measles is a force as powerful as any weather.

Scientists didn't have a vaccine or a cure for measles yet. When the disease became deadly, it was usually because of secondary infections, like pneumonia. Young soldiers died at 12 times the rate of civilians. Wilson's Republican rivals used the measles fiasco to attack him, and so Gorgas was forced to give testimony.

As this passage shows, epidemics aren't just a medical issue but also a political one. They can spur positive political outcomes (reform, funding for research) but also negative ones (partisanship, repression). Gorgas's position suggests that public health officials must not only be experts in medicine, but must be able to navigate politics as well.

Gorgas hoped his testimony would make the army devote more resources to protecting troops. In some ways it did, though some of his peers shunned him for speaking out. Meanwhile, at one of the hardest hit camps, Welch learned that the mortality rate for soldiers who got pneumonia after measles was 30 percent.

The reaction to Gorgas illustrates a common problem that many reformers face: saying nothing allows the status quo to continue, but speaking up about problems often draws a backlash. The juxtaposition of Gorgas's mixed reception with the startling 30 percent mortality rate that Welch witnesses suggests that while public perception is important, ultimately there are some hard facts that can't be changed.

CHAPTER 12

Pneumonia, a disease that attacks the lungs, was the leading cause of death in the U.S. until 1936. It has often been lumped together with influenza in international health statistics, and even in the 21st century, it's usually in the top 5 or 10 deadliest diseases.

Once again, pneumonia is a topic that demonstrates how problems in the past have continued to reverberate into the present. Though the book focuses on an influenza pandemic, Barry reiterates that public health doesn't happen in a vacuum and that officials are always dealing with many disease threats at once.

The most common cause of pneumonia is a bacterium called pneumococcus. Scientists have been trying to make serums to cure it since at least 1892. By 1916, in the early part of World War I, one textbook still noted that no known treatment could cure pneumonia.

The history of pneumonia represents an early triumph of modern medical science, though in some ways it also highlights the limits of what science can do to combat nature.

At the Rockefeller Institute, Rufus Cole was putting most of his energy into treatment for pneumonia. He knew that finding a solution involved stimulating the body's own defenses—the immune system. This was the principle behind all vaccines developed so far; however, the problem was that diseases like tetanus and diphtheria didn't change much, making them easy targets, but pneumococcus was much more variable.

In this passage, Rufus Cole demonstrates what the early stages of the scientific method look like. The process starts by asking questions and looking into what is already known. From there, the scientist can proceed into trying to figure out some of the unknowns.


In 1912, Cole developed a serum that was moderately successful against one type of pneumococcus. Curing the disease was a passion for him, but it became an obsession for Oswald Avery. Avery was a scrawny man who grew up in New York City as the son of a Baptist minister. Like Welch, he never married, and by most accounts, Avery had almost no social life, devoting everything to his research.

The similarities between Avery and Welch seem to suggest that scientific research in the period either attracted a certain type of personality or perhaps even required it. Because the research was so demanding, it required investigators who could afford to give it a single-minded focus.


Together, Avery and Cole made slow but important progress studying pneumonia. They were able to identify three fairly common strains: Type I, Type II, and Type III, as well as other less regular strains that they collectively called Type IV. These categories helped focus their efforts on developing a serum. One of the big puzzles was that certain pneumococci were lethal while others weren't. Eventually, Avery, Cole, and their colleagues got ready to test a serum on human subjects.

One of the hallmarks of scientific advancement is learning how to name and classify things that were previously mysterious. Avery and Cole's classifications of pneumonia represented an important step forward for better understanding the disease, which was in turn a step toward attempting to minimize the amount of suffering it caused in the world.

CHAPTER 13

Even Cole's first experiments with his serum for pneumonia showed promise on patients. Though he and his colleagues didn't have a cure, they were able to cut the death rate for pneumonia caused by Type I pneumococci, the most common kind.

Progress in science is often slow, but Cole's early experiments proved that for an investigator who proceeded methodically, it was possible to put theory into practice and see real-world results.

Gorgas wrote to army hospital commanders in 1917 to inform them that pneumonia would likely be one of the most important diseases among troops. Meanwhile, Cole began looking into the logistics of producing a pneumonia vaccine effective against certain strains, which would be difficult to do on the mass scale needed. An early test in March 1918 among 12,000 troops camped on Long Island suggested good results for the vaccine but wasn't conclusive.

The day-to-day work of lab scientists like Cole and public health officials like Gorgas was very different, but their goals were intertwined. Though Cole didn't necessarily produce his vaccine for use in war, its vital importance for soldiers in close encampments meant that his research would inevitably have applications in war. As a result, this helped him get test subjects and other resources.

Gorgas asked Welch to chair a board specifically dedicated to pneumonia. Welch called Flexner, and the two of them agreed that Cole was actually the best man for the job. The pneumonia team ended up being very effective and was later recognized with awards and accolades for many of the members.

Because scientists like Welch and Flexner were dedicated to the common good, they could recognize situations when someone else was best suited to do a job. This spirit of cooperation defined many of the best scientists of the World War I era.

Gorgas, Welch, and Cole weren't worried at first about influenza, although they were tracking outbreaks (which were typically mild). They quickly identified overcrowding as one of the biggest risk factors for an epidemic. By 1918, it seemed that humankind was finally "modern" enough to put up a fight against nature, at least when it came to disease.

Modernity can be defined in a lot of different ways, not all of them positive. World War I is sometimes considered the first modern war because of its brutal efficiency, not because it represented any sort of progress. Still, in medical science, modernity does generally represent progress, and the time around World War I saw many people's quality of life improving due to new medical innovations.

CHAPTER 14

Though Haskell County, Kansas, seemed like the most likely source of the influenza epidemic that tore through Camp Funston, it was impossible to prove it. Though the disease spread widely, it wasn't as deadly as it was in Haskell, and so some officials didn't take it seriously yet.

Barry returns to the theme that many officials in 1918 had plenty of warning about the possibility of epidemics but refused to heed them. He suggests that waiting until a moment of crisis to act is too late, particularly when there is already so much evidence from the past to inform one's actions.

Post-pandemic, some epidemiologists would go back through the records in search of unusual flu activity before the Funston outbreak, but they didn't find any. In Europe, particularly in France, influenza didn't begin to flare up in an unusual way until after the American troops' arrival. It quickly spread out from there and soon presented a problem by rendering many soldiers unable to fight.

Because history is often pieced together in retrospect, it sometimes resembles detective work, with historians piecing together evidence that wasn't always available to people living through the moment. Because no one was paying attention to influenza until it was too late, charting the movements of the disease was only accomplished through retrospective analysis.

Meanwhile, Spain remained neutral and only had a few cases before May 1918. The reason why the disease became known as the "Spanish flu" is likely because **the press** in Spain were the only ones publishing accounts of the disease (because, as a neutral country, Spain's government wasn't censoring papers to help the war effort). By the end of May, this influenza had reached as far as Shanghai and Sydney. Despite its wide spread, however, the disease remained relatively mild—so mild that some doubted if it was even influenza at all.

The importance of the free press is one of the biggest themes in The Great Influenza. *But while Barry often portrays a free press as beneficial, he also shows some of the consequences—here Spain's free press causes the country to gain an unjustified reputation as the source of the influenza virus. In the larger context of the book, however, Barry suggests that this downside to honesty is minor and that the problems suffered by nations with more repressive pandemic coverage, like the U.S., were actually much greater, since the lack of transparency led the public to mistrust institutions.*


In a couple isolated locations, like Louisville, Kentucky and a small station in France, there were unusually high mortality rates. Welch, Cole, and Gorgas closely studied the epidemic's progress abroad, looking for clues about what would happen next.

Despite humanity's progress in understanding viruses, there were many aspects of them that remained mysterious in 1918 and which remain so today. This again shows the limits of science against nature.

After a summer when about 1 in 10 British soldiers in France were too sick to fight, suddenly the disease seemed to be gone in mid-August. In the United States, there was never any widespread epidemic to begin with, though influenza remained active. In reality, the virus had not disappeared anywhere—it was just gone underground, temporarily.

Even with the warning from the early wave of influenza, many public health officials continued to underestimate the threat. Barry attempts to get rid of the myth that the 1918 pandemic (and pandemics in general) are impossible to predict; he suggests that, based on what they'd already learned, health officials should have been able to project that the virus would return with a vengeance.


CHAPTER 15

While the spring wave of the influenza pandemic wasn't especially lethal, the second wave was. Several explanations have been proposed: the first is that the deadly disease was caused by a different virus than the mild disease. But this is unlikely, since victims of the first wave had significant resistance during the second.

Barry describes unlikely possible causes for the deadliness of the influenza pandemic virus in order to portray how some experts thought at the time, while also showing how science doesn't support these explanations.

The second possible explanation is that while in Europe, the American-originating virus encountered a European variant, and a new variant arose when the two viruses attacked the same cell and "reassorted" their genes in the process to create a deadlier version. Most experts today, however, also believe that this possibility is unlikely.

Barry mentions unlikely but possible explanations as a way of acknowledging that even contemporary science is fallible, and that while the best available evidence favors one possibility, it is worth considering others, even if only to learn why they fall short.

The third, and most likely, explanation is that the virus adapted to humans. In 1872, a French scientist studying anthrax in rabbits discovered that as the virus passed through different rabbit victims, it became more efficient at killing newly infected rabbits. The flip side of this, however, is that if a virus becomes too efficient, it runs out of hosts and destroys itself, so most of the time virulence will stabilize and eventually recede. It seems like this pattern of increasing virulence is similar to what happened during the 1918 influenza outbreak.

