

## Clara Maass: An American Heroine by Stanton E Cope



Figure 1: Clara Maass portrait, circa 1898.



Figure 2: Clara Maass commemorative stamp, 1976.

The hypothesis that the bite of an insect or other arthropod could somehow cause illness or death to human beings has been around for some time. This theory was put forth by several individuals during the second half of the 19th century, although it had been mentioned, perhaps cryptically, in some earlier writings.

### GIANTS IN MEDICAL ENTOMOLOGY

Prominent among these early advocates was Dr Carlos Juan Finlay. Finlay, of French and Scottish descent and born in Cuba, graduated from Jefferson Medi-

cal College in Philadelphia in 1855 and moved back to Cuba, becoming a highly respected physician. He claimed, rightly so it turned out, that the mosquito *Culex fasciatus*, now known as *Aedes aegypti*, transmitted yellow fever virus. However, he had been unable to fully convince the international scientific community during many years of experiments. In most scientific and medical circles, the idea that an insect bite was dangerous was scoffed at, or at least disregarded as folly.

What has been referred to as 'The Golden Age of Medical

Entomology' began around 1878, when Sir Patrick Manson, working in China, observed the development of the nematode *Wuchereria bancrofti* in *Culex quinquefasciatus*. Shortly thereafter, in 1880, a French physician named Alphonse Laveran found the causal organism of malaria living in the red blood cells of humans.

In 1889, Theobald Smith, working for the United States Department of Agriculture, discovered the organism responsible for causing Texas cattle fever, and in 1893, Smith and F L Kilbourne clearly demonstrated that the

cattle tick was the necessary developmental host to complete the pathogen's life cycle.

Sir David Bruce, a Scottish pathologist and microbiologist, established in 1895 that the causative agent of nagana (animal African trypanosomiasis) was conveyed from animal to animal by bite of the tsetse fly. Sir Ronald Ross, a physician in the British Army working in India in 1897, reported discovering sexual stages of malarial parasites in "dapple-winged mosquitoes," which we now call *Anopheles*.

However, the main piece of scientific work that would, for the most part, convince the world of the role of arthropods in the transmission of pathogens causing human disease was yet to be accomplished.

#### WORK OF THE REED COMMISSION

In May of 1900, a special commission consisting of Major Walter Reed, Dr James Carroll, Dr Aristides Agramonte, and Dr Jesse Lazear was ordered to Cuba by the United States Army to investigate the cause and prevention of yellow fever. Through a series of simple yet elegant experiments, for the first time using human volunteers with informed consent, the commission showed conclusively that yellow fever virus was spread *only* by mosquito bite and *not* by contaminated objects known as fomites, nor by poisoned air.

Most significantly, the commission proposed that the spread of yellow fever could be stopped through rigorous mosquito control methods coupled with patient isolation from mosquito bites. This finding turned out to be one of

the great contributions to public health and disease control.

Dr William Gorgas, a sanitary engineer for the Army working in Cuba, skillfully applied the recommendations of the commission in Cuba and within a few short months yellow fever had been eliminated from Havana. Basically, it was a military-style operation, going from house to house looking for mosquito larval sites and fumigating houses with sulfur.

A hideous plague had been swept away. Without doubt, thousands of lives eventually were spared and millions of dollars were saved. This, however, was not the end of the story in Cuba, especially with respect to the use of human volunteers. What follows is the tragic but moving and inspirational story of Clara Maass.

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## AFTERMATH AND THEN TRAGEDY

Walter Reed sailed home from Cuba on February 9, 1901, never to return. On board with him were John Kissinger and John Moran, two of his human volunteers, both of whom contracted yellow fever during the experiments but declined the payments in gold offered to them. Major Gorgas, who remained in Cuba, believed in the validity of the commission's experiments and findings, but he felt that in addition to controlling mosquitoes, means would be needed to completely eliminate yellow fever.

One such approach, ill-fated as it turned out, involved immunization, using infected mosquitoes. With the advice and consent of Major Gorgas and Major General Leonard Wood, the Military Governor of

Cuba, Dr Juan Guiteras, a Cuban physician, began a series of experiments designed to immunize humans by giving them a mild case of yellow fever through mosquito bite.

