Pioneer Science and the Great Plagues

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Published by Purdue University Press

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Purdue University Press, 2021.
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diluted to one part per million. The lack of science caught up to the scam and the homeopathic school and hospital closed in 1919.\textsuperscript{37}

Veterinary homeopathy had first been formalized when a German veterinarian named F. A. Gunther published his \textit{Homeopathic Veterinary Medicine} in about 1840. It appeared on the American scene when a second edition was translated into English and published in the U.S. in 1853. The book was publicized big-time by Dr. F. Humphreys, a prominent physician in Philadelphia, who took up veterinary work treating horses with dilute suspensions of belladonna (one part in a trillion of water), which had “the horse on his feet in two hours. Ten doses at 12-hour intervals ‘perfected the cure.’” Humphreys printed pamphlets and books on homeopathy that flooded the eastern markets.\textsuperscript{38}

Humphreys’s remedies cost less than a penny per dose, which he prophesized that “any sensible, faithful man of ordinary intelligence can master without difficulty.”\textsuperscript{39} But like human homeopathy, science caught up with veterinary homeopathy and it was gone. J. F. Smithcors, in noting the frequent brutal treatments delivered by veterinarians in those days, wrote that “at a time when both men and animals literally died of the doctor, homeopathy at least gave them the opportunity to die of disease—or recover with the aid of Nature, perhaps assisted by homeopathic nursing care.”\textsuperscript{40}

\section*{9. NEW PLAGUDES, CIVIL WAR, AND THE UNITED STATES DEPARTMENT OF AGRICULTURE}

A rapidly spreading respiratory disease of cattle entered Massachusetts on July 23, 1859, with four Dutch cows imported by Winthrop Chenery of Belmont, near Boston. The cows, shipped from Rotterdam, had high fevers, labored breathing, and frothy noses. They were all so sick when they arrived in Boston that only two were able to walk from the boat to Mr. Chenery’s farm.\textsuperscript{41} When the carcasses were examined, the lungs were heavy and inflamed and the lining of the rib cage was rough and carpeted with tags of clotted serum. The disease was recognized immediately as contagious pleuropneumonia, but not before it had begun to spread through the area. Within the next four years the disease had appeared in twenty townships in Massachusetts. The potential for massive outbreaks in eastern states and the need to prevent contagious pleuropneumonia from spreading westward into the cattle country of the open
plains and South Texas was an important factor spurring Congress to establish a U.S. Department of Agriculture.43

WHEN THE AMERICAN CIVIL WAR BEGAN, the absence of veterinary care in the U.S. Army made it dangerous to be a military horse. Remount purchases of sickly horses from corrupt contractors used by the Army Quartermaster Corps led to enormous death losses. Cavalry horses, weakened by poor nutrition and husbandry, could not withstand long military sorties and were susceptible to strangles and glanders. The Civil War was notorious for quartermaster kickbacks.

Army Quartermaster Corps officer McKinstry was court-martialed for paying $119 for horses that sold on the market for $80. Contaminated meat was supplied to the Army at high prices. Wool material knitted from cheap shoddy—yarn constructed of scraps or old clothing—was sold to the government by New England mills at the price of high-grade wool; uniforms disintegrated after the first rain.

No qualified veterinarians were available: Europe had thirty formal veterinary colleges; North America, none. The Army quickly created the position of veterinary sergeant, a noncommissioned officer, for each battalion. No veterinarian applied, and in 1862 the position was eliminated. Joseph Bushman, a graduate of London’s Royal Veterinary College practicing in Washington, D.C., was asked by the Lincoln administration to serve in the U.S. Army as a veterinary sergeant. Bushman declined since in England military veterinarians were commissioned officers; he was later recruited to supervise the critical horse and mule recruitment center, the Remount Station along the Potomac River.43