While Barry sometimes frames the conflict between humanity and nature as a battle, he also acknowledges the ways in which it's a mutually dependent relationship. Though it may seem like viruses "want" to kill people quickly, in fact, such an outcome would be bad for the virus itself, since it would leave the virus without new hosts to spread to.

On June 30, 1918, a British freighter ship docked at Philadelphia and was carrying a deadly disease. Examining the British crew at the University of Pennsylvania Hospital, the physicians and med students concluded that the crewmembers were dying of pneumonia but had strange influenza-like symptoms. The rumor was that these crewmembers died of Spanish influenza. The disease, however, didn't spread.

Big transportation vessels like freighter ships are yet another symbol of modernity that show how the world was truly connected for perhaps the first time during World War I. Unfortunately, these connections provided ideal conditions for epidemics to flourish. While modern medicine helped protect people against many diseases, other aspects of modern life actually made diseases more consequential.

Most history of the 1918 pandemic portrays it as abrupt and unexpected. In fact, however, the deadly second wave happened more gradually. Deadly outbreaks in the earlier part of the year remained limited in scope, like at one French base where five percent of all recruits died. By the end of August, the lethal variant of the virus had established itself in three continents—Europe, Africa, and North America—and it was poised to break out.

While Barry can only cover a limited scope of what happened during the 1918 pandemic in one book, he acknowledges the wider breadth of the pandemic. The fact that deadly outbreaks only occurred in some very specific areas again suggests that a virus—and by extension, nature—can act in unpredictable ways.

First, there were signs of an outbreak at Brest, a French city where many American soldiers landed. Soon after, influenza spread through Freetown, Sierra Leone, which was a major center for coal, killing at least three percent of the Africans living there—or perhaps even twice that. Finally, an overcrowded ship arrived in Boston. Two sailors were sick with influenza, but the number quickly multiplied, and so did the death toll.

These three incidents, spread across three continents, emphasize the extent to which the influenza pandemic was truly global. Notably, the movements that caused the disease to spread tended to be related to the war, suggesting that events like wars can have negative consequences that stretch beyond just battlefield casualties.

CHAPTER 16

Camp Devens was a military encampment 35 miles northwest of Boston. Since its establishment in September 1917, it had already suffered from measles and pneumonia, but it had a capable medical staff. When in 1918 several seeming cases of pneumonia suddenly broke out in the camp, some public health authorities worried that it might be the sign of an influenza epidemic.

Camp Devens ended up being one of the first sites of a major outbreak of the 1918 influenza virus. In many ways, the virus's outbreak at Camp Devens encapsulated features of the virus that would remain true throughout the pandemic: its comparatively severe impact on young adults and its spread through transportation related to the war.

The epidemic soon exploded through the camp. The Red Cross sent help, but the nurses soon got sick themselves. The disease was so powerful that victims turned dark blue from lack of oxygen, fueling rumors that, in fact, the disease was the **Black Death**.

The comparisons to the Black Death help to illustrate the fear people felt during the pandemic, and they show how people looked to the past to try to understand their present situation.

Gorgas ordered Welch, Cole, Victor Vaughan, and Fredrick Russell to go to Devens. They were shocked by the devastation they saw, all caused by the virus. Welch concluded that it must be "some new kind of infection or plague." He immediately called a prominent local pathologist, the Rockefeller Institute, and the acting army surgeon general, letting them know about the disease and about the desperate need for more hospital space in Nevens.

The fact that so many prominent scientists went to Devens together suggests that officials were finally beginning to wake up to the scope of the epidemic they were confronting. Even these experts, however, were shocked and confused by what they saw. The process of discovering what caused the influenza epidemic was in many ways a microcosm for what the scientific method looks like in action.

The army surgeon general began urging that men shouldn't be transferred from camp to camp unless absolutely necessary (in order to quarantine the virus). The measure came too late, though: around the world, as far away as Bombay, lethal variants of the virus started to explode.

The refusal of people in authority to listen to experts until it's too late was a common theme during the 1918 pandemic. Barry argues that it's worthwhile to be more proactive in preparing against threats like the 1918 influenza pandemic—while authorities can't predict the specifics, they can predict a general pattern based on past epidemics.

CHAPTER 17

On September 7, 1918, 300 sailors from Boston disembarked in Philadelphia. Philadelphia was known for its shipbuilding, which had brought tens of thousands of workers to the city. Housing became scarce, and this led to overcrowding, which was already a problem before the war. This set the stage for an epidemic. To make matters worse, the city was run by a corrupt political machine, which meant that basic services like sanitation and education often weren't available for citizens.

Barry spends several pages chronicling the situation with the pandemic in Philadelphia, not just because it was one of the first major cities to be affected, but also because in many ways the city was a microcosm of how the virus affected the whole country. Philadelphia is important symbolically because of its role in the early days of the founding of the United States, and so it's a natural choice to represent the country as a whole.

Four days after the Boston sailors arrived, 19 sailors reported influenza symptoms. Despite quarantine efforts, it was too late, and some sick Philadelphia sailors had already left the city. As the epidemic tore through Philadelphia, the city's public health director, Wilmer Krusen, did nothing (although other public officials tried to take action). Krusen denied that the epidemic was a threat to the city and insisted that all the dead were simply victims of "old-fashioned influenza or grip."

Krusen's decision to dismiss the epidemic as influenza was technically correct, but it also showed the arrogance of officials who refused to understand science or listen to experts. While some of his poor leadership can be contributed to him as an individual, it also makes sense to attribute it to the general culture that men like Wilson and Creel had fostered in the U.S. at the time, where it was considered unpatriotic to talk about the influenza epidemic openly.

At this time, two million Americans were abroad for the war, and even at home, the war seemed to influence every aspect of life. President Wilson and his administration strongly encouraged civilians to make sacrifices, such as giving up meat on certain days. The administration targeted socialists, German nationalists, and union members. Some were imprisoned; others suffered vigilante justice and were even lynched.

While the Wilson administration arguably had legitimate reasons to ask for wartime sacrifices from civilians, Barry makes it clear that Wilson went well beyond what was required and used the war as a pretext to repress groups with only a tangential relation to the war. A minor theme of the book, illustrated in this passage, is how opportunists can use crises to their advantage.

The government started a "Liberty Loan" campaign that involved selling bonds to average citizens. To promote it, Philadelphia had scheduled a big parade, and despite objections from public health experts, Krusen didn't cancel it. Krusen heard news that Paul Lewis might be on the verge of identifying the pathogen for the new influenza, meaning a serum and vaccine could soon follow. Krusen only focused on the good news and said the parade would go on.

Today, the Liberty Loan parade is often viewed as a turning point in the pandemic—when the virus really took off among civilian populations. Though it is perhaps unfair to blame a mass outbreak on one person, Krusen's bad judgement undeniably caused the virus to spread ferociously. Like many officials before and after him, he refused to heed the warnings of experts until the consequences were so obvious that it didn't take an expert to see them.

The incubation period for influenza is 24 to 72 hours. Two days after the parade, Krusen announced that the epidemic had spread from military bases to the civilian population.

The coincidence between the incubation period and Krusen's announcement helps establish that there was a cause-and-effect relationship between the parade and the outbreak.

CHAPTER 18

While the influenza outbreak at Camp Devens was a surprise, subsequent outbreaks at military bases were not a surprise. After Devens, Gorgas immediately warned other camps around the country.

Though Barry criticizes the government and military for lack of preparedness at Camp Devens, he reserves even stronger criticism for the leaders at camps that were affected later, since they had the clear example of Camp Devens to guide their actions and still refused to make necessary preparations until it was too late.

Joe Capps, a friend of Cole, discovered that making patients with respiratory disease wear gauze masks could greatly decrease the risk of infection spreading. He also recommended reducing crowding.

These recommendations for reducing the spread of a respiratory disease are still used today, showing how advanced some medicine was, even as far back as 1918.

In August 1918, Colonel Charles Hagadorn took command of Camp Grant. The camp was already overcrowded, and Hagadorn wanted to add even more people. He believed the disease could be controlled, and while he made some concessions to the scientists and health officials advising him (reducing how much men could travel), he ultimately went ahead with his orders.

While Hagadorn wasn't totally opposed to virus control measures, in some ways, his half-measures were just as bad as Wilmer Krusen's recklessness in Philadelphia. The events at Camp Grant showed the danger of trying to adapt or compromise on science as Hagadorn did.

Soon, the first cases of influenza were discovered at Camp Grant. Hagadorn ordered a quarantine for the sick soldiers, but it was too late, and the epidemic began spreading through the whole camp. Training for war stopped as the soldiers struggled just to stay alive.

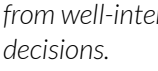
Barry shows how even for those who considered the war top priority, it was bad to ignore potential epidemics, since they inevitably shut down war preparation activities like training, to say nothing of the soldiers who actually died.

The same day that the first Camp Grant soldier died, 3,108 troops from the camp boarded a train headed for Camp Hancock in Georgia. Men on the tightly packed train soon got sick, and eventually over 10 percent of them died.

Hagadorn's bad decisions were hard to reverse—had he taken the advice of his advisors more seriously, those soldiers might not have been shipped out and might not have helped spread the disease so widely from the camp.

Back at Camp Grant, Hagadorn had ceded most of the camp's operations to medical experts. The death toll continued to rise, with many of the victims being younger. Hagadorn ordered his sergeant to leave the building and have all headquarters personnel stand for inspection outside. The sergeant didn't understand but followed the order. Eventually, they heard the pistol shot of Hagadorn killing himself.