The hypothesis was simple: allow mosquitoes to feed on a mild case of yellow fever, hold them in the laboratory until they were ready to transmit the virus, then allow them to feed on susceptible (non-immune) humans, who would theoretically acquire a mild case of the disease, survive, and hence be immunized for life. Well, we now know that yellow fever does not behave in this fashion!

Tragically, some of the cases produced in these experiments were much more severe than expected. Three of the volunteers died, including Miss Clara Maass.

## GROWING UP & EARLY CAREER

Clara Maass was born June 28, 1876 in East Orange, New Jersey. Her parents were German immigrants and she was the oldest of nine children. Economic hardship forced her to leave school at age 15, when she went to work in the Newark Orphan Asylum. In 1893, she entered the nursing program at what was then known as Newark German Hospital, graduating in 1895. In 1898, at age 21, she was named the Head Nurse. Clara Maass was obviously very intelligent, highly motivated and had a bright future.

Also during 1898, Clara served as a contract nurse for the United States Army during the Spanish-American War. At that time, nurses were not able to serve as officers in the Army, as they are today. She cared for soldiers

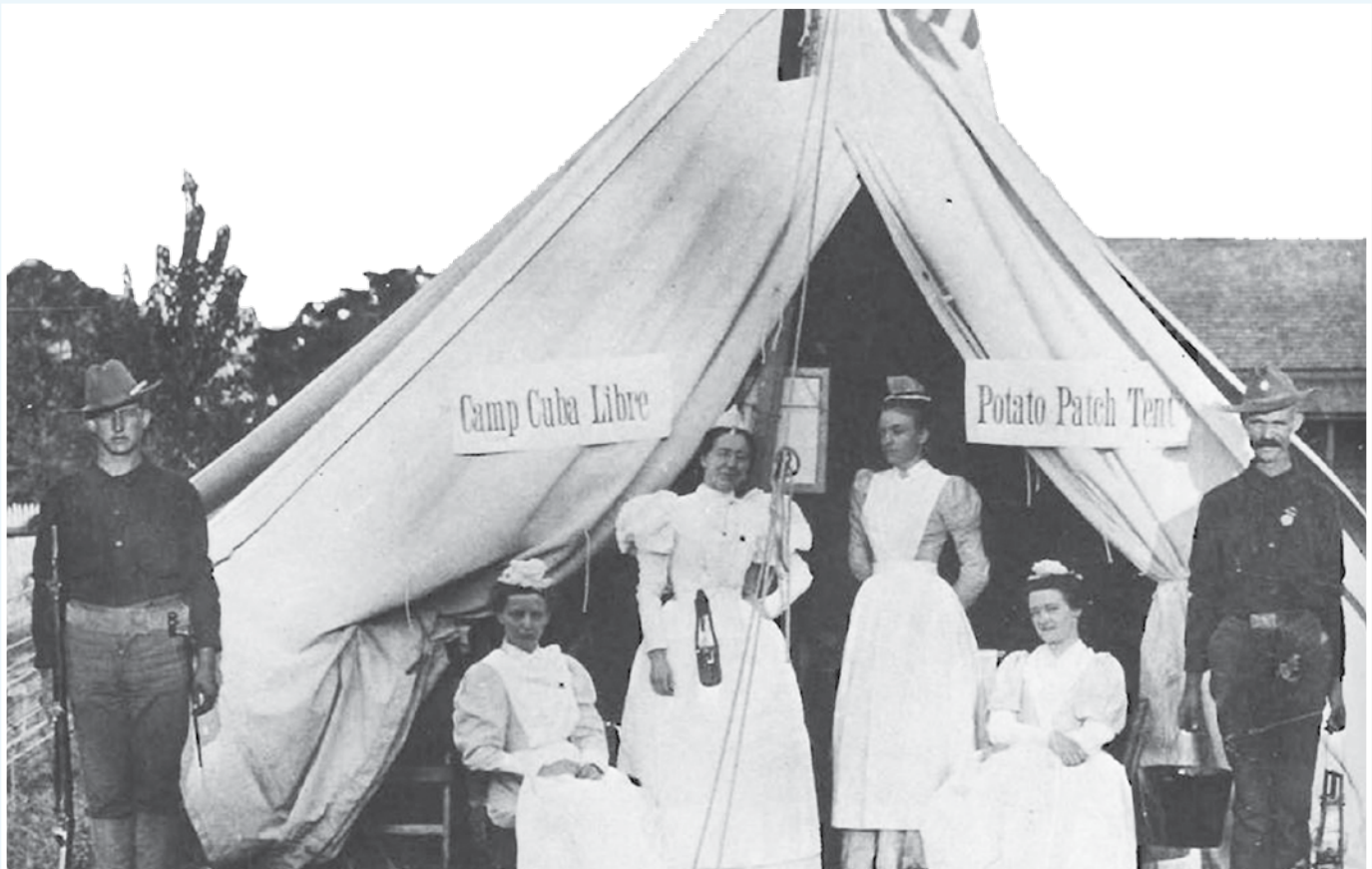


Figure 3: Clara Maass, standing on right, with friends in Jacksonville, Florida, circa 1898.

in Jacksonville, FL; Savannah, GA; and Santiago, Cuba, becoming intimately familiar with typhoid fever, malaria, dengue and yellow fever. After successful service, she was discharged in February 1899 and returned home to New Jersey. The following November, however, Clara again boldly volunteered for service in the Philippines, where the United States Army was fighting. After seven months she was sent home to recover from what was reported to be a case of dengue fever!

### OFF TO CUBA AGAIN

Clara Maass must have been a remarkable woman, for in October of 1900, after most of the work of the Reed Commission was complete, Clara again volunteered to go to Cuba to assist in the fight to control mosquitoes and yellow fever. Upon receiving an urgent message – “Come at once” – from Major Gorgas to report, she did so. Upon returning to Cuba, Clara worked in the Las Animas Hospital, caring for victims of yellow fever. Also, she bravely volunteered for the Guiteras mosquito experiments, sending nearly all her payment of \$100 in gold home to her mother. Of the 19 participants in these studies, she was the only woman and the only American. She received numerous mosquito bites during May, June and July but she did not contract yellow fever, not even a mild case as some historical documents claim.

