BRIGADiER GENERAL CARL ROGERS DARNALL

This portrait hangs in the lobby of Carl Rogers Darnall Army Medical Center at Fort Hood, Texas

INTRODUCTION

Brigadier General Carl Rogers Darnall, a career US Army medical officer, is one of the most important figures in the history of public health. His technique for chlorination of water eliminated bacterial contamination of public water systems. This has saved millions of lives worldwide. He was a native Texan, born and raised in Collin County.

HOME and EDUCATION

Carl Rogers Darnall's parents, Joseph Rogers Darnall and Mary Ellen (Thomas) Darnall, newly married, left Paris, Kentucky, seat of Bourbon County, right after the Civil War, arriving in Texas in 1866. They were part of a large migration to post-war Texas, leaving a shattered South in search of a new start. They settled in the Cottage Hill community in northeast Collin County, an area now only historically remembered, between the present towns of Celina and Weston. By the time of their arrival there was a thriving settler community of the western edge of the Texas frontier. Many fellow Kentuckians were there evidenced by the (then) large settlement of Kentucky Town in adjacent Grayson County. That family members had earlier settled in north Texas must have influenced the young Darnall couples migration. One of Joseph's older brothers (A.L.) had come to McKinney in 1860 to teach school. He had graduated from Bethany College in Virginia (now in West Virginia). Joseph Rogers Darnall had followed his brother to Bethany College, graduating and staying to teach during the War years. Mary Ellen's mother (Joseph's mother-in-law), having had one of her brothers earlier settle in Sherman, made the trip to Texas with her daughter and new son-in-law. This brother had probably encouraged the move to Texas and the purchase of 500 acres. The family had travelled from Bourbon County to St. Louis, probably at least partially by train, then on to Texas by covered wagon. In Collin County there was fertile blackland for farming, forests along the creeks furnished timber for building, and there was clean water in the many creeks. Wild honey could be found giving Honey Creek its name, which it still retains. Their initial homestead of 500 acres, purchased at $1 per acre in the Cottage Hill community, would later be extended to 800 acres. Joseph Rogers Darnall would become a successful farmer and a respected Christian minister. He founded Corinth Church near Weston and preached widely throughout north central Texas. There is no Corinth church now; Corinth cemetery is currently (2020) being restored on CR 92.

Carl Rogers Darnall was born on the Cottage Hill farm on December 25th, 1867, the first of seven children. Education was an important family tradition. He was educated in local community schools; none exist now. For higher education, Carl at age 17 was sent to Carlton College in Bonham, Texas. This was a private college in adjacent Fannin County, At that time many colleges were founded in frontier areas by entrepreneurial teachers. The Carlton College register in 1885 lists Carl Rogers Darnall and his sister Maggie (second-born) on the roster of 200 students. In 1887 Carlton College was changed to an all-female institution. Maggie Darnall stayed on, graduated, and became a prominent citizen and educator in McKinney, Texas. Carl transferred to Kentucky University in Lexington, Kentucky, and graduated in 1888. His father likely selected this school because Lexington was only ten miles from the Darnall family home in Paris, and because one of his professors at Bethany College, from which he had both graduated and taught, had become president of Kentucky University. Father Joseph Rogers Darnall would send all five of his sons to Kentucky University. They were expected to graduate in four years and could not return home during those years due to the cost of train fare. It is likely that there was some family support present from relatives still in nearby Bourbon County. In 1902 the state of Kentucky founded the University of Kentucky in Lexington. Kentucky University, the

oldest university in Kentucky, had to change its name and became Transylvania University. It continues today as a prestigious private liberal arts school. Texans will be interested to know that Stephen F. Austin, the "Father of Texas," was an 1810 graduate.

After Kentucky University Carl Darnall entered Jefferson Medical College in Philadelphia. Why he decided to become a physician isn't known. (*Moses Hubbard was a physician who moved to Cottage Hill at the same time as the Darnall family. Joseph Rogers Darnall named his youngest son Moses Hubbard Darnall, presumably after Dr. Hubbard who had become a close friend and who helped him establish his Corinth Church. Maybe herein lies* the *connection to medical school*). In 1888 the medical curriculum was two years in length and Carl Rogers Darnall graduated from Jefferson Medical College in 1890. Carl's youngest brother, Moses Hubbard Darnall, followed the same educational path as Carl; graduating from Kentucky University, then medical school at George Washington University in Washington, DC. The physician brothers would be reunited by the US Army in Washington, DC as World War One approached.