Hagadorn's decision to cede the camp to medical experts suggested that he was perhaps not as selfish or corrupt as men like Krusen were. The tragic end to his story for all involved suggests that some of the worst devastation of the influenza pandemic may have come from well-intentioned but ultimately ill-informed leadership decisions.



CHAPTER 19

Two days after the Liberty Loan parade in Philadelphia, Krusen announced that influenza had exploded through the city. Hospitals had to start refusing patients. On October 3, five days after the parade, Krusen banned all public meetings in the city. Within just 10 days, there were hundreds of thousands ill and hundreds of deaths daily.

The course of the virus in Philadelphia demonstrates that whatever short-term benefits denialism might seem to offer, the long-term consequences will ultimately become too large to ignore. Krusen represents the consequences of bad leadership.

Meanwhile, Lewis had been spending all his time in his laboratory, even more so than usual. He was horrified to hear about the deaths but continued in his search for a cure and vaccine.

The dedication of scientists like Lewis provides a counterpoint to the lack of commitment from political leaders when it came to fighting the virus.

Two thirds of the people who died in Philadelphia were under 40. Undertakers ran out of coffins. The symptoms, which could include blood flowing from the eyes and nose, were terrifying. Rumors spread that the disease was a new **Black Death**.

The horrifying details in this passage help convey what experiencing the disease must have been like to people who lived through the era, something that can't be fully conveyed in generalized statistics.

The virus spread throughout the country, while Philadelphia remained in a state of constant fear. In one hospital, about a quarter of patients died each day. The streets were quiet, no longer filled with cars, and the life of the whole city seemed to have stopped.

The quiet in the city and the lack of cars represent how totally the virus disrupted normal life, and also provide an eerie portent of what the rest of the country might soon be facing .

CHAPTER 20

Despite rumors about the **Black Death**, the virus was definitely influenza. Most victims still got well, although many of them still experienced painful symptoms. Those who survived recounted intense pain coming from everywhere, and some never fully recovered.

While living through the 1918 influenza pandemic was horrifying, Barry clarifies that the disease was not as deadly on an individual level as some previous deadly epidemics. The fact that some individuals never recovered from the disease also reflects how, on a broader level, some cities and even countries didn't recover from the disease for a long time.

The victims experienced a wide range of symptoms, many of which were previously unknown for influenza. Joint pain, extreme headaches, and even losing the ability to smell were all possible symptoms. In U.S. Army camps, 5 to 15 percent of all men hospitalized had severe bleeding from the nose that was reminiscent of Ebola. The virus never seemed to cause just a single symptom.

While the virus caused a wide range of physical symptoms, it also had a wide range of disruptive effects on society more broadly. The virus caused new symptoms previously unheard of for influenza, and it also caused a pandemic on a scale that was previously unheard of.

Over the course of the pandemic, 47 percent of all U.S. deaths were from influenza or its complications, reducing life expectancy by over 10 years. Some of these patients might have died anyway, so the most important figure is the "excess death" toll, which is still staggering. It was so high that a comparable percentage of the population dying in 2006 would have been 1,750,000 deaths.

Barry avoids trying to distort the death figures to be as shocking as possible; instead, he provides context about which figures are most important. This relates to the ongoing theme of the importance of the truth and the ultimate futility about trying to persuade people with half-truths and propaganda.

Normally, influenza kills the "weakest" people, like the very young and the very old. But the new influenza spike caused a massive spike in deaths for young adults. An army doctor studying the lungs of infected victims concluded that the effect on the lungs looked similar to poison gas.

The devastation caused by influenza was eerily similar to the type of devastation that was typically caused by war, both in the demographic affected and in the poison-gas-like effect the disease had on the lungs.

CHAPTER 21

The 1918 influenza strain struck so suddenly that some victims remember the exact moment it hit, even fainting on the sidewalk or falling off a horse. Death also came quickly, sometimes within 12 hours.

The suddenness with which the disease affected individual victims reflects the suddenness with which the disease struck an unprepared world at large.

Pathologists studying the disease were most interested in what happened in the lungs. The lungs of people who died within a couple days of their first symptoms were unusual, not typical of normal influenza or pneumonia. During autopsies, pathologists didn't find evidence of the bacteria that usually attack lungs during pneumonia and related infections. Normally the lungs are well-protected from viruses and sterile, so when the 1918 influenza virus invaded, it triggered a massive immune response. Ultimately, it was the immune system response that was killing young people, not the virus itself.

The use of autopsies and other methods of direct observation demonstrate how medicine was firmly in its modern period by the time the pandemic struck. The processes the scientists followed were frequently based on good science, but the speed and complexity of the virus exposed the limits even of modern medical science, particularly in a crisis situation.


In the 1970s, researchers would eventually learn about acute respiratory distress syndrome (ARDS), which can be caused by drowning or toxic gas, and which was also the mechanism for the 1918 influenza strain. ARDS is basically like a burn to the lungs. It didn't cause the majority of the influenza deaths of 1918 and 1919, but it explains why so many young people died. It's impossible to find the actual rate of death by ARDS (since most samples were from the army, where a higher proportion were young men), but ARDS is still a bad sign for future pandemics, particularly with the recent rise of antibiotic-resistant bacteria in hospitals.

Barry has drawn parallels between the 1918 pandemic and the present in previous parts of the book, and this is one of the most direct passages about what modern officials can learn from the past. Even before the COVID-19 pandemic, Barry was warning about how new diseases could follow a similar path to the 1918 pandemic. Antibiotic-resistant bacteria represent a particularly new threat, since it is only comparatively recently that antibiotics became prevalent enough for resistant bacteria mutations to develop.



CHAPTER 22

The influenza virus of 1918 was a force of nature. Scientists knew they couldn't control it, but they still tried to save as many lives as possible. A worldwide race for the cure began. Three questions confronted them: first, what was the epidemiology (how did the influenza behave when it spread)? Second, what was the pathology (what did it do to the body)? Third, what was the pathogen (what microorganism caused it)?

By pitting the battle between scientists and the virus as one between humanity and nature, Barry suggests that perhaps the scientists were fighting a war they'd never be able to win. At the same time, however, Barry recognizes how extraordinary scientists' efforts were, that humanity had reached a point where it could even attempt to control and understand nature.

The first question about epidemiology turned out to have an easy answer. People with influenza "shed" the virus on roughly the third to sixth days that they had it. People could catch the virus by inhaling it or by contact between the hand and the mouth or nose (since the virus could survive on hard surfaces for days). All this means that the only way to combat the spread was a strict quarantine, which only slowed it down at best. The third question, about the pathogen, was the trickiest to answer but provided perhaps the best hope of effectively combatting the disease.

Many of the epidemiological details about the 1918 influenza virus resemble COVID-19 because they are both respiratory diseases that spread in similar ways. Discovering the pathogen became a major focus of research during the 1918 pandemic, since many investigators viewed it as the first step toward creating a cure or vaccine. This suggests that to fight back against nature, scientists must first understand it.

After a visit to Camp Devens, Welch himself began to feel unwell. He didn't go to the hospital because he knew firsthand the horrors happening in hospitals due to the pandemic. Though the disease rendered him unable to leave the house for a long time, he was spared the worst symptoms.

Welch's situation underscores how doctors and investigators weren't immune to the dangers around them and how, in spite of all their expertise, their professions actually made them more vulnerable to the disease.

Scientists began combatting the disease with what they already knew, starting with the use of disinfectants to get rid of pathogens outside the body. One scientist named Richard Pfeiffer, working under Koch, believed that he discovered the bacterium that caused influenza (calling it *Bacillus influenzae*). Other scientists even began to nickname it after him, in part because of Pfeiffer's stature in the scientific community. No one would challenge him, even though doubt is often a crucial part of good science. Many scientists began to believe that without Pfeiffer's specific bacteria, there could be no influenza.

While Pfeiffer's bacillus was a major breakthrough, in many ways his discovery actually stifled research that came after it, since it encouraged future researchers to investigate possibilities that ultimately weren't productive. While the scientific community was not as rigid in suppressing dissent as George Creel was, the conditions during the pandemic nevertheless encouraged narrow-minded thinking that delayed progress.

CHAPTER 23

Prestigious labs around the world began to focus on influenza, but in 1918 they were operating at a reduced scale because so much of research had been geared toward war. Because the war started in Europe, and European labs were devoting more resources to it, the U.S. had comparatively more resources to investigate influenza.

Barry shows again how war has consequences that go far beyond the battlefield. While medical research in the U.S. was gaining a better reputation due to recent reform, it also benefitted from sheer timing and the fact that the U.S. was late to entering World War I.

In New York City, the infamous Tammany Hall political machine had recently retaken control of the city, including public health. When influenza broke out, Tammany tried to stifle the story, but the disease soon spread so far that no amount of propaganda could disguise it.

Tammany Hall was a political organization based in New York City that played a large role in influencing local and at times even national politics. It was frequently corrupt but very successful at influencing elections for a time, most notably under the leader "Boss" Tweed in the mid-19th century. Many criticized Tammany's harsh methods as undemocratic.

William Park and Anna Williams teamed up for their research. Park was a precise, methodical scientist, while Williams used to enjoy flying in stunt planes. Their New York City lab was one of the biggest and best in the world, with over 200 workers. When Park got a telegram asking him to look into the agent causing Spanish influenza, he replied immediately that he'd get to work.

