

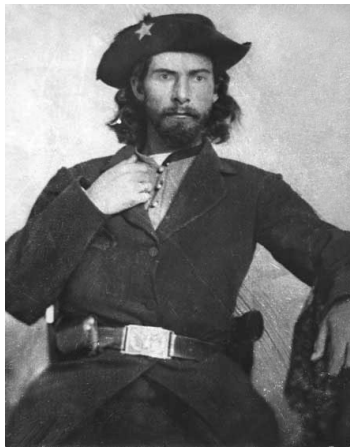
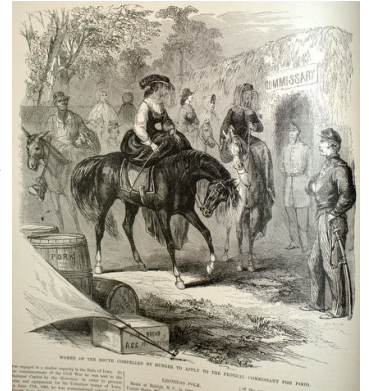
THE BATTLE CRY

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FROM SCIENCE TO REALITY

Why Some Civil War Soldiers Glowed in the Dark



William T. Anderson



Matt Soniak

BATTLE OF SHILOH

NEXT PROGRAMS

Mar. 15, 2016

Frank Crawford

The Centralia Massacre:
September 27, 1864

Apr. 19, 2016

Joe Reinhart

Germans in the Civil War

May 17, 2016

TBA

By the spring of 1862, a year into the American Civil War, Major General Ulysses S. Grant had pushed deep into Confederate territory along the Tennessee River. In early April, he was camped at Pittsburg Landing, near Shiloh, Tennessee, waiting for Maj. Gen. Don Carlos Buell's army to meet up with him.

On the morning of April 6, Confederate troops based out of nearby Corinth, Mississippi, launched a surprise offensive against Grant's troops, hoping to defeat them before the second army arrived. Grant's men, augmented by the first arrivals from the Ohio, managed to hold some ground, though, and establish a battle line anchored with artillery. Fighting continued until after dark, and by the next morning, the full force of the Ohio had arrived and the Union outnumbered the Confederates by more than 10,000.

The Union troops began forcing the Confederates back, and while a counterattack stopped their advance it did not break their line. Eventually, the Southern com-

TRIVIA QUESTIONS

- What was the most populous city of the Confederacy?
- What were the only two Confederate state capitals never captured by the Union Army?
- What Confederates did Johnson's amnesty exclude?
- What creative ruse did Nathan Bedford Forrest employ to cause Union colonel Abel Streight to surrender at Lawrence, Alabama, on May 3, 1863?
- When casting was underway for the movie *Gone With the Wind*, a famous comedienne of the day was given some consideration to play the female lead. Who was it?
- What controversial military decision did Jefferson Davis make on July 17, 1864?



manders realized they could not win and fell back to Corinth until another offensive in August (for a more detailed explanation of the battle, see this animated history).

All told, the fighting at the Battle of Shiloh left more than 16,000 soldiers wounded and more 3,000 dead, and neither federal or Confederate medics were prepared for the carnage.

The bullet and bayonet wounds were bad enough on their own, but soldiers of the era were also prone to infections. Wounds contaminated by shrapnel or dirt became warm, moist refuges for bacteria, which could feast on a buffet of damaged tissue. After months marching and eating field rations on the battlefield, many soldiers' immune systems were weakened and couldn't fight off infection on their own. Even the army doctors couldn't do much; microorganisms weren't well understood and the germ theory of disease and antibiotics were still a few years away. Many soldiers died from infections that modern medicine would be able to nip in the bud.

A Bright Spot

Some of the Shiloh soldiers sat in the mud for two rainy days and nights waiting for the medics to get around to them. As dusk fell the first night, some of them noticed something very strange: their wounds were glowing, casting a faint light into the darkness of the battlefield. Even stranger, when the troops were eventually moved to field hospitals, those whose wounds glowed had a better survival rate and had their wounds heal more quickly and cleanly than their unilluminated brothers-in-arms. The seemingly protective effect of the mysterious light earned it the nickname "Angel's Glow."