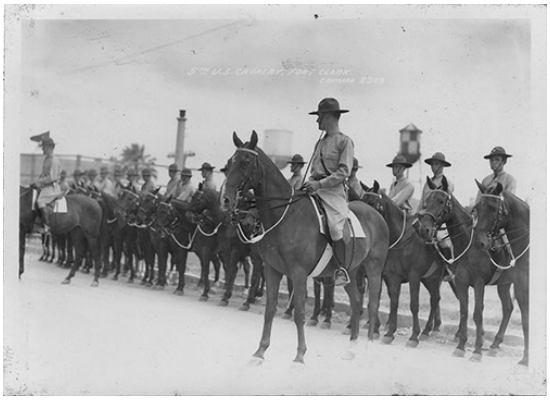
MILITARY CAREER

After completing Jefferson Medical School in Philadelphia, Carl Darnall started a practice in Milford, and later Trenton, New Jersey, both just across the Delaware River from Pennsylvania. In 1892 he married Annie Estella Major from Erwinna, Bucks County, Pennsylvania, just downriver from Milford. There are no known stories from their courtship, but the romantic narrative is young bachelor doctor meets beautiful young lady. And nature arranges the outcome. Their marriage would last for their lifetimes. Their first two of their three children, all sons, were born in Milford. In October 1896 young Dr. Darnall made a historically propitious decision to leave private medical practice and join the US Army. At that time newly appointed military physicians would spend the first six months at the Army Medical School in Washington, DC. There they would learn Army protocol and the unique medical needs and practices of military medicine.

The Army Medical Museum and Library housed the Army Medical School from 1893 to 1910. It was on the National Mall at Independence Avenue

and 6th Street SW. The Army Museum and Library remained here until the 1960's. The building was then torn down and replaced with the Smithsonian Hirschhorn Museum.

Graduating in 1897 with his commission as 1st Lieutenant Carl Darnall's first posting would take him home to Texas. Sent south in Texas to the Rio Grande, 1st LT Darnall was first assigned to Fort Clark in Brackettville, and later to Fort McIntosh in Laredo. At that time turmoil along the Texas-Mexico frontier required military presence. The recurrent political upheavals in Mexico would later lead to the Mexican Revolution in 1910.



Fort Clark Troops

Commissary, Fort Clark

The turn-of-the-century Army was still a horse cavalry.

Officer's Row, Fort McIntosh

Today Fort Clark is preserved by the private Fort Clark Springs Association. The remaining structures from Fort Mcintosh have been incorporated into Laredo Junior College.

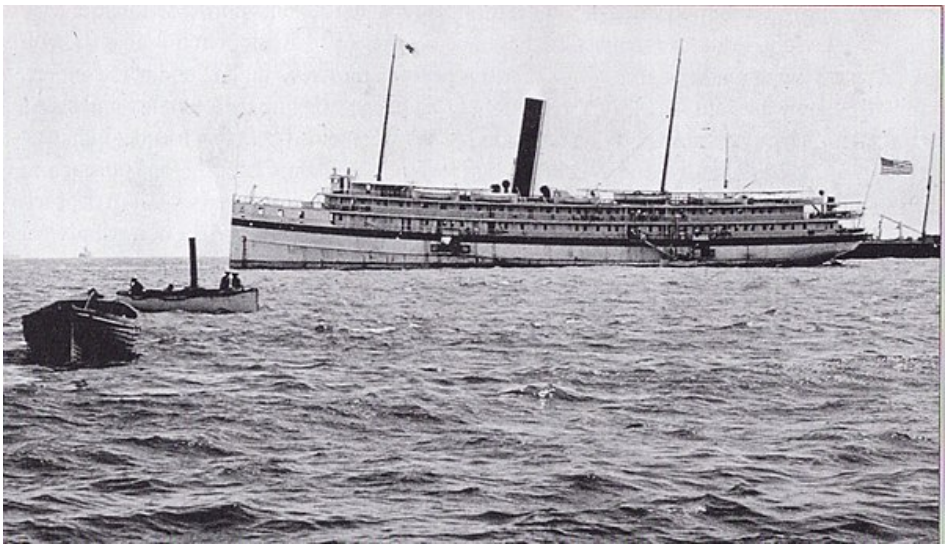
Darnall's quiet posting in south Texas would not last long. Since 1895 revolutionaries in Cuba had been fighting for independence from the Spanish colonial government. The US public and their government under President McKinley followed the news. Sympathy was with the rebels. In early 1898 President McKinley sent the US warship USS Maine to Havana harbor for protection of American citizens and commercial interests. On February 15, 1898 the Maine exploded killing 260 of the 400 US sailors. At the time some news reports attributed the disaster to a Spanish mine in the harbor, but historical review has suggested a possible fire in the ship's munition compartment. Hostile claims were exchanged between Spain and the US. War was soon declared by both.

