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The Confederacy's Bomb Brothers

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George and Gabriel Rains had a knack for blowing things up during the American Civil War between 1861-1865. They were the Confederacy's "Bomb Brothers." Were they fathers of the modern day land mine?

By Peggy Robbins

President Jefferson Davis studied the small, odd-looking object. A heavy, black iron casting, it resembled a lump of coal. What it was, however was a bomb fresh from the drawing boards of the Confederate Torpedo Bureau. This device, experts told Davis, could be spirited aboard a Union steamer and dropped into the ship's load of coal. When heated in a boiler, it would explode and cripple the vessel. Turning the weapon over in his hands, Davis exclaimed, "Perfection herself!"

One of the first victims was the steamship *Greyhound*, headquarters of the Union Army of the James's commander, Major General Benjamin F. Butler. As the ship steamed along Virginia's James River on November 27, 1864, crewmen unwittingly threw one of the "coal lump" devices

into one of the boilers. In moments, the *Greyhound* erupted into flames and sank. Among her startled passengers, none of whom was seriously injured, were Butler and Rear Admiral David D. Porter. Union investigators declared, "Confederates dressed as roughly-garbed stowaways [had] slipped aboard and planted explosives, then fled." Confederates who knew the truth only laughed.

The new weapon was the invention of Gabriel James Rains, whose munitions experiments were known throughout the South. But he was only part of the Confederacy's success at developing and using explosive devices. Gabriel's younger brother, George Washington Rains, undoubtedly provided the powder that filled the bomb. The younger Rains was instrumental in creating much of the struggling South's gunpowder. These two munitions experts were the Confederacy's "Bomb Brothers," and without them the South would likely have fallen far sooner than the spring of 1865. President Davis and other Confederate leaders considered them among the South's greatest assets.

Gabriel and George Rains were brothers, but 14 years separated their births, and they had few strong ties to one another. There is no evidence that their professional lives intersected before, during, or after the war, nor do they seem have had a close personal relationship. What is likely,



George Rains (right) and his older brother Gabriel (left) created explosive solutions to the Confederacy's problems during the war. George created the gunpowder, and Gabriel used it to create landmines lethal to Federal soldiers.

however, is that they were rivals. There was fierce competition and jealousy between branches of the Confederate Ordnance Department, and the Rains brothers labored in different divisions—Gabriel leading the Torpedo Bureau and George, the Niter and Mining Bureau.

Sons of a North Carolina cabinetmaker, the "Bomb Brothers" were born in Craven County, North Carolina, Gabriel in 1803 and George in 1817. George was still attending a preparatory academy when Gabriel entered West Point, from which he graduated 13th in the class of 1827. As a lieutenant in the 5th U.S. Infantry, Gabriel served in Florida and Louisiana, fighting in the Second Seminole War, and later recruited troops for the Mexican War, in which he also took part. During his years in the Regular Army, Gabriel earned a reputation for experimenting with explosives. By May 1861 he had risen to the rank of lieutenant colonel, but when his native North Carolina seceded, he resigned his commission and entered the Confederate army as a colonel; by September he was a brigadier general.



George, meanwhile, had followed his brother to West Point, graduating third in the class of 1842. He began his military career as a second lieutenant in the Corps of Engineers, then transferred to the artillery, his true interest. George taught chemistry, mineralogy and geology at West Point from 1844 to 1846 before serving as a first lieutenant at Port Isabel, Texas. He got his first taste of combat in the Mexican War. George continued to pursue his longtime interest in perfecting guns and gunpowder throughout his army career.

Federal soldiers suffered great losses at the hands of the Confederacy's landmines.

George was a captain when he resigned his commission in 1856 and headed north to become president of the Highland Iron Works in Newburgh, New York. There, he honed his powder-making skills, inventing efficient steam engines and boilers, until the outbreak of war drew him home to join the Confederate army. Commissioned a major of artillery in July 1861, he was soon chilled to the Ordnance Bureau and assigned to establish powder mills. He would rise to the rank of lieutenant colonel in May 1862 and colonel in July 1863.

Both brothers were enthusiastic about their munitions work. Gabriel, however, began the war unsuccessfully as a brigade commander. His failure to attack Federal troops of Major General George McClellan during the May 31-June 1, 1862, Battle of Seven Pines, Virginia, drew criticism from Confederate Major General Daniel H. Hill. Rains would hold no further field command in the war. But Jefferson Davis had something bigger and louder in mind for him.