In 2001, almost one hundred and forty years after the battle, seventeen-year-old Bill Martin was visiting the Shiloh battlefield with his family. When he heard about the glowing wounds, he asked his mom - a microbiologist at the USDA Agricultural Research Service who had studied luminescent bacteria that lived in soil - about it.

"So you know, he comes home and, 'Mom, you're working with a glowing bacteria. Could that have caused the glowing wounds?'" Martin told Science Netlinks. "And so, being a scientist, of course I said, 'Well, you can do an experiment to find out.'"

And that's just what Bill did.

He and his friend, Jon Curtis, did some research on both the bacteria and the conditions during the Battle of Shiloh. They learned that *Photobacterium luminescens*, the bacteria that Bill's mom studied and the one he thought might have something to do with the glowing wounds, live in the guts of parasitic worms called nematodes, and the two share a strange lifecycle. Nematodes hunt down insect larvae in the soil or on plant surfaces, burrow into their bodies, and take up residence in their blood vessels. There, they puke up the *P. luminescens* bacteria living inside them. Upon their release, the bacteria, which are bioluminescent and glow a soft blue, begin producing a number of chemicals that kill the insect host and suppress and kill all the other microorganisms already inside it. This leaves *P. luminescens* and their nematode partner to feed, grow and multiply without interruptions.

As the worms and the bacteria eat and eat and the insect corpse is more or less hollowed out, the nematode eats the bacteria. This isn't a double cross, but part of the move to greener pastures. The bacteria re-colonize the nematode's guts so they can hitch a ride as it bursts forth from the corpse in search of a new host.

The next meal shouldn't be hard to find either, since *P. luminescens* already sent them an invitation to the party. Just before they got back in their nematode taxi, *P. luminescens* were at critical mass in the insect corpse, and scientists think that that many glowing bacteria attract other insects to the body and make

Continued on page 4

**BEATEN FROM THE OUTSET: The Confederate States, it's people, its
Cause and Way of Life Outmatched
By Bruce Maxian**

Thinking generally about the Civil War my mind wandered back to Alvin Toffler's, *Third Wave*. Paraphrasing his comparison of the development of social trends that move somewhat like waves in the ocean. Starting with the Agrarian society being slowly diluted by the Industrial society and in turn by the Information society. Toffler updates the wave, carries it further however, for our purpose, the first two waves describe differences between the agrarian south and the Industrialized north. What follows is something to think about. Would you support the premise offered below or not. Whichever, can you express why you made your choice?

**Why the Confederacy Wasn't Ready for War
By Arturo Rivera**

The political, economic, and military strength of the Union was much greater than that of the Confederacy. However, the war did last four years. The Confederacy proved itself resilient on many occasions. Throughout the war the tide constantly shifted, and with that so did the political, economic, and military strength of either side. Although each side had its share of military successes, in the end, the superior Northern economy, centralized government and overwhelming manpower would eventually lead to victory. In mid 1863, both the Union and the Confederacy could have won the war although; the Confederacy lacked the industry, or manpower to wage a long war with the Union.

The Union was far more industrialized than the South. The North possessed 80% of total U.S. industry. In addition, most Confederate industry was located in the Upper South-particularly in Virginia. The Confederacy lost a great deal of potential industry and manpower when West Virginia, Kentucky, Delaware, and Maryland joined the Union instead of the Confederacy. The loss of these states to the Union was as much a testament to shrewd northern politics (Maryland) as it was to opposition within the states (West Virginia). Confederate industry, especially with the loss of these states, was unable to compete with the Union.

In addition to the South's lack of industry, most capital was invested in slaves and land-both of these are non-liquid. The South's lack of a large supply of liquid capital made it difficult for Southerners to buy munitions for the war effort. As a result of the South's lack of liquid capital the North enjoyed a decided advantage.