1st LT Darnall was sent with the 9th and 10th cavalry regiments from Fort McIntosh to Cuba. He was in the right place at the right time. They would be joined by the 1st Voluntary Cavalry Regiment raised by Theodore Roosevelt at the legendary bar of San Antonio's Menger Hotel. Colonel Leonard Wood, an Army physician, worked with Roosevelt in training the "Rough Riders," and was the commander of the troops leaving from Texas. All departed Texas together in May, joined the massing US forces, and shipped out from Tampa, Florida, to Cuba. Landing near Santiago on the eastern end of the island, they were quickly involved in the War's first battle of Las Guasimas. A week later on July 1, 1898 the battle for Kettle Hill and the legendary charge up San Juan Hill was the last major battle in the Spanish American War. Battle casualties were far exceeded by those from disease. Yellow fever, malaria, typhoid, and dysentery were so severe that a month after hostilities ceased, it was reported only one-fourth of the 22,000 soldiers sent to Cuba were still fit for service. Certainly this was noted by a young medical officer, and must have planted an interest that would later lead to a great public health breakthrough.

The Spanish-American War was the first military conflict with the routine use of antiseptic dressings for treatment of wounds. This recently acquired knowledge linking disease and bacteria was growing and certainly absorbed by a newly minted medical officer.

With the defeat of Spain the USA acquired the Philippine Islands which had been under Spainish colonial control for almost 400 years. Immediately after hostilities ceased in Cuba US troops were sent to the Philippines . A rebellion there to achieve independence had long been underway just as it had been in Cuba. The organized rebel army wanted independence for the Philippines, and interpreted entry of the US Army as the beginning of another colonial era. Attacks on US troops led to a bitter and bloody Philippine-American War that started immediately in 1898. President McKinley, and subsequently President Roosevelt, sent William Howard Taft to be Governor General. He was able to reassure the Philippine people that there would not be a return to harsh colonial rule, but the fighting did not end until 1902 with the surrender of the last rebels.

The military's first hospital ship had been used in Cuba. The USS Relief, a passenger ship, was purchased by the Army and converted into a floating hospital. Whether Lieutenant Darnall spent time on the USS Relief in Cuba isn't known, but he was now in the right place to accompany the ship to the Philippines.



USS Relief off the the coast of Cuba -1898
The small boats in the forefront were used to ferry casualties to the ship.

Through 1902 1st LT Darnall was Assistant Surgeon and pathologist aboard the USS Relief at Iloilo City on the historic island of Panay, and commander of the hospital in lililo City, and Assistant Surgeon at Military Hospital Number One in Manila. However, due to turmoil in China, his time in the Philippines would have a significant interruption.

In 1900, at the time of The Boxer Rebellion in China, the United States joined seven European nations in the Eight Nation Alliance sending a military expedition to protect their citizens and commercial interests in China. In the summer of 1900 the section of Peking with the European Legatlons, inside a high walled compound, was surrounded and under siege by the Chinese rebels. (*Since there was no formal diplomatic ties between China and other governments, the visiting foreigners had "Legations," not Embassies)*. The US Mission was protected by 47 Marine guards. Help was urgently needed. US forces nearest to China were in the Philippines. Labelled the "China Relief Expedition" President McKinley sent 1200 Marines, the 9th US Cavalry plus other Army units that could be spared. 1st LT Darnall was again in the right place at the right time. He accompanied the 14th infantry Regiment as a medical officer. Landing on the Chinese coast at Tientsin, US troops had to march in scorching summer heat and fight their way the 80 miles to Peking. A fierce fight ensued in Peking to relieve the embattled Legation Quarter (3*9 Congressional MOA were awarded)*. The 55 day siege was broken as Americans fought alongside British and Russian soldiers.

Soldiers of the US Army's 14th Infantry Regiment scaled the massive Tartar Wall to enter the besieged Legation Quarter. They climbed the wall and carried the flag with them.The Wall was 43 feet high, 65 feet thick at the base, and 52 feet wide at the top. The Wall had been built in the 1500's.

The hospital ship USS Relief came to the landing site in China, along with the hospital ships Maine and Solace. Too far away from the combat front for emergency care, they brought personnel and supplies, and later took wounded to Japan, the Philippines, or the States. In addition to providing medical care, a young medical officer would see the tremendous logistical problems of transporting large numbers of troops and keeping them supplied. This knowledge added to a talent for organization would later become a great US Army asset. Due to different political goals and different military hardware political and military cooperation among the Eight Nation Alliance was disjointed. But for medical care where needs and treatment were the same, cooperation among countries did prevail. Another lesson to be absorbed by a young medical officer.