The collaboration between Park and Williams shows how laboratories often brought together people with different personalities and work styles. At the same time, however, Park and Williams shared a high level of dedication to their work, just like many of their peers in other laboratories.

Park treated research like a war, investing all the lab's resources into investigating the pathogen of the new influenza variant. But at first he was frustrated, as people in the lab got sick and even died. Meanwhile, outside the lab, New York City was panicking, with medical staff at hospitals in short supply, particularly nurses. Some nurses were literally kidnapped.

The details in this passage serve to highlight how desperate things became during the pandemic, not just for the general public, but even inside the labs of the people searching for a cure or vaccine.

All this pressure forced Park to abandon his most ambitious plans. He tasked Williams with finding Pfeiffer's bacillus (*B. influenzae*), and she perfected the technique of isolating it. They agreed that Pfeiffer's bacillus seemed like a good starting point for studying the disease, even though Park's methodology wasn't as meticulous as he usually liked.

The 1918 pandemic forced many people to make hard decisions. While Park and Williams were not as meticulous as they might have been in other circumstances, their actions were arguably justified by the situation, demonstrating how lab research doesn't just exist in a vacuum but is always part of the world around it.

Park's lab struggled to make an antiserum and vaccine for Pfeiffer's bacillus. While the bacillus did kill lab rats, their symptoms didn't resemble influenza's. Meanwhile, in a different lab, tests of the bacillus began on human volunteers. None of the volunteers got sick; one doctor died of influenza, but this didn't demonstrate anything according to the scientific method.

The lack of results for a cure targeting Pfeiffer's bacillus suggested that perhaps the bacillus was not as important to the pandemic as some initially thought. The struggles Park and Williams experienced in the lab show that even smart, dedicated researchers often face disappointment, particularly when the process must be rushed.

CHAPTER 24

While Park was working in New York City, Philadelphia was on the verge of collapse. Despite the chaos, Lewis was still there looking for an answer. Taking inspiration from Flexner's work on meningitis, he looked into the best ways to save lives *immediately*, using blunt-force methods to make the best of the limited data available.

As with Park and Williams, Lewis also faced challenges when it came to doing good science in less-than-ideal conditions. His approach made the best of his situation, showing how one of the most important qualities of a good researcher is often adaptability.

Eventually, Lewis passed this blunt-force work onto others who could do it just as well, then concentrated on four tasks for himself. First, he tried to develop an influenza vaccine following the same methods used for polio. Second, his team searched for Pfeiffer's bacterium. Though he struggled at first, eventually he was able to isolate it. His third and fourth lines of inquiry involved using dye experiments and shifting from trying to kill tuberculosis bacteria to trying to kill pneumococci.

Lewis's work demonstrates his extraordinary flexibility and adaptability—qualities that are important in research and doubly so during a crisis. He and his team encountered failures, but this was a natural and expected part of the research process. The more important thing is that Lewis continued to be creative about pursuing new lines of investigation.

Lewis and his lab combined all their knowledge to attempt a vaccine. The first result was promising, though it wasn't proof—and even if it was, his lab lacked the ability to mass produce. Lewis again passed off his work to others to continue it, so that he could look into a fifth line of inquiry: a serum to cure the disease. This would be trickiest of all, since a serum has to work against a single target, and picking a target is difficult.

As a leader, one of Lewis's most important skills was to recognize where he was needed and where he could delegate to others. One of the recurring problems with ineffective leaders during the 1918 pandemic (which, in Barry's assessment, would likely include President Wilson) was that they tried to do too much on their own and didn't entrust enough to people below them.

As the target for his serum, Lewis picked Pfeiffer's *B. influenzae*. Flexner and a collaborator had already failed to develop a serum for this bacillus that could help humans or even lab animals, but Lewis hoped that perhaps Flexner's technique was simply faulty. Lewis took a hands-on approach to ensure his technique was immaculate, even cleaning the glassware himself instead of leaving it to technicians (because clean glassware was vital to his experiment). He worked meticulously while society collapsed around him.

Though Lewis's process was rushed, his methodology still demonstrated many hallmarks of good science. While Lewis was skilled at delegating, he also realized that it was important to oversee certain tasks on his own. His recognition of the importance of little details like sanitized glassware helps to illustrate why he was such an effective scientist.

CHAPTER 25

As soon as Welch saw autopsies of victims at Camp Devens, he called a Harvard pathologist, Gorgas, and Avery at the Rockefeller Institute. Avery immediately went back to his lab and got to work. On September 27, 1918, Welch, Cole, and Vaughan wired the surgeon general at Devens that Pfeiffer's bacillus was the cause of the pandemic. But Avery remained skeptical and continued to work.

While day-to-day work in laboratories during the pandemic could be isolated, this isolation was balanced out by exchanges with other scientists at other labs. Again, Welch showed good judgment by recognizing that what was happening at Camp Devens was bigger than anything that he himself could investigate—it would require a whole scientific community.

From the start of his career, Avery liked to exert control over his labs, although young scientists who worked with him still said he was an agreeable colleague. Avery disliked working in a pandemic not because of the pressure but because of the chaos it introduced into his orderly systems.

Avery represents a different style of leadership from Lewis, although he shared many of the same positive qualities. Like Lewis, Avery found a way to balance the ideals of the scientific method with the reality of the unfolding crisis.

Avery set up an experiment in order to test whether Pfeiffer's *B. influenzae* was actually showing up in victims of influenza or whether other labs had a confirmation bias because they expected to find it. He proved that in certain conditions, it was possible to grow *B. influenzae* and create false positives. Avery recommended doing everything possible to rapidly push the anti-pneumococcus vaccine but not the anti-influenzal (*B. influenzae*) vaccine. Creating it at a large enough scale, however, would be a challenge.

Barry jumps between the research of Pfeiffer, Park and Williams, Lewis, and now Avery to show how research progressed incrementally and on multiple fronts at once. Avery's research into false positives was particularly useful because it revealed a potential flaw in the work of many of his peers. Often, researching the correct solution involves finding ways to eliminate wrong solutions.

CHAPTER 26

The massive devastation of the pandemic meant that society practically had to reinvent itself, with some institutions finding ways to cut through bureaucracy and others getting bogged down. Despite a somewhat disorganized entry into the war, by 1918, Wilson had used the government to influence just about every aspect of daily life and point it toward the war.

Barry sets the stage for this chapter by looking at the pandemic in the U.S. from the broadest level. By zooming out, he shows how one of the main effects of the pandemic everywhere was change: it forced communities and institutions to adapt to the new circumstances.

Ironically, right as Wilson was gearing up for war, in August 1918 Austria made its first inquiries about terms for peace (which Wilson rejected), and Bulgaria signed an Armistice on September 29th of that year. On October 7, Austria sent a note to Wilson formally asking for peace on Wilson's terms, but the note went unanswered for 10 days.

Many of Barry's criticisms of Wilson are presented indirectly. This passage, for example, juxtaposes dates in a way that suggests Wilson was not considering the possibility of peace as seriously as he should have, although Barry doesn't state that criticism outright.

Previously, Wilson had spoken about "peace without victory," something he was desperate to avoid. He believed in fighting ruthlessly. Perhaps this was why his government didn't even acknowledge the virus, because it was still so focused on war. This had consequences: when Gorgas raised a warning at Camp Devens that soldiers shouldn't be transferred between camps to contain the spread, his superiors ignored him and kept moving men around as usual. One camp provost marshal canceled the draft, likely saving many lives, but most others in the army decided that lives lost to the pandemic were an acceptable cost.

Once again, political calculations played a role in the response to the virus, with unfortunate results. As Barry has noted previously, this single-minded focus on war wasn't even good for the war, since the spread of the virus often disrupted vital operations. The fact that some army leaders chose to simply accept pandemic losses highlights the cruelty of war and also shows that such cruelty took many forms that extended well beyond the battlefield.

While the army continued to ignore warnings from its own medical advisors, it did eventually make some concessions, preventing men with influenza symptoms from sailing to Europe. But the quarantine of the sick men wasn't total, and they still often spread the virus when they went to public places, like when they ate in mess halls. Even on the ships, which were supposedly free of men with symptoms, outbreaks frequently occurred. In such cases, the ships usually still went ahead to Europe instead of turning back to go home.

This passage shows how sometimes half-measures and compromises are little better than inaction. Nature and viruses don't negotiate, and so the army's partial attempts to stop the pandemic were largely ineffective. While Barry praises the potential of strong institutions elsewhere, here he demonstrates how slow-to-change institutions like the army can cause real damage by preserving an unhealthy status quo.

The situation in France was nearly as bad. Influenza hit American troops so hard that some hospitals had to close. Still, Wilson didn't speak publicly about the disease, even as he took private meetings. Despite receiving warnings from advisors that it was dangerous to keep shipping men overseas, given the pandemic, Wilson didn't stop doing so. In early October, he sided with a general who believed soldiers who died in transport were giving a noble sacrifice, just like those on a battlefield. Transport of soldiers to Europe continued, even though the war would end in a month and Germany was already starting to ask about peace.

Again, Barry does not directly criticize Wilson's actions, but he presents them in a way that makes them seem potentially callous and cynical. The fact that World War I was so close to ending suggests that perhaps American soldiers weren't urgently needed at this point and that soldiers' spread of the virus caused suffering that could have been avoided. This passage highlights the dangers of nationalism and of inflexible leadership.

Wilson expressed even less concern for citizens suffering from the pandemic, even in private. Most of the people Wilson appointed took no interest in public health, and Surgeon General Rupert Blue's peers considered him a "lightweight," not taking any decisive action against the pandemic. Blue reached his powerful position through an early success controlling plague in rodents in San Francisco, which helped his powerful friends to support his future endeavors.