At the war's outset, the South's harbors were largely defenseless against the threat of Union attack. The old brick forts with their old, rusty cannon were nearly useless in preventing Union ships from steaming up Southern rivers. Officials of the Confederate War and Navy departments discussed the use of "torpedoes"—exploding mines. The technology was not yet developed, and there were controversial ethical issues to resolve, but the experimenting began.

The South's first torpedoes were simple, powder-filled tin cans with trigger attachments. These offered little promise. But then Gabriel developed what came to be known as the "Rains Patent," a mine that could be used both on land and in water. These early torpedoes were made of sheet iron, and each had a fuse protected by a thin brass cap covered with a beeswax solution. If pressure were exerted on that cap, the torpedo would explode. Rains used these bombs with significant success both in the water and on the land.

In the spring of 1862, while Gabriel was still leading a brigade, he turned his "Rains Patent" into the "sub-terra explosive shell," known today as a landmine. In May, during the Peninsula Campaign, the Union Army of the Potomac was pressuring Confederate forces retreating from Yorktown in the outskirts of Richmond, Virginia, the Confederate capital. Rains' brigade was part of the Rebel rearguard. Some of Rains' men found loaded 8- and 10-inch Columbiad artillery shells equipped with sensitive fuse primers in a broken-down ammunition wagon near Richmond. Rains planted these shells inches beneath the sand of Richmond's beaches "simply as a desperate effort to distance our men from pursuing Union cavalry," he explained. Suddenly a series of shells exploded beneath the hooves of Federal horses. Pandemonium erupted as many whole Union companies bolted in panic. They were the victims of the first land mines ever used in battle. Rains had originally buried four of them and was so impressed by the contusion they caused that he buried more. Their use around Richmond grew proportionately. Rains estimated that the

approaches to Richmond were laced with more than 1,300 land mines by 1864, most of them operated by trip cords that could be pulled by hidden Confederates.

Union officers angrily denounced the mines as unethical and lambasted the Confederacy for using "sub-terra booby traps," but Rains continued to plant them. They were buried around houses, shops, and telegraph poles, and hidden in carpetbags and bags of flour. Army of the Potomac commander Major General George McClellan immediately threatened to use prisoners of war to clear minefields, and Union Attorney General Edward Bates spoke out indignantly about the "devilish devices." For two and a half years Major General William T Sherman railed against the use of the mines, like McClellan, vowing to force prisoners to march ahead of his troops, who knew the mines as "infernal machines."



Union sailors carefully remove torpedos from Mobile Bay after Federals captured the bay in August 1864.

Not all the opposition to the mines came from the enemy. Major General James Longstreet, who commanded a retreating division that had directly benefited from Rains' Richmond mines, furiously condemned them and forbade any further use of them. But Rains lobbied the Confederate government for approval of the mines. The dispute grew until Secretary of War George Randolph announced the South's official policy for employing the new weapon. "It is admissible to plant shells in a parapet to repel assault, or in a road to check pursuit," Randolph decreed. "It is not admissible to plant shells merely to destroy life and without other design than that of depriving the enemy of a few men."

Rains had won the squabble, and he was delighted. "No soldier will march over mined land," he predicted, "and a corps of sappers, each having two ten-inch shells, two primers, and a mule to carry them, could stop an army." His vision may have been a bit too optimistic, because once the first explosions occurred, the unhurt Union soldiers simply detoured around them. But Rains' mines were indeed useful, particularly in guarding fortifications. For instance, during the Siege of Charleston, South Carolina, in July 1863, the Confederates planted a large mine held with mines so close together and so near the surface that no soldier could step on the field without detonating one or two. The mines were used effectively around Battery Wagner on the South Carolina coast, at the northern tip of Morris Island, and just below Fort Sumter, allowing Charleston to withstand strong Union assaults. The Union suffered 1,623 casualties in the siege while the Confederacy suffered on 1y 186. The experience was repeated elsewhere; Sherman wrote that in December 1864 "the rebels' land torpedoes at Fort McAllister, Georgia, killed more of our men than the heavy gun of the fort."

Even as Rains was placing mines along Richmond's roads, Davis urged him to begin his work on protecting the South's harbors. On October 31, 1862, the Confederate Congress authorized a Torpedo Bureau, a division of the War Department, to organize and improve torpedo and mine warfare and Rains was placed at its head. Immediately he closed off the James River to enemy shipping by lining it with hundreds of mines and torpedoes. It was not long before Union men were reporting that there were mines in the river, some of them 2,000 pounds in size. Several, fired by wires stretched from the banks, had blown up Northern ships, and no river vessel was safe. Bombs resembling coal, like the one used to sink the Greyhound, added to the North's confusion on Southern rivers.