In 1902 Captain Darnall left the Philippines and reported to the Office of the Surgeon General and the Army Medical School in Washington, DC. He would remain there until 1914—twelve formative and inventive years. He would be Secretary of the Faculty, instructor for sanitary chemistry, and instructor for operative surgery. Major Walter Reed had done much of his research at the Army Medical School. In addition to discovering the mode of transmission of yellow fever, Reed had connected typhoid fever to contaminated food and water. At this time in history the transmission of disease by bacteria, the science of bacteriology, was still new. Unfortunately Walter Reed died of appendicitis in November 1902, so it is unlikely the two physicians were able to collaborate.

Captain Darnall became an active teacher at the Army Medical School, a clinician and surgeon, and a researcher. He was well-regarded as a teacher and was promoted to Major. One of the most important research projects was producing safe drinking water for soldiers in the field. The solution to this problem would become the most important public health innovation of that era.

Knowledge of the many disease-causing bacteria that could be transmitted by drinking water was increasing, and it was known that chlorine in water became an oxidative agent that could kill bacteria. Coalescence of these two facts was needed. The French pharmacist Antoine Labarraque had introduced a sodium hypochlorite solution as an disinfectant and deodorizer in 1825, a generation before Pasteur and Lister had birthed the bacteria and antisepsis revolutions. The first use of hypochlorite compounds for water treatment was their use in flushing the water delivery systems during a typhoid fever outbreak in Maidstone, England in 1898. The first use of hypochlorite compounds to attempt sterilization of drinking water was directed by Dr. John Leal in Paterson, NJ. in 1908. Calcium hypochlorite (chloride of lime) was efficient in clearing bacteria from the lake water source, but its use was difficult. Judging the dose, regulating its administration into flowing water, measuring chlorine levels in water, handling the powdered compound, and the need for personnel to manage all these tasks was formidable and laborious. Even then maintenance of proper chlorine level in the treated water was unreliable.

At the Army Medical School Major Darnall developed the idea of using liquified chlorine as a water sterilizing agent. Large quantities of chlorine gas were made during the electrolysis of salt and in the manufacture of caustic soda (sodium hydroxide). Chemically pure anhydrous chlorine was dried and liquefied under pressure, then stored in steel cylinders. It was readily available and inexpensive. Major Darnall postulated this chemically pure chlorine could sterilize water. Measured quantities of the dried compressed gas could be accurately dosed into measured quantities of moving water. Conducting experiments from 1908 to 1910 at the Army Medical School and in the basement of his Washington, DC home, Darnall tested infusing this liquified chlorine gas into Potomac River water. After removal of gross debris the effect of chlorine immediately sterilized the water. The level of chlorine in the treated water could be controlled. Chlorine combines with hydrogen in the water molecules creating a mild hydrochloric acid solution. Release of the nascent oxygen leads to oxidation with destruction of bacterial cell walls and of internal bacterial cellular proteins. All bacteria are killed. Most viruses are similarly eliminated. Darnall built an apparatus that he dubbed the “chlorinator.” His research was published in 1911. Anhydrous liquid chlorine in measured volume would be infused into a measured volume of flowing water and the resulting chlorine concentration could be measured. Careful experimentation proved this to be completely successful for the production of clean bacteria-free water. The same plan of the “chlorinator” is the basis for all modern water purification systems. With the spreading adoption of water chlorination the scourge of water-borne infections finally began to disappear.

In 1914 Major Darnall was sent back to the Philippines for a two year assignment. In addition to clinical duties at The Department Hospital Manila, he was also in charge of The Medical Supply Depot. He distinguishing himself for exceptional knowledge of

medical supply needs and for his logistical skills. In 1916 he was brought back to Washington, promoted to Lieutenant Colonel, and attached again to the Office of the Surgeon General. World War One was raging in Europe, and despite political and popular resistance, American involvement was on the horizon. Darnall's skills demonstrated in the Philippines led to his selection to organize the Army's medical supply chain. He was placed in charge of the Field Medical Supply Depot, and when American men were sent to fight WWI, he also directed the Finance and Supply Division. For his direction of the medical supply mission during the war Lt COL Darnall was awarded the Distinguished Service Medal. His citation reads:

> *For exceptionally meritorious and conspicuous service. He has rendered especially meritorious and distinguished service in organizing, developing, and administering the Supply Division of the Medical Department and it is due to his foresight and ability that new sources of medical supplies were developed in the country so that adequate quantities of material were always available tor use with the sick and wounded of the Army.*

While Carl Darnall was in Washington, DC, his younger brother, Moses Hubbard Darnall, received his medical degree in 1907 at George Washington University and started practice in adjacent Maryland. Certainly this was a great reunion, with younger brother being guided by his older brother. Moses Hubbard Darnall was a Major in the Army Reserves and served in France during WW1. After the war he returned to medical practice in DC and Maryland.

