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THE UNITED STATES ARMY YELLOW FEVER COMMISSION

History of the U.S. Army Yellow Fever Commission

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Philip S. Hench Walter Reed Yellow Fever Collection

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The U.S. Army Commission Experiments

The Death of Jesse Lazear from Yellow Fever



Agramonte, Lazear, and Carroll at Camp Columbia Barracks, July-August 1900. Reed was probably in the U.S. finishing the typhoid report when this was taken. Hench-Reed Collection, Historical Collections, CMHSL

On June 25, 1900, [Walter Reed](#) and his team of [James Carroll](#), [Aristides Agramonte](#), and [Jesse Lazear](#) met for the first time at Columbia Barracks in Quemados, Cuba, where a yellow fever epidemic had recently begun. Ross's *Anopheles*-malaria work and Carter's extrinsic incubation period convinced the commissioners to test Finlay's mosquito theory. Finlay himself provided Lazear with the mosquito eggs for the experiments.

After infecting and incubating the mosquitoes, Lazear allowed them to feed over a period from August 11 to August 25, 1900 on nine American volunteers, none of whom developed yellow fever. Two days later Carroll then agreed to be bitten, and four days later a second volunteer, Private William Dean of the Seventh Cavalry was bitten. On August 29, Carroll showed the first

symptoms of the disease. Two days later Dean showed signs of yellow fever. Lazear noted that Carroll's and Dean's mosquitoes had been incubated for at least ten days after having fed on infected persons before the third day of illness. The incubation periods proved to be the key that was missing in Finlay's experiments.

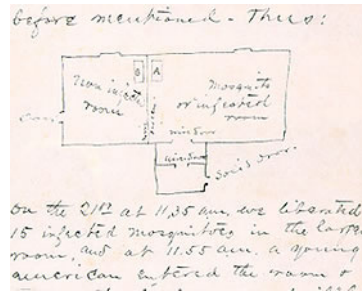


Lazear's grave, Loudon Park Cemetery, Baltimore. Hench-Reed Collection, Historical Collections, CMHSL

While Carroll and Dean recovered, Lazear was diagnosed with yellow fever. How he became infected remains a mystery. Some claimed that Lazear applied infected mosquitoes to his own arm and fell sick, but others, including Lazear himself, said that he was accidentally bitten while attending to patients in the yellow fever hospital. It is possible that Lazear reported his case as "accidental" in order for his family to inherit his life insurance benefits: a self-experimentation "suicide" might have nullified their claim. Lazear died of yellow fever at Columbia Barracks Hospital, September 25, 1900, after just seven days of illness.

Reed was shocked by Lazear's death, but, with such encouraging results, he felt obligated to continue what Lazear and the rest of the team had begun. With Sternberg's approval, he presented his team's preliminary findings on October 23, 1900, at the Annual Meeting of the American Public Health Association in Indianapolis.

Reed returned to Cuba in November and ordered a new series of experiments that he hoped would



Reed's sketch of the Infected Mosquito Building at Camp Lazear, from a letter to his wife, Emilie, December 1900.
Hench-Reed Collection, Historical Collections, CMHSL

convince the remaining skeptics. He secured over \$10,000 from Governor-General [Leonard Wood](#) to continue research and established an isolated experimental station outside Havana which he named Camp Lazear. There the team not only reinforced the mosquito-yellow fever connection but also disproved the fomites theory. Volunteers confined for nearly three weeks in a small shack full of "infected" clothing, pillows, and blankets from the yellow fever hospital did not develop the disease.

In addition, the team demonstrated that yellow fever could be induced by direct blood transfusion. They were not able, however, to isolate the causative agent.

In August, six months after the Camp Lazear experiments, Carroll returned to Cuba to conduct further research at Havana's Las Animas Hospital. He produced yellow fever in a volunteer whom he had injected with infected blood that he had first passed through a Berkefeld filter. The mystery as to why no one had been able to positively identify the yellow fever parasite was solved: the germ was filterable, or "ultra-microscopic." Today Carroll's "filterable agent" is commonly known as a virus.



Las Animas Hospital Ambulance, Havana, ca. 1900.
Hench-Reed Collection, Historical Collections, CMHSL

Informed Consent for Yellow Fever Experiments

The team needed human subjects in order to test the mosquito theory because, at the time, no one knew of any animals susceptible to the disease. The commissioners agreed to experiment on themselves before requesting volunteers. Agramonte was exempted since his childhood case had made him immune. When Reed departed for Washington to complete the typhoid report of 1898, only Carroll and Lazear were left to share the risk with their volunteers.

Several Spanish immigrants participated in the experiments, but the majority of volunteers came from Lieutenant Albert E. Truby's Hospital Detachment at Camp Columbia. Governor-General Wood authorized Reed to offer the volunteers a \$100 gold piece. To a poor Spanish immigrant or an underpaid army private, this was considerable incentive. Added to this was the likelihood of contracting yellow fever naturally during their assignment in Cuba, a point that Reed emphasized in the consent form. Better, said Reed, to contract yellow fever in a controlled environment where one could receive immediate medical attention from reputable physicians than to unexpectedly develop yellow fever in a remote camp where adequate care was unlikely. Even so, Reed stated the possibility that volunteers might die during the experiment. The members of the Yellow Fever Commission are considered the first advocates of informed consent because of their conscientious approach to human experimentation.

Yellow Fever Volunteers



Hospital Corps Detachment at Camp Columbia, Havana, September 1900. Most of the volunteers for the yellow fever experiments came from this unit. Lt. Albert E. Truby, unit commander, is seated in the front row, second from left. Hench-Reed Collection, Historical Collections, CMHSL



John J. Moran (1876-1950). Hench-Reed Collection, Historical Collections, CMHSL



John R. Kissinger (1877-1946).
Hench-Reed Collection, Historical Collections, CMHSL

John R. Kissinger was the first volunteer at Camp Lazear. Private Kissinger, an Ohioan from Truby's hospital corps, developed yellow fever on December 8, 1900, after being bitten by several infected mosquitoes. He recovered ten days later, but the disease left permanent damage. He was granted a disability discharge the following year. In 1910, Congress rewarded Kissinger with a \$100 per month pension for his services.

Mr. John J. Moran, a civilian clerk in General Fitzhugh Lee's headquarters, was bitten just six days after Kissinger, but he did not develop yellow fever. Moran later volunteered to be confined in Camp Lazear's "Infected Mosquito Building." There he was bitten repeatedly by 15 contaminated mosquitoes. On Christmas Day, 1900, he fell ill with yellow fever. Moran survived. 40 years later he assisted Dr. Philip S. Hench in his search for the actual site of Camp Lazear.

Ms. Clara Louise Maass was the only American woman to volunteer. **Maass** was a contract nurse with the U.S. Army who volunteered to participate in Dr. **Juan Guiteras's** yellow fever experiments at Havana's Las Animas Hospital in August of 1901. Guiteras hoped that his mosquitoes would cause only mild cases of yellow fever in order to demonstrate that lifetime immunity could be safely produced in a controlled environment. His experiments proved, however, that this was not possible. Several volunteers developed

Clara Louise Maass (1876-1901).
Hench-Reed Collection, Historical
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severe cases of yellow fever and died,
including Clara Maass. Her death on August
24, 1901, created a public outcry that
ended human experimentation in yellow
fever research.