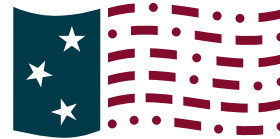


THE LINK



1ST EDITION

FEBRUARY 2011



NATIONAL CRYPTOLOGIC
MUSEUM FOUNDATION

EDITOR'S INTRODUCTION

I recently succeeded Dave Gaddy as editor of **THE LINK**, a publication of the National Cryptologic Museum (NCM) Foundation. The Foundation will have two publications: **THE LINK** and a newsletter, edited by Bill Saadi and sent electronically to most members. For now, **THE LINK** will reach members by mail.

In re-starting **THE LINK**, my objective is to narrow the publication to monograph format primarily, leaving the more time sensitive news and announcements to the newsletter.

This, the first issue, will consist of an article by Dave Hatch, the NSA historian, about the evolution of the NSA Center for Cryptologic History, followed by a brief discussion of the forthcoming NCM exhibit on the Civil War and a monograph on highlights of Civil War communication and cryptology, with emphasis on the former, and including historic events on the coming of the telegraph that took place within walking distance of the NCM.

Lou Benson, Editor



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NSA HISTORIAN'S CORNER

Readers of **THE LINK** are familiar with the National Cryptologic Museum, but I'd like to introduce NSA's Center for Cryptologic History (CCH).

The CCH was the museum's "parent," and though now separated organizationally, our staff still works closely with the museum staff.

The first NSA historian was no less a figure than Thomas Dyer, the WWII cryptanalyst who is now in the Hall of Honor. In the 1960s, the Agency had a professional historian, George Howe, who had been in academia and had written one of the Army's "Green Books" on WWII.

In the late 1980s, the then historian, Henry Schorreck, concerned that the history program was withering, met with the then Director Vice Admiral William O. Studeman about the situation. Director Studeman, understanding the need for history in a large institution and how it might be used at NSA, authorized establishment of the CCH in late 1989.

For chief of the CCH, the Director selected David W. Gaddy, a long-time senior official whose interest in history was known. In addition to providing leadership that brought the new organization safely through bureaucratic perils, Dave Gaddy initiated some far-reaching programs, such as the Scholar-in-Residence and the Symposium on Cryptologic History that are still important today.

Another CCH function Dave Gaddy promoted was a vigorous publications program. Previously, historians had been discouraged from making their work available too widely. Most of the CCH's unclassified publications are now available in softcopy on the official website, www.nsa.gov. (Readers can also order bound copies of our books at that site.)

In future issues, I will write about how the CCH and the museum work together, as well as more about our historians and the CCH programs today.

David A. Hatch, NSA Historian

CIVIL WAR COMMUNICATIONS AND CRYPTOLOGY

The year 2011 brings the 150th anniversary of the start of the Civil War. The war has been the subject of thousands of books and articles, and we may expect a huge new outpouring of historical works in the four years of the Sesquicentennial observance.

There will be new perspectives, new forms of historical presentation. A few long-accepted conclusions are unlikely to change; for example, the supremacy of the Confederate battle captains – Lee, Jackson, Longstreet – over their Union counterparts in the Eastern Theater of operation, at least until Gettysburg.

But in technology and engineering – a major factor in the outcome of the war – the Union would be supreme. This was a matter of wealth, infrastructure, outlook and the performance of gifted men who understood and managed the relatively new technology of the railroad and the telegraph – including Grenville Dodge, John Dix, Orlando Poe, Sherman, Grant, and even the personality-and-character-challenged McClellan and Ben Butler. Of particular note is the brilliant Herman Haupt who ran the military railroads and made superb use of the telegraph. And, at the top, Lincoln understood technology and made superior use of the telegraph and encrypted communications for command and control of his vast forces.

During 2011, the NCM will mount an updated and expanded Civil War exhibit, which will be a centerpiece display featuring some rare and recently acquired cryptologic documents obtained by Dave D’Auria.

Patrick Weadon, the museum curator, expects this display to help satisfy the public’s never-ending interest in the Civil War, an interest that will be even greater because of the Sesquicentennial.