In 1917 Lt COL Carl Darnall was promoted to Colonel. That same year he was elected to membership in the American College of Surgeons. After the War he remained on the Army Surgeon General's Staff and resumed teaching at the Army Medical College. In 1922 he was assigned as surgeon to the hospital at Fort Shafter in Hawaii. Hawaii might have been a reward for his work during the Great War. It is easy to envision that in the quieter environs of Fort Shafter COL Darnall would have put to use his years of experience in military medicine, operative surgery, hygiene, and administration. The developing hospital had in 1920 been named named Tripler Army Medical Center after Brigader General Charles Stuart Tripler who had served during the Mexican-American War and the Civil War. Today Tripler is the greatest medical center in the Pacific Basin and the primary point-of-care for all military personnel in the Pacific and Asia. Returning to DC in 1925, hopefully after a restorative Pacific Island tour, COL Darnall resumed duties as executive officer in the Army Surgeon General's Office. In November 1929 he was promoted to Brigader General (BG) and in December assumed the duty of commanding general of the Army Medical Center. By this time the old Army Medical College was now the Army Medical Center. In 1923 it had been moved to the campus of Walter Reed General Hospital that had been growing since its establishment in1909. There the Army Medical Center was in the now historic Building 40 which later housed the prestigious Walter Reed Army Institute of Research. On December 31, 1929 BG Darnall became the 13th commanding officer of Walter Reed General Hospital (WRGH). You can be certain that he continued to direct the development on WRGH on its journey to become Walter Reed Army Medical Center,

one of the world's greatest hospitals. He would hold this leadership post until December 31, 1931, when he retired from military service.

LEGACY OF CLEAN WATER

The human lives that have been saved and the suffering that has been prevented by clean water is incalculable. Worldwide the number must be in the hundreds of millions. Sadly many in the world today live without clean water and are still subject to the many hazards of water-borne infections. As effective water disinfection progressed throughout the USA the once ubiquitous presence of typhoid fever steadily disappeared.

When Carl Darnall first demonstrated his "chlorinator" he was urged to obtain a patent. He replied no. He stated he had created his invention while in US government service. so it belonged to the country, and additionally should be available to all mankind. The object of Darnall's experiments and the building of the "chlorinator" for the provision of clean water in military encampments, did not immediately materialize. The Lyster Bag would remain the principal water source to troops in the field through the Vietnam era.

Though Darnall didn't patent his technique for chlorination of water, others soon would. Providing safe drinking water was certain to become a large commercial business. And it did. Today the use of liquified chlorine gas, and sometimes now liquified ozone gas, suffused into water, just as Darnall originally described, remains the prevalent worldwide method for water disinfection.

it all began because Carl Rogers Darnall, born and raised on a farm in Collin County, Texas—had parents who stressed education and love of God, fulfilled his duty in the US Army, honored his country, solved the problem of water purification, and served his fellow man. Remember him the next time you turn on your water tap.

IN MEMORIAM

Father Joseph Rogers Darnall died on the family farm in Cottage Hill in 1909. Mother Mary Ellen (Thomas) Darnall was cared for by the youngest daughter, Henrietta, who never married, and died in 1923 at a home on Benge Street in McKinney, Texas. The parents and some of their seven children, the siblings of BG Darnall, are buried in the peaceful Cottage Hill Cemetery in rural Collin County between Celina and Weston. BG Darnall's younger brother, Moses Hubbard Darnall, who followed him into medicine, and who served in the wartime Army as medical officer in France, stayed in Washington, DC, died 1950, and is buried in a VA cemetery in Maryland.

Cottage Hill Cemetery today, in northern Collin County, between Weston and Celina, Texas

In retirement BG Carl Rogers Darnall stayed at his home in Washington, DC. His devoted wife, Annie Estella (Major) Darnall, who had followed him throughout his long Army medical career, supporting him while raising a family in the faithful way so many Army wives do, received *his* support when she became ill in her last years. She died in 1941. Six days later BG Carl Rogers Darnall died January 18, 1941 at Walter Reed Army Hospital, aged 74 years. They are buried together at Arlington National Cemetery. (Section 3 Site 2801-A) Their three sons all served in the US Army, two of them being career soldiers, one of those a career medical officer.