In contrast to institutions like Johns Hopkins and the Rockefeller Institute, Wilson's administration did not hire the most capable candidates to run things. While personal relationships play a role even in more successful scientific institutions, Rupert Blue was an example of what happened when these personal relationships overshadowed actual success (or lack of it).

As a surgeon general during a pandemic, Blue was ineffective, actually blocking relevant research at one point because he believed it was "not immediately necessary to the enforcement of the law." The Public Health Service was late to acknowledge the influenza pandemic, and those working under Blue in the office were seldom any better than he was. On September 22, his office finally put out guidelines to avoid influenza, but they were general and didn't provide clear guidance. Blue was a bureaucrat and seemed to believe that more direct action was beyond the scope of the Public Health Service.

Though Blue was not actively spreading false information to the extent of someone like George Creel, Blue's narrow-minded focus on research with immediate short-term applications had a similarly repressive effect. The lack of success at the entire Public Health Service shows how organizational problems often start from the top down and how ineffective leaders like Blue can sink whole institutions into inaction and bureaucracy.

CHAPTER 27

While influenza was unstoppable in the U.S. and Europe, more active intervention and stricter quarantines could have interrupted its process. The decisive actions taken to stop SARS in 2003 are one example how effective intervention can be (although influenza is more contagious than SARS). Though the influenza pandemic was in some ways unprecedented, cities had mobilized with stringent measures against diseases before, as the East Coast did for polio in the late 19th century.

When Barry first published the book, some political commentators believed that the U.S. and other countries had overreacted to the threat of diseases like SARS, which never caused destruction on the same scale as something like the 1918 pandemic. Here, Barry attempts to rebut that argument, arguing instead that the reaction to SARS was necessary and that it was precisely this intervention that prevented it from turning into a global pandemic.

Though Blue's Public Health Service fumbled the initial pandemic response, his administration and the Red Cross had a chance to do some good in October by providing doctors and nurses to the areas most in need. Even without a cure, doctors still had the potential to save lives. Doctors learned that patients should continue to rest even after a seeming recovery, since this was sometimes just the prelude to a more serious bacterial infection.

An organization as large as the Public Health Service might not be entirely compromised by bad leadership. While the failures of the Public Health Service might seem to contradict Barry's argument about the importance of institutions, the PHS still did some good, suggesting that one of the benefits of strong institutions is that sometimes they even work under bad leadership.

Meanwhile Avery, Cole, and others from the Rockefeller Institute developed a vaccine that showed promising early results based on a test at Camp Upton. They also had a serum that decreased mortality for Type I and Type II pneumococcus, and other investigators had developed vaccines and serums as well. Still, even with these resources, the lack of doctors remained one of the biggest problems.

The earlier failures and false starts of research have begun to culminate in modest successes. This passage shows how previous "failures" actually may not have been failures but simply stepping-stones to the next stage of the investigative process.

The government started a program to target younger female doctors and those with physical disabilities, hoping to find the best doctors not subject to the draft. The plan collapsed, however, since doctors were needed everywhere and couldn't be spared—and on top of that, the government offered few resources and a poor salary.

Again, leadership in the U.S. tried to implement a compromise solution and it proved ineffective. In this case, recruiting new doctors from untapped sources could have been an effective idea, but the lack of resources for the program doomed it to be ineffective from the start.

Nurses proved even harder to find than doctors. Though a military drive to recruit nurses was somewhat successful, it left many hospitals around the country severely short-staffed. One Red Cross recruiter wrote "There will be no nurses left in civil life if we continue at this rate" on September 5, just a few days before the big Camp Devens outbreak.

Staffing shortages during the 1918 pandemic presented a difficult problem, because the shortages were for skilled positions. Perhaps the lesson was that there is no good solution under circumstances like this, showing all the more that preventative measures are critical.

CHAPTER 28

In late 1918, Philadelphia continued to be isolated and struggle with influenza. Its mayor was arrested in the early days and became sick, doing nothing to help his city. Krusen had also lost everyone's trust. Lewis felt the pressure to help his city, throwing himself even deeper into his lab work. His only silver lining was that he got to spend more time on lab work and less time courting support from donors.

This passage again sets up the contrast between ineffective public officials and the more competent investigators working in labs. Barry demonstrates how there are different types of leadership and how sometimes activities like research can be their own form of public service.

In 1918, two wealthy families in particular wielded influence in Philadelphia: the Biddles and the Drexels. These families and others pulled the strings behind many of Philadelphia's institutions, and their bloodlines went back to the American Revolution.

This passage shows that sometimes actual power isn't about titles or positions—there are other ways to spread influence, both for better and for worse. The deep roots of the families mentioned here suggest that they had found a way to achieve power that goes beyond election cycles.

In October, Krusen finally took action. He ceded control of city nurses to a private organization run by some of Philadelphia's rich families, then seized money from the city's emergency fund to supply hospitals and hire physicians at double the rate Public Health Service offered. He sent out trucks with water sprays and sweepers to sanitize the filthy streets.

Though the corrupt political system in Philadelphia that Krusen represented was largely ineffective, this passage highlights some positive actions Krusen did take. The problem, however, is that he did these things too late—had he been more proactive, his actions might have had a larger effect.

Corpses piled up, and there weren't enough grave diggers to bury them all. Despite the city's renewed efforts to fight influenza, the pandemic didn't let up. People in the city couldn't remember what life was like before the pandemic. Calls for amateur volunteer nurses only got a few replies. During the worst week, almost 5,000 Philadelphians died from influenza alone, about 10 times the normal death rate from other causes in a week. Even essential war industries and social services shut down.

This passage captures the extent to which the 1918 pandemic interrupted daily life, beyond just the mortality and infection rates. While the death rates were horrifyingly high, there were other, sometimes unexpected consequences to the widespread illness and death, like the shortage of grave diggers and the breakdown of social services.

CHAPTER 29

Philadelphia's situation wasn't unique. Around the world, cities saw equally horrifying death rates. Often, **the press** made things worse, downplaying the seriousness of the disease, even though people could see the devastation with their own eyes, leading people to mistrust what they read. Officials believed controlling the press and urging calm in public statements would help stop fear from spreading, but the lies and half-truths in print only spread more fear.

This passage reveals one fundamental problem with censorship and confusion: that sometimes the public can see past it with their own eyes. This leads to distrust, not just of the press but of institutions in general, which in turn leads to fear. All of this makes it harder for national leaders to deal with an unfolding crisis.

Publications told readers not to be scared. Many printed some variation on the idea that the influenza was "Simply the Old-Fashioned Grip, Masquerading Under a New Name." Others printed nothing about the pandemic at all. Only a rare few publications, like the *Journal of the American Medical Association*, wrote about the true extent of the pandemic.

"Grip" (also "grippe") was an old way of referring to influenza. By saying that the current influenza was just like previous versions, newspapers were technically correct, but they seriously misrepresented the scale of the disease. By contrast, the specialist publications gave a more accurate analysis.

Attempts by government and **the press** to control fear were ultimately futile. Still, the awful circumstances did inspire some people to meet the challenge, one of them being Dr. Ralph Marshall Ward. A doctor turned cattle rancher, he lived near the Mexican border. One day, hundreds of Mexicans came to meet him, having heard that he was the only doctor around for miles. Despite his lack of resources, Ward set up a makeshift hospital to care for them as best he could, then eventually went back to Kansas City to become a doctor again.

This passage shows how even as the 1918 pandemic spread fear and misinformation, it also inspired some to rise to the occasion. Here, Ward represents the ideal spirit of the doctor as someone who helps those in need, regardless of where they come from or what they can afford to pay. Perhaps it's notable that Ward lived in a remote area, farther from the influence of the press and the government.

As paranoia swept the country, some blamed everything on Germany. There was no evidence for this, and investigating it wasted scarce public health resources. While the war remained distant for many Americans, the pandemic was immediate and inescapable. People stayed inside all day. One city made it illegal to shake hands.

The tendency to find a scapegoat during a crisis is a common theme in history, both before the pandemic and since. Barry shows why this is a problem during a pandemic: because it diverts scarce resources away from where they're needed most.

Shipbuilders were one of the cornerstones of the war effort, and as a result, they heard lots of propaganda about patriotism and received some of the best treatment of any workers during the pandemic. Sickness still soared, and on any given day, over half of workers might be unable to come in.

One of the side effects of the 1918 pandemic (as well as World War I) was that some professions like shipbuilders and nurses were better recognized for the essential work they do, at least temporarily.

When the war finally ended, the pandemic still lingered. An internal American Red Cross report compared the situation to the **Black Death**.

The persistence of a pandemic after the war shows how the negative effects of war linger long after the peace treaties are signed.

CHAPTER 30

At the height of the 1918 pandemic, the Red Cross and Public Health Service were so flooded with distress calls that they had to keep turning down calls due to staffing shortages. Physicians started trying desperate measures to treat patients, some grounded in science, others less so. There was no time for clinical trials or peer review, so some physicians became superstitious about unproven cures.

The pressure imposed by the pandemic caused many doctors to try methods that resembled an earlier period of medical history. This dramatizes how good science needs time and how, while sometimes good science can be performed when necessary in a crisis, it is not the ideal condition.

Elsewhere in the world, things were little better. From Greece to Italy to Britain, physicians were testing treatments with little to no proof that they actually worked. Hundreds of millions of people around the world couldn't see a doctor at all, and a small industry of snake oil cures started advertising itself in **the press**.