The underwater torpedo may have been the South's most effective defensive weapon. Confederates had used crude underwater torpedoes, most constructed from glass demijohns (large, narrow-necked bottles) or tar-covered beer barrels, as early as 1861. These were not very effective, but they were the forerunners of the very destructive instruments Rains helped develop in 1862 and 1863.

Led by Gabriel Raines, the Confederacy's Torpedo Bureau created the explosives, like these newly cast torpedoes at the Charleston Arsenal, that linked key Southern rivers and ports.

Problems delayed Rains' early work on underwater torpedoes. He needed wire for an electrical firing system, but wire was scarce in the Confederacy. The general corrected that by sending female "wire-stealing crews" into Union territory. The women's biggest haul by far was a cable the Union had abandoned in the

Chesapeake Bay. Gabriel unraveled tile cable and used it in hundreds of mines. Still another problem was lack of funds. Despite Davis' support, Rains was often without his fair share of military appropriations. He began his torpedo work in 1862 with \$20,000. The allotment rose to \$350,000 in 1864 and later to \$6 million, when it was too late.

Despite these handicaps, Rains managed to establish torpedo manufacturing plants in Richmond and ports throughout the South, along with a so-called "munitions plant" along the Mississippi River. The last, unlike the others, was simply a shed under which three or four men packed powder into demijohns, attached ignition devices, and loaded them on a wagon. A slave named "Old Pat" drove the wagon, and his job was to place the mines in the river where they would explode beneath the invading Federal fleet. They didn't work very well, largely because Old Pat failed to anchor them properly. Most of the torpedoes floated away with the current.

Nevertheless, Confederate underwater torpedoes were having an effect. Torpedoes detonated from shore destroyed seven of 12 Federal vessels steaming up the Roanoke River to capture Fort Branc, North Carolina, on December 9, 1864. An electric torpedo sank the U.S.S. Commodore Jones, a converted ferry, on the James River on May 6, 1864, killing 40 men. Witnesses claimed the ship was blown 50 feet into the air. A Confederate soldier captured on the riverbank afterward refused to tell the location of other torpedoes until he was lashed to the bow of a Federal ship dragging the river for mines. Farther south, a large field of buried mines protecting Fort Fisher, North Carolina, helped stall the fort's capture until January 15, 1865.

Such incidents not only took lives and destroyed ships but also unsettled Union naval officers, some of whom began to exercise extreme caution that weakened their effectiveness. In April 1862, Captain Quincy Gillmore reported that at Fort Pulaski, near Savannah, Georgia, "the probability of encountering torpedoes, for which our vessels were not designed, determined a change of plan." On March 12, 1863, Federal Secretary of the Navy Gideon Welles wrote in his diary: "The attack on Charleston will be delayed.... Little is known of obstructions and torpedoes, but great apprehensions are entertained." Confederates added to the confusion by dumping empty barrels into harbors, creating the appearance of floating mines.

As excellent as Rains' torpedoes were, they had one weakness: prolonged submersion could corrode them, rendering them useless. An example came in Mobile Bay, Alabama, on August 5, 1864, when Union Rear Admiral David Farragut steamed his fleet through heavily mined waters to capture Mobile. Farragut is famous for his command. "Damn the torpedoes! Full speed ahead!" What seems like boldness, however, was actually recklessness. Many officers in the fleet heard the almost constant snapping of primers under the bottoms of the ships and wondered why only one torpedo exploded (the one that sank the monitor *Tecumseh*). They later learned that the torpedoes had been in the water so long they had corroded.

A postwar U.S. Navy report listed the loss of Union ships from torpedoes as much greater than all other causes combined. "The torpedo service of the Confederacy probably contributed more to its defense by far than all the vessels of the Confederate Navy," Russell Soley, a Northern observer and writer during the war, later wrote. Gabriel Rains had been sure of that all along.

His brother George, sometimes called the "chief chemist of the Confederacy," was just as busy as his brother during the war. When he joined the Ordnance Bureau, Colonel Josiah Gorgas, chief of ordnance told him to get busy making gunpowder. It was up to George to determine where and how.