Colonel Harold W. Jones, MC, US Army was a physician training at the Army Medical School when Darnall was on its teaching faculty. He wrote an official eulogy in 1941 Two Quotes:

"My first acquaintance with him was as a student at the Army Medical School in 1905-06. Darnall was then secretary of the faculty, professor of chemistry, and also of operative surgery, for he was not only an excellent chemist but a skilled surgeon. It was related of him that when General O'Reilly selected him to give instruction in

chemistry, some officer in the Surgeon General's staff expressed doubt as to Captain Darnall's experience and training in that subject. The reply of the Surgeon General was to the effect that it would make no difference, he knew his man, and if Darnall didn't know it at the moment he soon would. This was true of him all his life, if he didn't know it at once he would before long. As students, our feeling for him was unlike that which we had for any other instructor. We had to endure their peculiariities and to do things their way. With Darnall, it was different. He was strict, but would unbend when you least expected it; everyone admired his knowledge and all of us knew that behind a slightly chilly exterior he was a real fellow who had no pretense about him. He was kind to us when we most needed it, and I have never forgotten this. When we graduated there was no member of the staff who was more enshrined in our hearts than the professor of chemistry."

"At the time of his retirement from the Army, nearly ten years ago, according to a well regulated custom, General Darnall sent his biography to the Army Medical Library. The record he made of his own life is extremely short, covering only a single page, but it is characteristic of him. He was a man of deeds and not of words."

All lives and all careers come to an end; inevitably, all fade and most are forgotten. But some of us leave behind a legacy that lives on even as our memory of them disappears. In 1965 the hospital at Fort Hood, Texas, was named the Carl Rogers Darnall Army Medical Center (CRDAMC) in memory of this Texan.

BIBLIOGRAPHY

CDC-Morb Mortality Wkly Rep. Achievements in Public Health, 1900-1999: Control of Infectious Disease. History of Drinking Water Treatment—A Century of US Water Chlorination and Treatment: One of the Ten Greatest Public Health Achievements of the 20th Century. MMWR weekly July 30, 1999; 48(29): 621-629.

Condram G, et al. "The decline in mortality in Philadelphia from 1870 to 1930; The role of municipal services." Pennsylvania Magazine of History and Biography 1984; 108(2): 153-177.

Cox M. Frontier Medicine: Texas Doctors Overcome Disease and Despair. Texas Medical Association: Tex Med, Jan. 2003.

Darnall CR. The purification of water by anhydrous chlorine. J Am Public Health Assoc. 1911; 1(11): 783-797.

Ferguson L. A Hometown Hero. OurCelina.com, May 2019.

"Funeral Held Tuesday in Washington For Brigader-Gen. Carl Rogers Darnall." The Courier-Gazette, McKinney, Texas, 21 Jan 1941.

Gotschlich EC. (Book review) Vincent Cirillo. Bullets and bacilli: The Spanish-American War and Military Medicine. J Clin Invest 2005; 115(1): 3.

Jones DS, Podolosky SH, & Greene JA. The Burden of Disease & the Changing Task of Medicine. NEJM 2012; 366: 2333-38.

Jones HW, Col. *Carl Rogers Darnall, Brigadier General US Army, Retired.* The Army Medical Bulletin, Number 56 (1941), US Army Medical Department, Office of Medical History.

Leal, John L. (1899) An Epidemic of Typhoid Fever Due to an Infected Public Water Supply. Public Health Pap Rep. 25:166-171.

McGuire MJ. The Chlorine Revolution. Water Disinfection and the Fight to Save Lives. American Water Works Association, Denver, 2013.

Moses Nelson Baker. The Quest for Pure Water: The History of Water Purification from the Earliest Records to the Twentieth Century. First published 1931 in the UK. 2nd Edition, Vol. 1, Denver American Water Works Association, 1981.

National Research Council (US). Safe Drinking Water Committee. Drinking Water and Health; Volume 2. Washington, DC: National Academic Press US (1980). II. The Disinfection of Drinking Water. Available from https://www.ncbi.nlm.nih.gov/books/NRK234590/

Piece JR. Historic Profiles: Brigader General Carl Rogers Darnall: Saving Lives on a Massive Scale. Federal Practitioner, March 2018, p. 47-8.

Pruitt BA. Combat Casualty Care and Surgical Progress. Ann Surg 2006; 243(6): 715-29.

Public Health Bulletin, Dr. Theodore Thomson. England. (1898). The Local Government Board Report on the Epidemic of Typhoid Fever at Maidstone. October 1898: 47-58.