The next year, the U.S. War Department ordered each cavalry unit to have a veterinary surgeon at $75/month (four times the pay of a veterinary sergeant) but failed to provide instructions or qualifications for selection by any responsible regimental officer. Army line officers ignored the order. One state militia did have a qualified veterinarian: the 7th Pennsylvania Cavalry had a Boston Veterinary Institute graduate, George F. Parry, probably the first schooled veterinarian to enter military service in the United States.44

General McClellan, head of the Army of the Potomac, knew about modern veterinary care and continued as a strong proponent of veterinary education. Replaced with Ulysses S. Grant, he ran unsuccessfully against Abraham Lincoln in the general election for president in 1864. Had he won, there may have been
a national veterinary school at West Point. Grant, although a superb horse-
man—he had been the best rider in the Cadet Corp at West Point—knew little
of the modern veterinary schools of Europe. He dignified quackery by persuad-
ing Congress to allocate $10,000 per year for a know-nothing charlatan named
Dunbar to teach horseshoeing and lameness care for Army cavalry.45

AFTER THE CIVIL WAR, as animals were imported and numbers increased, so
did infectious diseases. Animal plagues were destroying the livestock industry
beyond the capacity of cities and states to deal with them. Texas cattle fever and
bovine tuberculosis were serious problems, and contagious pleurpneumonia,
trichinosis, and hog cholera were closing European markets to exports of pork.
It was the federal government and its fledgling U.S. Department of Agriculture
that stepped in to save the animal industry.

Despite the energy consumed by the Civil War, three major developments of
the period set the stage for veterinary science in the rural Midwest: the imme-
diate success of the Bureau of Animal Industry in combating the infectious
plagues, the establishment of the National Academy of Sciences to provide
scientific advice to Congress, and westward expansion of the railroads and the
ensuing growth of the livestock industry. In the Midwest, the Northwestern
Railroad crossed the Mississippi River and connected to the Union Pacific in
Omaha in the 1860s, and the Kansas Pacific extended through Denver to the
Union Pacific in Cheyenne. In contrast, the Texas and Pacific Railroad moving
west from New Orleans and Shreveport reached Fort Worth only in 1876. The
Civil War had stopped railroad construction throughout the South. Still lack-
ing stockyards, railroad stock cars, and access to the Chicago markets, Texas
cattle continued to use trails to Kansas for another decade (see appendix I).

TEXAS CATTLE FEVER (called southern cattle fever in the eastern states)
appeared during the summer months in the western plains as cattle were driven
north to the railheads in eastern Kansas, Missouri, and Illinois. The disease killed
quickly—it destroyed red blood cells but left few other signs of disease except
for red urine and striking pallor from anemia. The disease occurred in native
cattle but was limited to those that had contact with longhorn cattle driven
north by South Texas ranchers—causing observers to call it Texas fever, or
redwater (because of the bloody urine), and later, when the disease was better
understood, hemoglobinuric fever.
The sturdy Texas Longhorn cattle had originated from Iberian lineages, direct descendants of the Spanish breeds Barrenda, Retinto, and Grande Pieto. They had been moved north by Mexican ranchers but abandoned when Texas was settled and became independent. Feral for nearly two centuries, the Texas Longhorns had evolved to be highly tolerant of feed and drought stress. They could withstand the grueling cattle drives to the Kansas railheads.

Before the Civil War, cattle were driven from Texas northward to markets in Missouri and Illinois on the Shawnee Trail via Austin, Waco, and Dallas. Closed during the Civil War—both Union and Confederate soldiers used the Shawnee Trail—routes shifted to the Chisholm Trail after the war, to new railheads in Kansas. The buildup of cattle in Texas during the war promoted huge cattle drives to the North. The price of cattle in Texas in 1866 was $4 per head; in Kansas City, $40 per head. In spring 1866 an estimated 250,000 longhorns headed north. As the Kansas Pacific Railroad arrived in Abilene, stockyards were built that attracted cattle drives; the terminus for the Chisholm Trail was Abilene from 1867 to 1871, when the Santa Fe Railroad moved south toward Wichita.