The conditions of the pandemic, particularly the desperation, seemed to foster anti-scientific thinking. The fact that the press wouldn't print real news about the pandemic but would print advertisements for snake oil (i.e., fake) cures is yet another indictment of how the press was run at the time.

By mid-October, vaccines developed by some of the world's best scientists finally became available for some. Meanwhile, the Army Medical School developed its own vaccine. Major publications like the *Journal of the American Medical Association* remained hesitant about the benefits of the vaccines, careful not to break the fragile public trust that had finally developed around American medicine.

The Journal of the American Medical Association is cautious, setting a positive example that contrasts with the wild claims made elsewhere in the press. While it might seem like a medical journal would enthusiastically support real science like vaccines, the journal editors recognized the importance of public trust and so were careful about making unverifiable claims.

As it turns out, none of the medicines or vaccines being produced at the time could prevent influenza. Even the masks worn by many were unable to stop the disease—only isolation and preventing exposure to the virus were effective. While some places succeeded by isolating themselves, most places that attempted isolation weren't strict enough to be effective.

The caution displayed earlier by the Journal of the American Medical Association *is proven right in this passage. Though there was good science behind many of the measures described, it was hard to account for all the variables in the real world, and this could lead to unexpected results.*

In Alaska, the Inuit people were particularly hard hit and came close to extinction. Their communal style of living in small spaces made them especially vulnerable. Things in the northeast side of the continent were just as bad, with over a third of the people in Labrador dying.

Barry expands the scope of the book to look at other communities that were hard hit by the influenza pandemic. The situation of the Inuit helps demonstrate one of the key points of the pandemic: that people who lived close together were most vulnerable, even when they lived in remote areas.

People who lived or worked in tight quarters—like coal miners—were particularly at risk of dying from the virus. Worldwide, the virus killed over 10 percent of the population in many places, often disproportionately affecting marginalized people like Black Africans in South Africa. Only a handful of places with truly ruthless quarantines, like American Samoa (where not a single person died of influenza), were able to escape the pandemic.

This passage shows how socioeconomic issues played a role in the spread of the virus. As is the case with many crises, people at an economic disadvantage often suffered the worst effects (though the rich were not necessarily spared from the worst outcomes, either). The unusual case of American Samoa provides an example of the level of quarantine needed to be truly effective against a disease like the 1918 influenza virus.

Death rates in China were huge but mostly unknown. India was one of the hardest-hit countries in the world, with as many as 20 million people dying, possibly many more. Vaughan speculated that if the virus continued to accelerate, it could wipe out civilization in a matter of weeks.

Because many parts of the world didn't keep accurate medical records at the time, some impacts of the influenza pandemic can only be estimated today. This illustrates how history is sometimes shaped not just by the events that happened but also by what records were left behind for future generations.

CHAPTER 31

While Vaughan believed the influenza virus threatened civilization, in fact, many viruses depend on civilization to survive. Measles, for example, will die out once all the humans in a community get infected and become immune. Influenza, however, doesn't need humans around, since it can survive in birds.

While previously, Barry has portrayed the pandemic as a war between humanity's science and the virus's force of nature, here he shows that the relationship is more complicated. A virus needs victims to survive, though what makes influenza particularly dangerous is that it doesn't need humans.

Twenty years before the influenza pandemic, H.G. Wells wrote *War of the Worlds*, which involves aliens that temporarily take over the human race, only to be defeated by Earth's infectious pathogens. Similarly, the suffering influenza caused would stop due to natural processes.

This passage is interesting because it flips the premise of War of the Worlds*—instead of humans being protected from aliens by a virus, like in Wells's novel, Barry implies that humans are the aliens threatened by a virus. Barry asks big questions about civilization, whether humans are the rulers of earth or just visitors at the mercy of nature.*

One process that helped end the pandemic was immunity, which people acquired after being infected. Though immunity didn't completely stop the virus from spreading, it did slow down its explosive pace. By the Armistice of 11 November 1918, the virus had already almost disappeared from Philadelphia.

The fact that the virus had largely disappeared in Philadelphia by November, after having first appeared in September, shows how rapidly it spread. Though Philadelphia residents were lucky the virus died out, the virus's short duration caused a concentrated amount of devastation.

The other process that helped end the pandemic was the mathematical concept of "reversion to the mean." Basically, because the 1918 influenza variant was so extreme in its virulence, and because influenza mutates so rapidly, it was only a matter of time before the variant mutated back to something with a lethality more like typical influenza.

Barry shows how basic concepts in statistics and probability can make up the foundation of exceedingly complex events like pandemics. Though the potential of viruses to mutate can be scary, Barry shows that some of these mutations actually benefit humans.

Some claimed that conditions improved because army doctors at affected camps simply got better at treating influenza, but there's no hard evidence for this. What is true, however, is that people struck later in the pandemic tended to become less ill. This was true both for residents in cities that were hit early and for whole cities (like on the West Coast) that were hit later.

People wanted to claim agency for stopping the pandemic, which is why some credited army doctors with improving their treatment efforts. The real truth—that the pandemic more likely ended due to sheer probability—was likely scary for many people, because it meant humanity was still at the mercy of nature's whims.

By November, the virus had made its way around the world, and the second wave was more or less over, though the virus was not fully gone. The virus mutated again, and by December 11, there were still pockets of the U.S. with severe epidemics, even if things were much better overall. This third wave was still very lethal, just considerably less so than the second wave.

This passage, and the ones that follow, illustrate how the virus persisted even after the worst devastation had passed. In many ways, the course of the virus resembled the course of World War I, with effects felt around the world long after the deadliest moments had passed.

By early 1919, Australia was just about the only place in the world that had escaped the virus, largely due to rigorous quarantines of incoming ships. The virus did eventually escape from a ship of soldiers. Because the war was over, the newspapers were no longer censored, and so journalists wrote vividly of the virus's devastation, even though Australia had a milder outbreak than the rest of the world. Survivors frequently compared their experiences to the **Black Death**.

The experience of Australia again illustrates the effectiveness of quarantine as a method of slowing a pandemic, but it also shows the need for total vigilance to that quarantine. As with Spain, the press in Australia exposed some uncomfortable truths about the virus that caused panic in the short-term. Barry seems to argue, however, despite the short-term shock of these newspaper articles, it was ultimately better to face the truth than to try to hide it.

Though the worst of the virus had passed, it still struck intermittently throughout spring 1919, and it remained powerful enough to do one last thing.

Though stories from history are sometimes told as contained events with satisfying conclusions, Barry shows here why such a neat approach to history can be too limited. The story of the pandemic does not have a simple ending, and its effects echo beyond its seeming end.

CHAPTER 32

Most disease victims, particularly in North America and Europe, made full recoveries. But some victims were left with a final complication. The influenza virus attacked the brain, and as a result of this, it caused various mental instabilities in some survivors. Delirium, depression, and apathy were all common among victims. A decade later, some linked the influenza to an increase in Parkinson's disease.

Recent research about "Long COVID" provides an interesting parallel with the after-effects of the 1918 influenza pandemic, even though the most recent edition of The Great Influenza *came out before the effects of Long COVID were widely known. Though Barry couldn't have intended the parallel, these current events help illustrate how prescient Barry's book was and how his central theme about the past repeating itself remains relevant.*

New research into the 1918 pandemic conducted throughout the 20th century seems to confirm the previously anecdotal evidence that influenza survivors often suffered mental health issues.

The fact that the 1918 pandemic continues to be a topic of research and scholarship testifies to its continued relevance.

Even as government officials died of the disease, an important meeting of heads of state from the victorious nations in the war was planned in Paris. Though many people from many countries attended, in the end many of the decisions were made by President Wilson, without his staff, in conference with France and Britain's leaders.

Wilson's decision to go it alone during the peace talks provides a contrast with all of the scientists who worked on a cure for the influenza pandemic collaboratively. Though the scientists worked long hours alone in a lab, they were part of a community, whereas Wilson seemed to be trying to do things unilaterally.


Wilson's negotiations in France stretched on, and people in his family caught influenza, which lingered even into late March of 1919. On April 3, Wilson himself had an attack so violent that some suspect he'd been poisoned (in fact, it was just influenza). Before his fever, Wilson was uncompromising, ready to walk away from any treaty if the United States didn't get favorable terms. After getting sick, he was eager to return to negotiations as soon as possible, but his health didn't allow it.

Wilson's own experience with disease shows why it is dangerous to invest too much authority in any single person—because even the most powerful people are human and vulnerable to things like disease. As Barry argues elsewhere, the way to combat this problem is to build effective institutions that will outlast the individuals who created them.

Some people around Wilson noted that he'd lost his mental "resiliency" since the attack. At one point, Wilson believed his home was full of French spies. Wilson appeared tired, and one day he suddenly yielded to all of France's demands without getting anything in return. This included having Germany accept all responsibility for war, pay reparations, demilitarize, and hand certain strategic territories over to France.

The outcome of the peace talks shows again the problems of trying to act unilaterally. Wilson's erratic behavior clearly demonstrates that his illness affected his judgment. In this way, just one case of influenza ended up having an enormous impact on world relations, arguably leading to the imperfect peace agreements that set the stage for World War II.

Germany was shocked by the treaty's terms and believed it violated the principles Wilson had set forth. Wilson continued to speak erratically, and many later described his mental state as resembling a nervous breakdown. Four months later, he suffered a major stroke.

Wilson's stroke emphasizes how the effects of influenza could be long-term and unpredictable. If one case of influenza could have such a large impact on the president of the United States, it doubtless had an even larger impact on individuals who didn't have the same medical resources available to them.