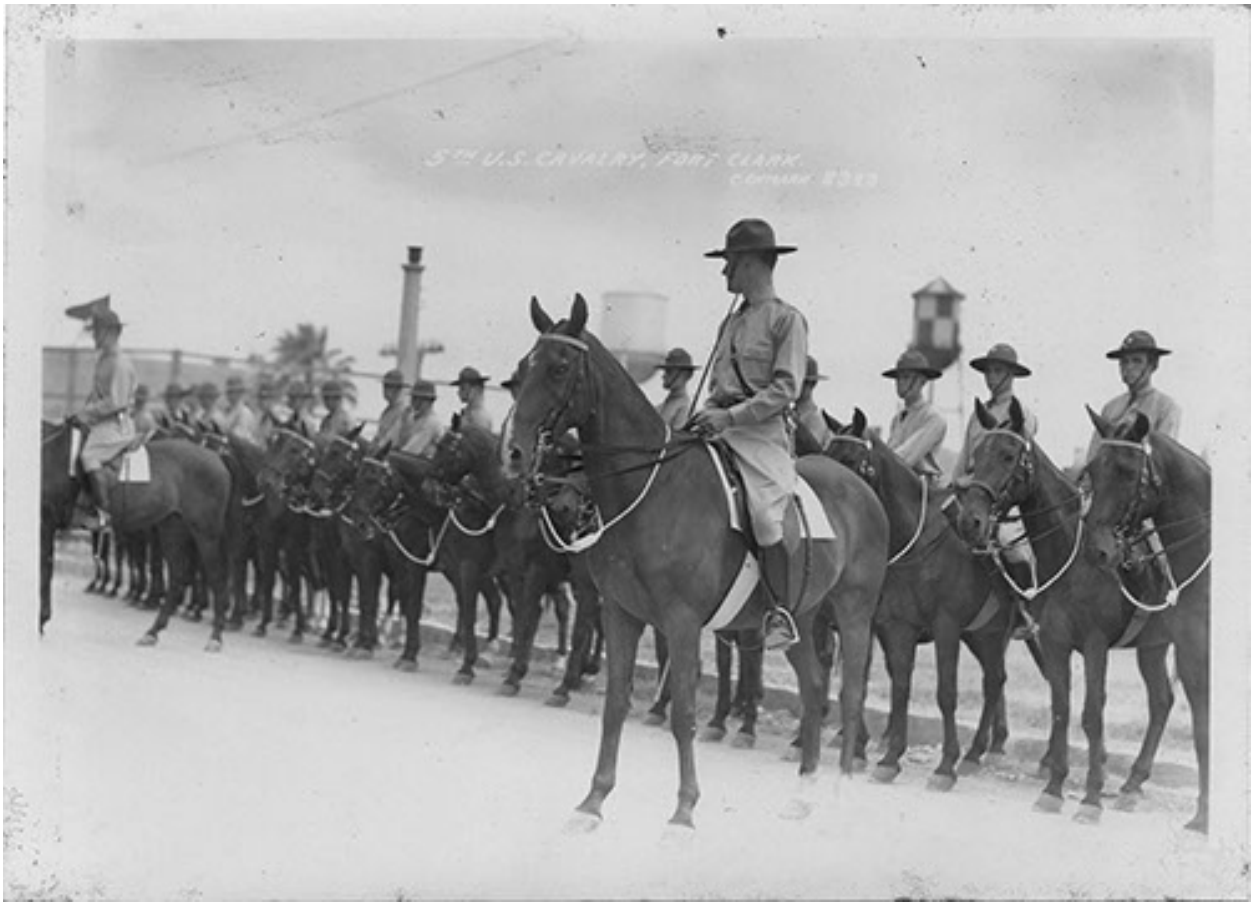
Scott, J. The Disinfecting Properties of Labarraque's Preparations of Chlorine. Published by S. Highley, 174 Fleet Street, London, 1828.
,
Wolman A, & Gorman AE. Water-Borne Typhoid Fever Still a Menace. Am J of Public Health and The Nation's Health. 1931; 21(2); 115-129.

PICTURES, DIAGRAMS, and CHARTS

BRIGADER GENERAL CARL ROGERS DARNALL

This portrait hangs in the lobby of Carl Rogers Darnall Army Medical Center at Fort Hood, Texas.