His task would not be an easy one. For half a century before the Civil War, there had been virtually no ammunition made in the South except during the Mexican War. A few days after the April 14, 1861, capture of Fort Sumter, the Confederate War Department reported that there was only 491,111 pounds of powder for rifles, muskets and cannons within Confederate territory. The comparatively small amount of powder (292,316 pounds) seized when the Federals abandoned the Norfolk Navy Yard in Virginia on April 20 was divided among Confederate armies gathering on the Potomac River and near Richmond and Mobile. None remained for the force assembling in Tennessee and Kentucky under General Albert Sidney Johnston. President Davis said his army had enough powder for one month of "light fighting." It was a desperate situation.

On July 10, George Rains left Richmond by rail on a mission: to enlarge and improve the South's existing powder-making facilities. "I almost lived in railroad cars," he recalled, "devising plans,

examining the country for locations, hunting up materials, engaging workmen, making contracts and employing more or less every available machine shop and foundry from Virginia to Louisiana."

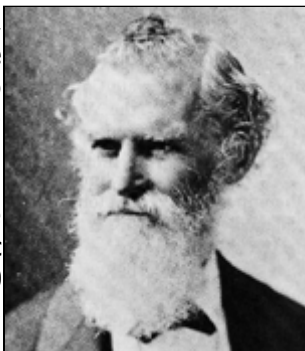
Gunpowder at that time was made mainly of potassium nitrate (a whitish, powdery metal also known as saltpeter or niter) with sulfur and charcoal. George knew there was very little above ground niter or sulfur in the Confederacy, so he prospected for these substances throughout the summer of 1861. In limestone caves in Arkansas, Tennessee, Alabama and Georgia he found an abundance of earth rich in nitrates. He put crews to work digging it out, and soon formed the Niter and Mining Bureau. Then he turned two idle mills near Nashville, Tennessee, into a powder-making factory and enlarged them; by late October 1861 the factory was producing 3,000 pounds of powder a day. The operation was so successful that Rains sought to start a second plant nearer to Richmond, but could find none capable of replacing him as overseer in Nashville. So, he wrote a booklet detailing the powder-making process, *Notes on Making Saltpeter from the Earth of the Caves*, and trained a force of men. Leaving them to run the Nashville plant, he headed for Richmond.

Rains had sent agents to Europe by way of Canada to buy more nitrate, and in time he smuggled about 2.8 million pounds through the Union blockade. Closer to home he found an untapped, if revolting supply: outhouses, latrines and chamber pots. Though the collection method was unpopular and heavily criticized, it was productive. Niter beds filled with these waste materials were established near many population centers and yielded several ounces of niter to each cubic foot. The process inspired some of the war's bawdiest songs.

By mid-November 1861, Rains was producing about 1,500 pounds of powder daily in Richmond. His two plants were producing powder at a rapid pace, but he knew it was not enough. About this time he read a booklet describing England's Waltham Abbey Works, then the world's most up-to-date powder plant. The Confederacy desperately needed a great plant like that, he told Gorgas, who agreed and allowed Rains to begin working on it.

The Waltham booklet contained no diagrams or drawings, but the instructions it provided were complete. With Shaler Smith, Rains chose Augusta, Georgia, site of a former U.S. arsenal, as the home for his new operation, the Augusta Powder Works. The complex stretched for miles along a canal and was ideal for a central supply base; it was safe from Union raiders, offered easy access to water and rail transportation to the South's main shipping points, and had sufficient willow trees to make charcoal.

With the location chosen, George searched the South for materials to build the factory. The renowned Tredegar Iron Works in Richmond, which produced up to half the Confederacy's domestic cannon, gave him 250 tons of machinery, including 24 five-ton rollers to crush the niter into gunpowder. He



(left), shown here years after the war, designed the Augusta powder works (right) with safety and efficiency in mind.

obtained two more rollers from a plant in Macon, Georgia, and another two from Chattanooga, Tennessee. In various corners of the South, George found machinery made in the North before the war—a 130-horse-power engine, five boilers, a 14-ton flywheel, huge retorts, iron cylinders, iron evaporating pans—and hauled it all to Augusta. It was quite an accomplishment. Gorgas was pleased to report periodically to Confederate government officials that "George Rains and his men are still working miracles at Augusta."

Under Rains' direction, copper boilers were made from turpentine and whiskey stills he brought in from back-woods moonshiners. He brought raw copper from Tennessee, iron and coal from northern Alabama and North Carolina, and tin and zinc for roofing from Mobile. He did not stop until the plant was ready to make powder. It continued its operation until the end of the war, furnishing the Confederacy with gunpowder of the finest quality.