As the Union Pacific moved into western Nebraska, a Texas Trail was established that led to Ogallala, Fort Scott, and other western cities. A strict law against moving cattle into the state was enacted by the General Assembly of the State of Iowa: moving cattle “in such condition as to infect with or to communicate to other cattle . . . Texas fever . . .” would be fined up to $1,000 and “any person injured or damaged by such an act may bring action to recover the damages.”

Days after the longhorns had passed through, local cattle began dying in large numbers. In Missouri, angry farmers started turning back the herds at the border. State legislatures created a hodgepodge of laws to keep southern cattle from passing through their states to market. The first legislation against the movement of Texas cattle had been an act by the Kansas Territory in 1859 prohibiting the driving of cattle from Texas or Arkansas through the four eastern counties between June and November. Missouri, Colorado, Nebraska, and the Dakota Territory soon passed similar laws. Challenged, the U.S. Supreme Court ruled these laws unconstitutional on the grounds that they discriminated against all Texas cattle and constituted a restraint of trade. Nonetheless, gangs of concerned citizens were formed in the trail states to prevent passage of cattle. Arriving at the outskirts of Kansas City on the Chisholm Trail,
many drovers were turned back by organized groups of angry Kansas stock-
men. Reactivated from Civil War antislavery vigilantes, they called themselves
Jayhawkers, and the task of bullying Texas drovers “jayhawking.” Loss of passage
through Missouri and Illinois shifted cattle trails westward to the Chisholm
Trail to connect to railheads of the Kansas Pacific Railroad being pushed west-
ward to Denver. The drives had to start in early June since the grasslands would
be dry by midsummer.

Horace Capron, a livestock breeder in Illinois, was appointed in 1867 as
commissioner of the U.S. Department of Agriculture—USDA for short. His
immediate problem was Texas cattle fever, and he proposed that this disease
receive the most attention. An article in The Veterinarian had notified its read-
ers that “a very subtle and terribly fatal disease” had broken out among cattle
in Illinois. Southern cattle moving overland to northern markets were bring-
ing the debilitating and deadly fever throughout the Midwest, especially into
Illinois, Indiana, and Ohio. In the East the disease was called southern cattle
fever, but the spread northward was similar; cattle shipped north from Florida
were bringing the fever to the Mid-Atlantic states.

Commissioner of Agriculture Capron, in his first annual report in 1868,
pointed to the need for funds for research on Texas cattle fever and went
further—he recommended the “creation of a division of veterinary surgery
for the investigation and prevention of diseases of domestic animals.” There
was no response from the U.S. Congress. States were paralyzed by the prob-
lem and no useful research was underway. “Out west,” John H. Rauch, MD,
the Chicago health commissioner, recorded over two thousand autopsies on
cattle with Texas fever from 1868 to 1869, including lesions and organ weights,
but the information didn’t explain what was going on.

State commissioners of agriculture from the Midwest assembled in Springfield,
Illinois, in December 1868 to deal with Texas cattle fever. They were divided as
to who should undertake investigations of the disease. Should it be Congress
and the Treasury Department, or the War Department with its installations
and network of veterinarians, or the fledgling U.S. Department of Agriculture?
The states settled on USDA commissioner Capron’s request for funds, which
allowed him to expand his current work with livestock. The state commissioners
also recommended to Congress that there be the establishment of a veterinary
division within the USDA. No response.
The new commissioner of agriculture, George Loring, asked veterinarian H. J. Detmers to undertake a study of southern cattle fever. After he spent several months on the ranges of Texas talking with ranchers and farmers about the disease, his 1885 report *Investigation of Southern Cattle Fever* dealt with cocci and bacilli recovered from the livers and spleens of dead animals as potential causal agents, but he knew that his study had failed to find the real cause of the disease. At the end of his sixth year with the Bureau of Animal Industry, a disgruntled Detmers resigned to become the professor of veterinary science at The Ohio State University.