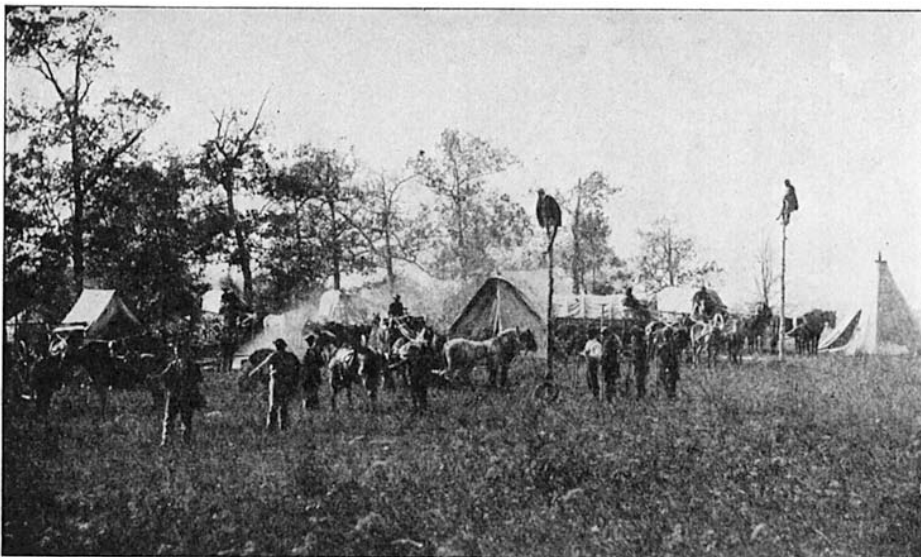
THE COMING OF THE TELEGRAPH

Samuel F.B. Morse, one of the greatest American painters of the 19th century, invented the telegraph – claims to the contrary notwithstanding. In the practical development and fielding of this revolutionary device, he had the help of Alfred Vail, his long-time principal assistant, Ezra Cornell (who endowed that famous university), and Samuel Colt (of six-shooter fame).

As in many scientific and pioneering developments (television, for example) there is always the question of “the first,” in this case the text and circumstance of the first telegraph message. Preceded by years of experimental telegraph messaging and then extensive operator chatter, the real “first” took place on 1 May, 1844, in a series of telegraph messages in “Morse code” on breaking political news. These messages were sent from Annapolis Junction, Maryland to the capitol building in Washington. The sending station at the Junction was probably in a small building beside the B & O railroad, a building that was the core of the late Henkel’s restaurant, so well-known to NSA employees.

Morse’s objective had been to build an underground line from Baltimore to Washington, along the B & O right of way. The railroad agreed to this at no charge, subject only to the understanding that the line was not to interfere with railroad operations. Ezra Cornell ran 10 miles of underground cable in a pipe starting from the depot in Baltimore. However, this initial enterprise failed, because the insulation failed.

Cornell and Morse then decided to string the wire overhead on chestnut



297 United States Military Telegraph Construction Corps, from a photograph by Gardner, Washington

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& CRYPTOLOGY

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tree poles, 30 feet high, buried 4-feet deep, and at 200 foot intervals. This time the telegraph line construction started in Washington. In other words, the telegraph line went south to north. When it reached Annapolis Junction, the operation stopped temporarily.

Morse wanted to obtain the results of the Whig Party's presidential convention in Baltimore and wire the news to the Capitol. He wanted to obtain the news from train passengers stopping at Annapolis Junction and telegraph the news further south before the train reached Washington. This venture was a success, with Vail telegraphing Morse in the capitol building where the news was received by excited members of Congress and visitors.

On 24 May, 1844 the overhead line, Washington to Baltimore, was completed and the famous message text, "What hath God wrought" was transmitted by Samuel Morse from the chamber of the Supreme Court to the railroad terminal in Baltimore. The text for the message – which, as we've seen, was not the first message transmitted – was selected from the Bible by the daughter of the head of the U.S. Patent Office. (The text is often ended with a question mark, which is inaccurate and not in the biblical passage.)

Morse, more and more as he aged, and once war began, showed himself as anti-union, pro-confederate, pro-slavery, anti-Catholic, and anti-foreign-born. This bitter, unhappy man lived through and beyond the Civil War, rich because of his invention and extensive holding of Western Union (and other) stock which, ironically, increased in value as the Union expanded the telegraph for military and civil purposes to a level far beyond that of the Confederacy.