The Confederacy spent about \$385,000 for the plant, and both Rains and Gorgas boasted that it was one of the South's best investments. By the time the plant began operation on April 10, 1862, powder coming through the Union's blockade cost more than \$3 per pound; the Augusta Powder Works made a million pounds a year at a significantly lower cost. According to George's calculations, the powder works saved the Confederacy almost \$2 million.

Rains pioneered clever new designs to increase the plant's productivity. He developed new ways to cool the powder and remove smoke and ashes from the factory. He also originated and perfected new methods of purifying and pulverizing raw sulfur. When a lack of willow threatened to slow charcoal production, he determined that cottonwood, abundant near Augusta, would work just as well.

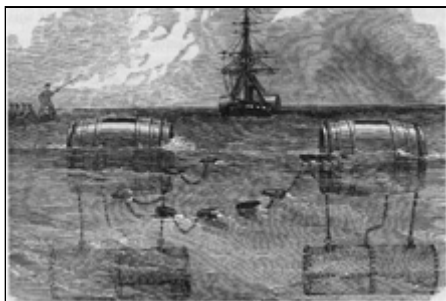
Safety was always one of Rains' main concerns at the Augusta Powder Works. To minimize the danger, the 12 rolling mills featured walls as thick as 10 feet, and the buildings along the canal were separated by at least 1,000 yards to prevent any explosion from setting off a chain of blasts. Thirty-gallon water tanks lined the area above the boilers and were rigged to drench the powder the moment a fire started.

During its three years of operation, the Augusta works suffered only four explosions, two of which were minor incidents causing no injury. The first serious explosion was caused by workers who failed to remove a finished charge from the mill before beginning a new one. Suddenly, 120 pounds of gunpowder burst into flame, and the front and roof of the mill were blown off. Several workers suffered minor injuries, but the other 11 mills were undamaged. The most serious explosion occurred just outside a temporary granulating building while the foreman, known for his strictness in enforcing safety regulations, was absent. It shook the earth for some distance, blew up three tons of powder and shot flames and white smoke 500 feet into the air. Seven men, a boy, and two mules were killed in the blast. It is believed to have been caused by workmen smoking—a violation of one of Rains' strictest rules.

Explosions were only a secondary problem at the plant claimed Rains. Because the Confederate army kept drafting his workers away, his workforce was relatively unstable. In 1864 he wrote to Gorgas: "My principal agent attending to the transportation of wood for the Steam Engine and for the powder works has been taken from the works to do duty with a local company here, so that these works are liable to be stopped for want of wood on any day and as the supply for all the Arsenals depends on the powder daily made at the works, such interruptions are likely to be disastrous."

With Gorgas' support Rains managed to keep the plant operating every day until the end of the war. The Augusta Powder Works responded promptly to the Confederate calls for powder throughout the war; in one two-day period the plant produced 22,000 pounds of gunpowder to fill a rush order from Charleston. Rains also devised "safety powder boxes" to replace kegs for shipment, and after the war he claimed there had been no explosions during powder deliveries from Augusta.

The Augusta Powder Works had produced 2.75 million pounds of high-quality gunpowder by April 1865. More than 70,000 pounds was still on hand when Richmond fell that month. George was pleased after the war to learn that his captured gunpowder was being used for artillery practice at Fort Monroe, where Federal officials classified it as "very superior—the very best."



Rains closed his powder works on April 18, 1865. "Sadly I took down the last beloved flag and folded it away," he recalled. "The fires went out in the furnaces; the noise of the mills ceased; one by one the workmen slowly went away and once more I stood on the banks of the canal alone."


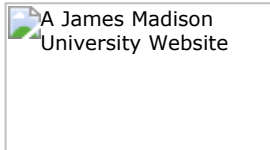
Rains remained in Augusta after the war. He was professor of chemistry and pharmacy at the Medical College of Georgia (later the University of Georgia) from 1867 to 1884, serving for a time as dean. The writer of *History of the Confederate States Powder Works*, George later went into business in New York in 1894 and died in Newburgh on March 21, 1898, at the age of 81. After the war; his brother; Gabriel, had found his way to Georgia too,

explosives, which they called "infernal machines" and "sub-terra booby traps." living for a time in Atlanta before moving to Charleston. In South Carolina he served in the U.S. Army's Quartermaster Department from 1877 to 1880. He died in Aiken, South Carolina, on August 6, 1881, at the age of 78.

The Rains brothers had lived separately, worked separately, and died separately. But in the South and North alike, their explosive legacy was remembered. To history, they would always be the "Bomb Brothers."

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