Investigations into the cause of Texas cattle fever seemed to be stymied. But the discoveries in its geographic spread and seasonal occurrence had been the beginnings of a new discipline, veterinary epidemiology. A Texas cattle fever quarantine line was established at approximately the thirty-seventh parallel of latitude that turned northward in the Atlantic Coastal Plains. Veterinarians in the new state departments of veterinary science made important contributions—Mark Francis in Texas, Frank Billings in Nebraska, R. H. Dinwiddie in Arkansas, and Paul Paquin in Missouri. Francis shipped eighteen Texas Longhorns to Paquin to investigate how ticks were involved in the disease spread. Although barren as to cause, these scientists laid the groundwork for a surprising discovery of the new agent that was destroying red blood cells in the dying cattle.

**Equine influenza**, a rapidly spreading and sometimes fatal respiratory disease, decimated horses in New York City, Boston, Washington, and Chicago in 1872. Transport in the cities stopped. The *New York Times* of October 30 reported that twelve thousand horses were down with influenza. In Boston, mail, groceries, and freight sat on docks undelivered; a fire that broke out in November could not be contained as fire wagons pulled by men, not horses, could not keep up with a fire spreading through the town. Much of Boston—776 buildings—burned. In Chicago, hundreds of sick and dying animals lay unable to function. Today, when transportation problems center on where to park one’s car, it is hard to imagine a time when business in most large American cities was paralyzed because horsepower was incapacitated by disease.

Equine influenza had originated in Markham, Ontario, Canada, in the last few days of September 1872 and had spread along railroad lines and hubs, canals,
and stagecoach lines throughout North America. The route of a traveling circus was traced by new centers of disease; even its mules and zebras were afflicted. Influenza was reported in Washington State in May 1873 and had rapidly spread throughout the Midwest and southward into Central America and the Caribbean. In one frontier skirmish the U.S. Cavalry and Apache Indians fought on foot—horses on both sides were too sick to ride into battle.

The first sign of influenza in horses was a rapidly developing fever, often increasing to 107 degrees within twelve hours. Horses coughed unproductively and respiration became labored and pulse rate accelerated. There were chills with trembling and shivering, first in the flanks, then progressing to all muscles of the body. Pregnant mares aborted. Rush Shippen Huidekoper described the fine points of the disease in Philadelphia: “hairs become dry and rough and stand more or less erect” and there is swelling of the eyelids, underbelly, and penis sheath. Mucous membranes of the mouth and other orifices were violet-red or even saffron-colored. Horses became stupid (the horseman’s language for unresponsive), standing immobile with head hanging, ears listless with puffy and swollen eyes, and paying little attention to the stablemates or surrounding attendants. Stupor increased: “The horse stands limp, as if excessively fatigued, staggers, and falls.”

Mortality was low, 2 to 10 percent, but recovery of horses required several weeks. Viral influenza was complicated by secondary bacterial infections of strangles; the virulent streptococci of strangles infected the throat and lungs, leading to fatal pneumonia. Weakened horses that recovered were useless for weeks so that business dependent upon cartage was suspended where oxen could not be procured to make deliveries. Glanders strewn by the Civil War was a factor in this influenza outbreak, complicating the diagnosis and confusing self-taught “veterinarians” who were called into the scene.

In the stables of the Washington streetcar line in the District of Columbia, the ravaging influenza epizootic of 1871–1872 paralyzed streetcars and general traffic. In the nation’s capital that year there was no veterinarian able to diagnose and deal with the problem, no government veterinary agency to call, and no veterinary diagnostic laboratory with experts to examine tissue specimens from an emergency animal disease. In their absence, the disease at the streetcar stables was investigated and identified by a military medical pathologist.

Joseph Woodward, MD, had done autopsies on two American presidents, Abraham Lincoln and James Garfield. The first pathologist at the Army Medical
Museum, the forerunner of the Armed Forces Institute of Pathology, he had founded the Division of Comparative Pathology. Woodward was called the father of veterinary pathology in America due to his studies on the pathology of the great cattle plague raging in the eastern United States during the 1860s; he had published his report on contagious pleuropneumonia in 1870, the first on microscopic changes in the lungs of cattle.49

Around the nation’s capital during the influenza outbreak, the lack of veterinary science expertise was clear to everyone, including the Army, the USDA, and the city’s Sanitary Department. There were too few educated veterinarians around to deal with serious animal plagues.