The south also lacked the factories, and other facilities (ironworks, etc.) to create cannons, rifles as well as other weapons. At the beginning of the war, the Confederacy only had one ironworks-located in Richmond. This was in stark comparison to the northern industrial juggernaut. The North had begun to industrialize in the early part of the century, this in relation to a primarily agricultural south. In 1860, 84% of Southerners worked in agriculture compared with only 40% of Northerners. The North also invested three times as much per capita in manufacturing by this same time. In 1860, only 25% of all railroads passed through the South. The South lacked the necessary industrial, and transportation infrastructure to wage an effective war

Ersatz in the Confederacy

By Mary Elizabeth Massey

Massey's research from dissertation to publication focuses on and provides profound insight into the homefront rather than the military. Among the many issues that support the South's unpreparedness for war was its dependency upon outside sources of supply of the essentials of life. She defines the dependency "for everything from a hair pin to a tooth pick, and from a cradle to a coffin." There existed a lack of self-sufficiency and an inadequate industrialization. Southerners believed they had boundless resources thus developed a "braggadocio" about the South's abilities that became detrimental to their war effort. The South had the resources to manufacture many of these and other articles but was too occupied with growing cotton for export to exchange for import from other countries and the North. An article in the *Southern Planter* stressed the peril of inadequate industrialization as did other agricultural journals — these warnings were largely ignored until it became too late. Hay, meat, horses, butter, cheese, clothing, shoes, beverages, paper, candles, oil kerosene, glass, rope, cordage, soap and starch were some of the items the South had to import. We "must not continue to imitate but "originate" warned another article. These examples are only a few that Massey addresses. This book should be in every Civil War enthusiast's library.

This editor has greatly reduced facts that address how unprepared the Confederacy was to enter into a war that, on top of everything else, was seriously unprepared to wage even what most thought would be a very short affair. Toffler's waves from Agrarian to Industrial societies seems to be a perfect analogy to what confronted those in the Confederacy to do battle, perhaps, prematurely with their brothers in the North.

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A Good Light

Looking at historical records of the battle, Bill and Jon figured out that the weather and soil conditions were right for both *P. luminescens* and their nematode partners. Their lab experiments with the bacteria, however, showed that they couldn't live at human body temperature, making the soldiers' wounds an inhospitable environment. Then they realized what some country music fans already knew: Tennessee in the spring is green and cool. Nighttime temperatures in early April would have been low enough for the soldiers who were out there in the rain for two days to get hypothermia, lowering their body temperature and giving *P. luminescens* a good home.

Based on the evidence for *P. luminescens*'s presence at Shiloh and the reports of the strange glow, the boys concluded that the bacteria, along with the nematodes, got into the soldiers' wounds from the soil. This not only turned their wounds into night lights, but may have saved their lives. The chemical cocktail that *P. luminescens* uses to clear out its competition probably helped kill off other pathogens that might have infected the soldiers' wounds. Since neither *P. luminescens* nor its associated nematode species are very infectious to humans, they would have soon been cleaned out by the immune system themselves (which is not to say you should be self-medicating with bacteria; *P. luminescens* infections can occur, and can result in some nasty ulcers). The soldiers shouldn't have been thanking the angels so much as the microorganisms.

As for Bill and Jon, their study earned them first place in team competition at the 2001 Intel International Science and Engineering Fair.

April 5, 2012 - 5:46pm

AREA EVENTS OF INTEREST

APRIL 22, 2016 at 7 pm Dr. James Denham , Prof. of History, Florida Southern college will speak on: **"Florida & the Civil War."** It will be held by the Friends of the Sarasota County History Center at the Auditorium of the Sarasota Garden Club. Light refreshments following Q/A session. Friends wrote a grant to flag Humanities Council to bring Dr. Denham.

Call Friends at (941) 361-2453 on M,W, or F (10 am to 4 pm) or Sat. (10-2) for reservation. Free and open to public.

Sat. April; 30, 2016 Noon to 1:15 pm at the historic Chidsey Building, 701 N. Tamiami Trail, Sarasota. State Archaeological Org. presents **"Shipwrecks of the Civil War."** Free & Open to Public. Call (941) 361-2453 same as above.

Check our monthly newsletter, *Battle Cry* at:
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