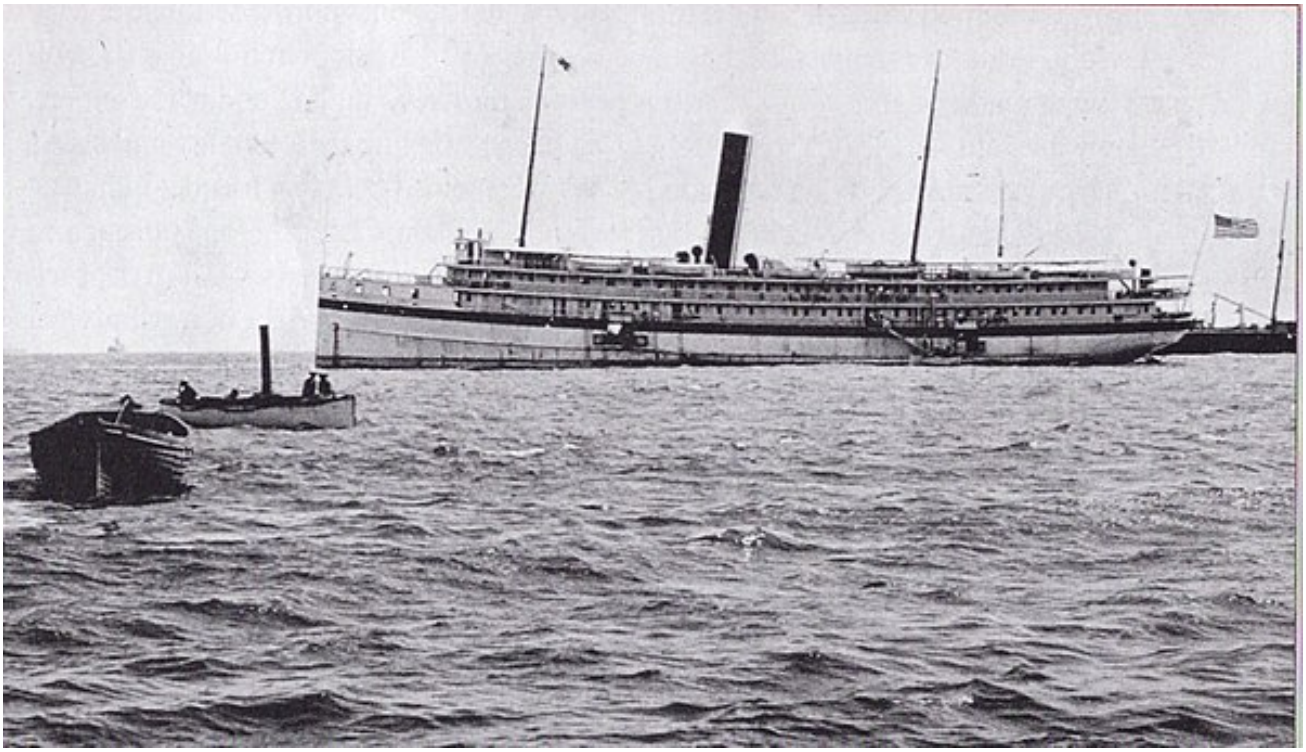
The Army Medical Museum and Library housed the Army Medical School from 1893 to 1910. It was on the National Mall at Independence and 6th Street NW. The Museum and Library remained until the 1960's. The building was then torn down and replaced with the Smithsonian Hirschorn Museum.



The turn-of the-century Army was still a horse cavalry.


The Barracks, Ft. Mc Intosh, Laredo, Texas.

The Commissary, Fort Clark, Texas about 1898



USS Relief off the coast of Cuba, 1898. The small boats in the forefront were used to ferry casualties to the ship.

Soldiers of the US Army's 14th Infantry Regiment scaled the massive Tartar Wall to enter the besieged Legation Quarter in Peking. They climbed the wall and carried the flag with them. The wall was 43 feet high, 65 feet thick at the base, and 52 feet

wide at the top. The wall had been built in the 1500's.

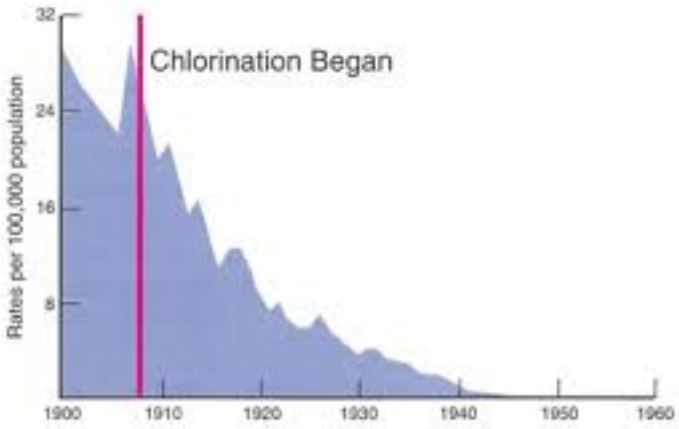


Figure 1. Death rates for typhoid fever in the USA

Cottage Hill Cemetery today, in rural northern Collin County, Texas, between the towns of Celina and Weston.