Some later historians argued that Wilson actually suffered his first small stroke in France, but one careful medical historian confirmed that Wilson's symptoms in France matched perfectly with influenza, not stroke. The myth of Wilson's stroke has often been repeated, even in the 21st century. A recent study shows, however, that there is a clear link between influenza and stroke.

One of Barry's main interests is not just what happened in history but also how this history gets told. Here, Barry gives an inside look at the process of how history gets recorded, showing how myths and other false information can be confused with real history.

It's impossible to know how Wilson's influenza case changed history. Most historians agree, however, that the harshness toward Germany in the World War I peace treaty was directly responsible for creating the conditions that led to World War II. Even at the time, many criticized Wilson's role in the peace treaty, calling him a hypocrite who betrayed his own principles. Several diplomats either resigned or threatened to.

One of the frightening things about Wilson's case of influenza is that it seemed to change his whole identity, causing him to give up values that had previously been central to him. Perhaps on a larger scale, a similar change was happening across the entire United States due to the scars left behind by the virus.

CHAPTER 33

In late September 1919, John Osler, one of the four founding faculty at Johns Hopkins Medical School, got influenza and died that December. Around that same time in September, many U.S. scientists were predicting that influenza would come back. By February 1920, the virus had, in fact, come back, spreading almost as rapidly as it had in 1918's deadly second wave. It took years to fade and never truly went away.

Once again, Barry complicates the idea that the influenza pandemic ended after the deadliest wave died down. Though the aftershocks were not as noteworthy as the initial devastation, the disease remained a force in public life for well beyond its initial explosion. The fact that the disease never fully went away symbolizes how history's effects can carry into the present day.


The virus had many consequences beyond just the death toll. Many people became orphans or lost children or siblings. Many reported lethargy that seemed to be a consequence of influenza, though it was a hard symptom to prove.

Barry shows how some of the influenza pandemic's most enduring negative effects were not its most dramatically destructive. He considers how a disease can disrupt a person's well-being without necessarily creating a life-or-death scenario.

The disease lived on in memory more than in literature from the time. Major writers from the period like Ernest Hemingway, William Faulkner, and F. Scott Fitzgerald said almost nothing about it. Though this may seem unusual, it actually has historical precedent: outside of a few well-known texts, little survives from the **Black Death**.

In this passage, the difference between actual history and the historical record comes to the forefront. Barry asks an open-ended question: what should we take away from the fact that some events, which made a huge mark on people who lived through them, nevertheless left little in the historical record?


Historians who study epidemics have noted that those in power often try to blame the poor for their own suffering, as was the case with "Typhoid Mary," an Irish immigrant who was unjustly imprisoned for 25 years. Some officials in 1918 took similar actions. One Denver health commissioner blamed the disease on Italian immigrants. The disease itself, however, made little distinction between race and class, becoming nearly a universal threat.

The theme of scapegoating and assigning blame returns in this passage. As Barry shows, often these techniques are a way of coping with fear of the unknown. The indiscriminate nature of the disease—the way it affected people of all races and classes—provides a clear counterargument, proving why this scapegoating is never productive.

The influenza death toll is almost impossible to calculate. Even in places that kept reliable records in normal circumstances, the sheer pace of the disease made tracking everything impossible. Many parts of the world, like rural India, didn't keep accurate records even in normal conditions but were surely hit hard by the virus.

The lack of death toll records dovetails with the lack of pandemic mentions in early 20th century literature, once again raising questions about how history is remembered. Though Barry laments the lack of information, he isn't necessarily criticizing places like rural India, which were overwhelmed by the virus and had little opportunity or ability to prepare.

A 1927 estimate by the American Medical Association put the death toll at 21 million. Every new figure since then has been higher. New data and better statistics bring the toll closer to 50 to 100 million, which was over five percent of the world population at the time.

The rising death tolls suggest a better understanding of the science as time goes on, as well as perhaps a greater willingness to look at the full toll of the pandemic.

Pure death tolls, however, can't convey the real horrors of the pandemic, since one of the most significant features of the virus was how aggressively it attacked people between 16 and 40. In less developed countries, as many as 10 percent of young adults may have died.

While statistics can be helpful for historians, they can also provide a false sense of confidence. Here, Barry still looks at mass statistics but tries to give them a more human touch by putting the destruction into context.

Going into the 1920s, a sense of loss lingered among survivors, in addition to some of the mental health problems associated with surviving influenza. One positive outcome, however, was that international health authorities began to cooperate on a greater level than ever before. Cities and states organized new institutions to better prepare for future health problems. And one of the biggest legacies of the disease was what happened in laboratories.

Though the 1918 pandemic is a dark story, Barry also highlights some of the undeniably positive outcomes. The cooperation among international health authorities could be seen as the first step toward moving beyond the stubbornness of some leaders, particularly in the U.S., who ignored their better-informed advisors.

CHAPTER 34

By World War I, the revolution in American medicine was complete, and it could finally compete with the rest of the world. The leading figures were a small group, with most of them connected to Hopkins, the Rockefeller Institute, or a handful of other major universities. They were also united by their almost single-minded approach to lab research, particularly during the height of the pandemic.

This new and final part of the book begins by summarizing what has happened over the course of the previous parts. It takes stock of the outcome of these events in order to highlight in broad strokes what was important about these events.

Up until late 1918, most of the innovators in American medicine were working in separate labs, with little communication among one another. As the second wave began to wane, however, some leading scientists organized a commission to focus on influenza. Even with all of them, they knew little about the disease, other than the fact that isolation helped stop its spread. But nevertheless, they were able to agree on a couple things.

The summary and recap of the course of the 1918 pandemic continues. Barry steps away from the granular stories about individuals and uses this high-level overview to examine broad patterns.

The scientists agreed that they had to perform epidemiological investigations, looking at how public health measures correlated with deaths and what measures for stopping the disease proved to be most effective.

While epidemiology and public health were disciplines before World War I, both the war and the pandemic caused major revolutions. The end of the pandemic didn't bring a return to the scientific status quo but a continued quest to understand what happened and how to prevent it in the future.

Gorgas went into World War I with the goal of making it the first war where more soldiers died in battle than from disease. Had it not been for influenza, he might have succeeded, since American soldiers fared far better against diseases like malaria than some European soldiers.

Though in some ways the 1918 influenza pandemic is a story of the failure of government public health officials, Gorgas represents someone in the system who was trying to do good. Barry shows that, while Gorgas was limited in what he could do, he still managed to make some significant progress as a leader.

The influenza commission of scientists had more meetings, and its members joined other commissions too. Everywhere, scientists collaborated on one of the most massive scientific inquiries ever undertaken. Their findings began to coalesce into a coherent body of knowledge.

This passage returns to the theme of how science is both a bunch of individuals working in separate labs as well as a global community. The end of the war and the pandemic allowed scientists to collaborate more widely and do more meticulous research.

First, the scientists confirmed that the deadly influenza pandemic in fall 1918 was a second wave of the less deadly spring influenza that year. Statistics helped confirm what many physicians already knew anecdotally: that the disease was particularly brutal on young adults. One theory was that a previous, much milder pandemic spread through the world at some earlier point, and that this left the elderly with surprising resistance to the 1918 virus.

One of the hallmarks of good science is that it relies on more than just anecdotal observation. While many reported from personal experience that young people were heavily affected by influenza, scientists after the pandemic knew it was important to verify claims like these by turning to more objective measures like statistics (which have their own limitations).

Surveys and investigations helped provide evidence for other things that were widely suspected but unproven: for example, that people who lived in the most crowded areas saw the worst spread. Still, one major gap in knowledge remained: the pathogen was still unknown, despite the efforts of the best scientists from around the world.

Even after the time pressure of the pandemic was removed, scientists struggled to discover the pathogen behind the influenza pandemic. This highlights how sometimes nature remains mysterious, even when confronted by the best of human science.

CHAPTER 35

The big questions that remained after the pandemic were simple: what caused influenza? Was Pfeiffer right about *B. influenzae*, or was the killer something else?

The beginning of this chapter establishes the main question that will frame it. The fact that the influenza pathogen had not been discovered yet shows how science is never focused on just the present—it's also in conversation with the past and the future.

Throughout the pandemic, investigators had mixed results when looking for *B. influenzae*, with some feeling pressure to find it and feeling like a lack of *B. influenzae* was simply evidence of bad science. But despite this pressure to conform, eventually enough evidence mounted to confirm that *B. influenzae* was not present in all cases. While it was definitely present in some cases, and it could cause disease and kill, a full explanation of the pandemic required more than just *B. influenzae*.

Research described earlier in the book seemed to strongly hint that B. influenzae *was not in fact the main pathogen of the influenza pandemic. Nevertheless, many scientists acted under the assumption that it was. While this could be seen an example of bad science, the extraordinary pressure of the pandemic often forced scientists to abandon the usual procedures. Barry leaves open the question of whether the focus on* B. influenzae *was a mistake or whether it was just scientists doing their best with the resources available.*

The frantic pace of research during the pandemic caused some investigators to compromise on the quality of their research, leaving questions afterwards about how to proceed with new research. After the pandemic, Park and Williams returned to their more deliberate approach. They reached a surprising conclusion: that perhaps *B. influenzae* wasn't a single strain but dozens of them, which meant any serum might work against some strains but not others. The multiple strains also led them to conclude that *B. influenzae* was just a secondary invader, not what caused the pandemic itself.