Clara Maass was bitten for the last time on August 14, 1901. She became ill on the 18<sup>th</sup> and even with the best medical care available, she died on August 24. She was all of 25 years old. Dr Gorgas kept Clara’s family fully up to date by telegram of her illness and death. After Clara became ill, she wrote to her mother in

New Jersey: “*God will care for me in the yellow fever hospital the same as if I were home. I will send you nearly all I earn, so be good to yourself and the two little ones. You know I am the man of the family, but do pray for me.*”

### FALLOUT AND RECOGNITION

As might be expected, Clara’s death, and the deaths of two other volunteers, sent shock waves through the Army, that reverberated all the way back to the United States. The major New York City newspapers carried the story of her death on the front page, and shortly thereafter all human experimentation with yellow fever in Cuba ceased. *The New York Times* reported that not only was Clara willing to incur the risk of infection and disease, but she desired to make herself immune through infection in order to better serve those suffering from yellow fever.

With her sister Sophie present, Clara Maass was hastily buried in Havana, with full military honors. About six months later, her body was returned to the United States and reinterred on February 20, 1902, in Fairmount Cemetery in Newark. Her plaque reads in part, “greater love hath no man than this,” from the Book of John, chapter 15, verse 13.

Clara’s contributions and memory have been honored in several ways. A Senate Committee finding “...that the services of this nurse can be accepted as of a military character at the time of her death...” resulted in the award of a pension to her mother. Postage stamps bearing her likeness were issued by Cuba in 1951 and by the United States in 1976, which served to help celebrate her 100<sup>th</sup> birthday. Also in 1976, Clara was inducted, along with 14 others, as a charter member in

the American Nurses Association Hall of Fame. In 1952 the Newark German Hospital, where Clara had once been the Head Nurse, was renamed the “Clara Maass Memorial Hospital” in her honor, and it remains so to this day.

### POSTSCRIPT

The angel Clara Louise Maass lived and died a true American heroine. Let those of us who toil in the fields of mosquito control and public health resolved to honor and cherish her name and memory, and the names and memories of so many others who have made the ultimate sacrifice for the sake of humanity.

*Disclaimer: The views contained herein are solely those of the author and do not necessarily reflect the views of the Department of Defense or the Department of the Navy.*

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