THE WAR

We start at Annapolis Junction. When the Civil War began with the Confederate bombardment of Fort Sumter, S.C. on 2 April, 1861, there was much concern for the security of the national capitol surrounded as it was by Confederate Virginia and pro-Southern Maryland. The garrison of Washington – modest detachments of regular army, marines and sailors – seemed unlikely to be able to defend Washington. Re-enforcements had to



Civil War field telegraph station.

come from the north.

There were two routes – via Baltimore on the main north-south railroad, and via the rather minor port of Annapolis – from which troops could march or proceed by rail (the Annapolis & Elk Ridge Railroad) to Annapolis Junction and then south into Washington.

Union troops from Massachusetts fought their way through Baltimore mobs. But bridges and telegraph lines were being cut by Confederate adherents. Annapolis was put under martial law by General Ben Butler. With some difficulty he secured the railroad, roads and telegraph line from Annapolis to Annapolis Junction and re-enforcements got through to Washington.

Thereafter, and in spite of the Union disaster at Manassas, Washington was safe. Annapolis Junction continued to be of importance during the rest of the Civil War as a railroad and telegraph center.

One more vignette from the Annapolis Junction area. In late April 1861, Andrew Carnegie, then a superintendent of the Pennsylvania Railroad travelled by rail from Annapolis en route to Washington to assist the War Department in transportation planning. Just south of the Junction he saw a downed (probably sabotaged) telegraph wire. He stopped the train, got out to investigate and suffered serious cuts from the wire.

We now turn to an overview and a few highlights of the role telegraphy, railroads and cryptology played in the Civil War. As to the latter, Dave Gaddy has already written an authoritative article in the publication **Masked Dispatches**, a CCH publication.

THE U.S. MILITARY TELEGRAPH CORPS DURING THE CIVIL WAR

In January 1862, Congress passed a law allowing the Federal government to take over all telegraph lines for military purposes. Further, the U.S. Military Telegraph Corps (USMTC) was created. The USMTC was a civilian outfit – despite some early objections by senior officers – that reported to the Secretary of War. Throughout the war, the Union was served by both the civil telegraph companies and the USMTC controlled lines. Anson Stager was chief of the USMTC and his authority extended to all military telegraph and high level (whether USMTC or civil) cryptography.

Stager started from a strong position, with actual and potential resources well beyond those of the Confederacy. In 1844 the sole telegraph line was Washington to Baltimore, about 40 miles. By the beginning of the war there were more than 50,000 miles of telegraph lines in the U.S., probably 90% within the Union. During the war, under Stager's direction, USMTC built an additional 15,000 miles of line (probably much more considering temporary battle area lines).

Stager, a colonel during the war who was promoted to brigadier general at the close of the conflict, came to the position of chief of USMTC from Western Union where he had been senior superintendent.

In a classic case of intra-service rivalry and clash of roles and mission, he ran up against major (and by end of war brigadier general) Albert J. Myer, the chief Signal Officer of the War Department. Myer, who had joined the pre-war army as a surgeon, had established the Army Signal Corps in 1860. He had developed the Army's signal flag/"wig-wag" system.

Myer's fundamental position was not unsound: his Signal Corps would run tactical/battlefield communications, while Stager would control strategic communications. However, the line between tactical and strategic was often blurred and there was the matter of central control of all telegraph equipment, lines and operators. Stager won out, Myer was sent west, and all equipment, personnel and cryptography would be under Stager's USMTC.

In this in-fighting, there are notable later parallels; for example, the Signal Corps vs. the Military Intelligence Service during World War II, and tactical vs. national signal intelligence between the military services and AFSA/NSA in the post-war period.

The Confederacy did not establish a military telegraph authority as such. The telegraph remained in the hands of the private companies, though President Davis used his authority to turn these private telegraph lines to military use.



Annapolis Junction, where the Annapolis and Elk Ridge Railroad joined the B&O. Note telegraph pole on left.

HISTORIC ANNAPOLIS JUNCTION TODAY

Grassland, still standing today at National Business Park, is a large brick house built in 1853 by William Anderson. The bricks were manufactured on the property as there are substantial clay deposits. The house is framed by timbers 30-40 feet long. Anderson's slaves built the house, supervised by Elias Gardner, a free African American.