The work of Park and Williams emphasizes how science changed during the pandemic and then again in the immediate aftermath. As this passage shows, having more time to proceed with research in a methodical way can lead to new and surprising discoveries that are much more difficult to make when facing down a pandemic. Again, this isn't necessarily a condemnation of pandemic-era science, which tried to make the best of extraordinary circumstances.


Park and Williams, along with other investigators, began to wonder whether the pandemic was caused by a "filterable virus" (a technical term for a very small virus that can pass through filters that bacteria can't). Its small size would make it difficult to observe with the equipment they used at the time. This wasn't the first time someone suspected a filterable virus; the idea had been tested before without conclusive results. Many continued to believe Pfeiffer's *B. influenzae* was the culprit simply because there wasn't good evidence yet for any alternative.

The lack of pandemic-era pressure allowed Park and Williams to explore unconventional ideas, like filterable viruses, instead of following common wisdom. This shows how sometimes science requires creativity, and how this creativity can be stifled in a crisis situation. With filterable viruses, Park and Williams pushed the limit of what they could discover with the equipment they had at the time.


Many investigators focused too narrowly on their own work: if they personally found *B. influenzae*, they assumed it was the culprit, and if they didn't, they assumed it must be something else. The issue was heavily researched but remained unsettled throughout the 1920s and into the 1930s. In 1931, Pfeiffer himself still believed he'd found the most likely pathogen, although Welch believed the real culprit may have been an unknown virus.

During the pandemic, leaders who tried to go it alone often ended up causing devastating unintended consequences. Though the stakes are not as high after the pandemic, some scientists fell into a similar trap, mistaking their immediate circumstances for a wider trend. Puncturing false ideas about B. influenzae *would take individual creativity, but it would also take an awareness of what was going on in the larger scientific community.*

Avery continued to work obsessively, even after the pandemic. He spent years of his life investigating pneumococci, specifically the capsule (which protects the pneumococcus on the outside and is made of a type of sugar). But then, a 1928 report came out and proved that his entire line of investigation was flawed. Avery got sick and took some time off before resuming his work in a new direction.

This passage shows how even an eminent scientist like Avery can get bogged down in the wrong line of investigation. Because science is about investigating the unknown, this is always a danger that scientists face. This passage seems to suggest that Avery was so disappointed by his failure that it made him physically sick—but it didn't make him give up.

Avery published fewer papers than before, partly because his advancing age prevented him from being as directly involved in experiments, but mostly because his work moved slowly and gave him little to report. He slogged on through 1943, continuing to publish little but excited that he may have been on the verge of a breakthrough. That year, he officially retired but continued to work as always.

Avery's work during this period provides a sharp contrast with the frantic work that he and other scientists were doing at the height of the pandemic. In some ways, his more deliberate approach to work might reflect his advancing age and his status as a scientific veteran as opposed to someone at the start of his career.

Finally, in late 1943, Avery published his big discovery. He had proven that DNA carries genetic information and is responsible for changing the capsule on a pneumococcus, and that this change can then be inherited.

Avery's big gamble—to slow down the pace of his work and not worry about racking up publications—paid off in a big way. His breakthrough on DNA showed that there was value to veteran investigators taking their time on an issue.

Before Avery's discovery, scientists had isolated DNA but didn't know its purpose. Avery's proof that it carries genetic information was so revolutionary that it took time to gain general acceptance. Later, James Watson and Francis Crick would famously discover the double-helix structure of DNA molecules. They credited Avery's experiments with influencing their own. Others also built off Avery's work, with many of them winning Nobel Prizes, although Avery himself never would. He died in 1955, just a couple years after Watson and Crick's discovery.

Though Avery's name is not as widely known today as Watson's or Crick's, Barry makes the case that Avery's work was in many ways just as valuable. By listing how many scientists achieved Nobel Prizes by expanding on Avery's work, Barry suggests that Avery was a foundational figure. At the same time, however, Barry questions how accurate awards like Nobel Prizes are, if they fail to recognize pioneers like Avery in their lifetimes.

CHAPTER 36

After the pandemic, Paul Lewis led an institute at the University of Pennsylvania. He kept working, researching tuberculosis and expanding his research into mathematics and biophysics. But he was unsatisfied with the results. Eventually, he accepted a new position at the University of Iowa that he hoped would help cure his restlessness. In fact, however, he ended up quitting the position before moving to Iowa in order to get set up in a lab closer to home in Philadelphia.

Paul Lewis, who found purpose and inspiration during the pandemic more than any other investigator, would struggle to find new goals in the years that followed. His acceptance and then abrupt refusal of the Iowa position show how Lewis was restless in these years and still searching for his next big idea.

Flexner helped Lewis get involved with a lab at Princeton. Lewis spent a peaceful year there but produced little. One year became three years with no results, and Flexner gently suggested that Lewis switch from tuberculosis work to something else. After five years with no results, Flexner began moving to end his research relationship with Lewis.

Lewis's lack of new publications was not initially a problem—Avery followed a similar process and achieved great results. But Flexner sensed that something was different with Lewis and that he'd become aimless. Even a prominent scientist has to focus on new research instead of coasting on past discoveries.

In May 1928, a prominent scientist died while trying to investigate yellow fever. Other scientists wanted to continue his promising work, but Flexner refused to let young men go because of the danger. Lewis volunteered to go study a virulent strain of yellow fever in Brazil.

Barry leaves the question open of whether Lewis was bravely going to Brazil to attempt new research that only someone like him could do, or whether he had simply stopped valuing his own life enough to care about the danger from yellow fever.

Lewis set up a lab in Brazil and seemed to recover some of his old vitality. Soon, though, he fell ill, and just a few days later, he died. Per his widow's request, there was no memorial. Flexner wrote an obituary for Lewis (who seemed to have accidentally caught yellow fever) and mentioned Lewis's earlier accomplishments while omitting the last five years of his life.

The tragic end of Lewis's story was perhaps somewhat predictable, given what happened to the previous scientists in his position. The fact that Flexner wrote Lewis's obituary suggests how much of Lewis's life was tied to his work—and why the lack of progress in his final years must have been so difficult for him.

Richard Shope, a younger scientist working with Flexner, began researching swine influenza. He was able to determine definitively that influenza in swine is caused by a virus. Today, scientists know that the virus Shope discovered was directly descended from the 1918 human influenza virus.

Shope only gets a small role late in the book, and yet he made arguably the single most important discovery about the 1918 pandemic. Barry doesn't do this to minimize Shope's contributions, but simply to illustrate how much of Shope's discovery was based on the long hours of work by the teams of scientists who preceded him.

Shope also proved that *B. influenzae* was a secondary invader during the pandemic and could still be highly lethal in its own right. Shope's work sparked an immediate reaction around the world. Though Shope made some errors that the painstaking Lewis might have prevented, had he lived, Shope was ultimately recognized as a capable scientist.

Shope's strengths and weaknesses as an investigator highlight the differences between eager new scientists and established veterans. Shope's youth helped motivate him to chase exciting new ideas, but it also caused him to make mistakes that a veteran might have avoided.

Park, Avery, and Lewis all had different work methods, but these different styles allowed each of them to contribute to medical knowledge in their own ways. In some ways, Lewis was the last victim of the 1918 pandemic.

The final lines of the book emphasize the communal nature of science and the long-lasting impact of the 1918 influenza pandemic.

AFTERWORD

The afterword is written in January 2021, after the COVID-19 pandemic has been happening for over a year. The author, John M. Barry, says he is often asked what lessons from 1918 can be applied to the present. He suggests two things: first, people in positions of authority must be honest and retain the public's trust. Second, measures like social distancing, masks, and proper ventilation are very effective.

COVID-19 is the whole reason why The Great Influenza *has experienced a renewed surge in interest, so it's natural that Barry would address the issue in a new afterword. The advice Barry gives to combat COVID-19 dovetails with his description of the influenza pandemic of 1918, particularly his descriptions of the mistakes leaders made.*

There are also important differences between the 1918 influenza and COVID-19, with the former being more virulent (i.e., deadly) but also less transmissible (meaning it didn't spread as easily as COVID-19 does). The other big difference is that COVID overwhelmingly affects the elderly, as opposed to the 1918 influenza, with disproportionately affected young adults.

Though it's easy to draw comparisons between the 1918 influenza pandemic and the COVID-19 pandemic, Barry cautions against oversimplifying things. The differences between influenza and COVID as diseases makes a huge impact on how each pandemic affected society.

Herd immunity offers hope for an end to the pandemic, but it will happen through vaccination, not infection. It also won't mean a complete end to the virus; the virus will continue to infect some people, just not on the same scale. Long term, the future of COVID may resemble influenza, with yearly booster vaccines needed to combat new strains.

Though Barry doesn't say so explicitly, in this passage he seems to be responding to people who oppose vaccination or COVID containment measures. Though herd immunity is a real concept, it was often brought up as a justification by politicians and commentators who opposed COVID safety measures, many of whom were also against vaccination. By emphasizing the importance of vaccination, Barry is making clear where he stands on the issue

Propaganda and censorship made the public lose trust in officials, and this ultimately worsened the course of the 1918 pandemic. Combatting COVID-19 will require the public's trust, which will involve no lies, distortion, or manipulation.

During the early stages of the COVID-19 pandemic, some politicians and news outlets attempted to dismiss the disease as no worse than the flu. Barry implies a connection between these recent events and events that occurred in 1918, when many newspapers also dismissed a deadly virus as "only influenza." He argues that whether it's 1918 or 2020, it's better to look directly at the threat a pandemic poses, even if it's unpleasant.

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