**Hog cholera, a new disease,** was first encountered in the Ohio Valley in the 1830s. Today named classical swine fever, it had moved rapidly through the Midwest. As hog populations increased, so did hog cholera and, in fifty years, the disease had spread through the country, often coming in waves of terrible death loss. It killed pigs quickly. Attacking blood vessels, it caused massive hemorrhages and swollen fluid-filled tissues. Piles of dead pigs were common in the rural Midwest when hog cholera attacked. In 1878, U.S. commissioner of agriculture Le Duc, a Minnesotan, asked nine veterinarians to investigate hog cholera in different parts of the country and report on the status and treatments used in various regions: H. J. Detmers, for Illinois; James Law, New York; D. W. Voyles, Indiana; D. E. Salmon, North Carolina; Albert Dunlap, Iowa; H. F. Dyer, Illinois; A. S. Payne, Virginia; J. N. McNutt, Missouri; and C. M. Hines, Kansas. At the time, Salmon and even Pasteur were writing that the cause of hog cholera was a bacillus to which they gave the name *Bacillus suis*. Theobald Smith concurred but was calling it *Bacillus cholera-suis*.50

Reports submitted by Law and Salmon were general and vague and contributed little; worse, they supported the hypothesis that bacteria caused hog cholera. In contrast, the report by Detmers made it clear that the bacterial cause of hog cholera was far from settled and that, in the facts known, the cause was most likely not bacterial. Using his pathology training from Berlin, Detmers cautioned rightly that the science behind this assumption was incomplete, that there were some cases where bacilli could not be cultured from dead animals, and that no bacillus had yet been proven to cause hog cholera; none had fulfilled Koch’s postulates. This was the start of an antagonism with Salmon that persisted for
two decades. Twenty years later, when Salmon wrote his history of veterinary research of the time, he did not mention Detmers.

10. AGRICULTURE AND VETERINARY SCIENCE IN THE MIDWEST

Farmers College of Ohio was built on College Hill in the outskirts of Cincinnati in 1848. One of the first institutions of higher culture beyond the Appalachian Mountains, it was dedicated to the “practical character of its course of instruction.” Cincinnati, the first major inland city, was populated by Americans going west; it lacked the immigrants ballooning eastern cities. It was the boombarm of mid-America, the sixth largest city from 1840 to 1860. Known as “Porkopolis,” its agricultural and meatpacking industries flourished before being replaced by Chicago and St. Louis.

In 1848, two years after statehood was granted, the Iowa Legislature petitioned the U.S. Congress to grant the state Fort Atkinson—buildings and two sections of land in Winneshiek County—for an agricultural college. Completed only four years previously to protect the Winnebago Indians in their migration from Wisconsin to Nebraska, Fort Atkinson had been disenfranchised. But the fort was assigned to the Iowa Volunteers military unit, not for an agricultural college. It was officially abandoned on February 14, 1849, at the start of the Mexican-American War.

By mid-century, several states began to see the enormity of agriculture’s economic impact and a need for encouragement. In 1855, state legislatures chartered the Agricultural College of the State of Michigan and the Farmers’ High School of Pennsylvania. Opened under a new name in May 1857, Michigan Agricultural College was a model of success. In Iowa, a bill founding a state agricultural college was signed by Governor Ralph P. Lowe on March 22, 1858, the charter being for an “Iowa Agricultural College and Model Farm.” Story County was selected as the site the next year, and the first building, Farm House, was completed in 1861. Then came the passage of one of the most effective acts ever passed by the U.S. Congress.

To address agricultural issues, the Land-Grant College Act, written by Justin S. Morrill of Vermont, chairman of the U.S. House Agriculture Committee, included provisions for teaching veterinary science as part of agricultural