There were 2 hotels at Annapolis Junction, now long gone. Anderson was pro-Confederate. During the war Union troops camped on his farm while waiting for rail transport. Also, Union officers visited his house. There are outbuildings surviving on the property; e.g. a possible slave house, smoke house, and some ruins.

The main hindrance to Confederate use of the telegraph during the Civil War lay in pre-War conditions. There were very limited telegraph circuits in the pre-war South, and objections to running these across state lines. This attitude seriously diminished confederate railroad systems, too. For example, Southern state legislatures saw interstate rail and telegraph lines as a threat to states' rights and local custom.

This was to hinder the Confederate military forces during the war.

PRESIDENT LINCOLN'S COMMAND STRUCTURE

That the Civil War was the first modern war is a truism. A major aspect of this was the Union's national command authority: President Lincoln and Secretary of War Stanton (Secretary of Navy Welles to a lesser extent) ran the war from Washington, by telegraph, sending and receiving a high volume of encrypted message traffic.

The command center was located in the War Department building, next door to the White House, on the second story of that four story building. Lincoln used a small room located between Secretary Stanton's office and the telegraph center. Here the president read incoming traffic from all theaters and wrote some messages to his commanders.

While many Union Army messages were plaintext or in a variety of encryption systems, White House-War Department messages were most often encrypted in a standard, higher grade system. Many of the telegraph messages written by Lincoln bear his or his secretary's notation at the top, "Cypher." This meant using the higher grade system with the "Route System" indicator, code word "Guard". This involved a 5x7 grid.

One example of Lincoln's personal involvement: before and during the Second Battle of Manassas (another Union defeat) in 1862, Colonel (later brigadier general) Henry Haupt carried on near instant exchanges of telegraph messages with the President. Haupt ran out telegraph lines to the front, accompanied by civilian telegraph operators, Signal Corps reconnaissance teams and a 200 man infantry screen. Haupt's reporting was concise and fast. The brilliant engineer Haupt would later be chief of the Union military railroad system and was suggested by some in Washington close to the President as a candidate for corps commander or even commander of the Army of the Potomac, especially, in the latter case, if McClellan was the alternative.

Examples of Lincoln's use of the telegraph abound and may be the subject of a later LINK article.

To close this section, a few more dates and names of local interest:

*The first federal government telegraph line was completed between the War Department and the Washington Navy Yard on or about 1 May 1861. By late 1861 there were 1000 miles of permanent or temporary telegraph line built by the War Department or under department control, in the Washington-Baltimore-

Alexandria region.

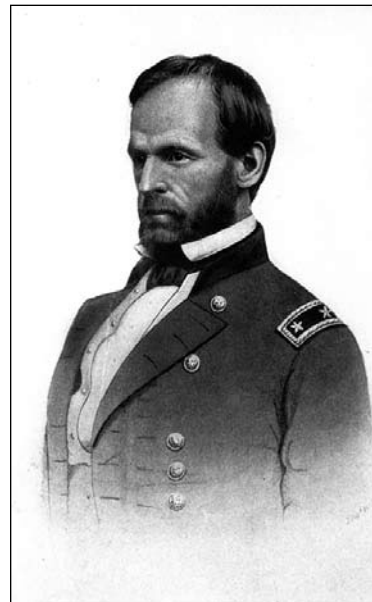
*Rescuing some names from obscurity, some of the telegraph operators in our area who supported the Union forces included William Kress and Crosby Ryan at Annapolis Junction and Samuel Brown and Jesse Russell at Annapolis. They and their unnamed colleagues were by then operating 24/7.

GENERAL SHERMAN AND MILITARY COMMUNICATION

In his Memoirs (1886) General William T. Sherman, ever-opinionated, wrote:

"For the rapid transmission of orders in an army covering a large space of ground the magnetic telegraph is by far the best, though habitually the paper and pencil, with good mounted orderlies, answer every purpose. I have little faith in the signal-service by flags and torches, though we always used them; because, almost invariably when they were most needed, the view was cut off by intervening trees, or by mists and fogs. There was one notable instance in my experience, when the signal flags carried a message of vital importance over the heads of Hood's army which had interposed between me and Allatoona, and had broken the telegraph wires... the value of the magnetic telegraph in war cannot

be exaggerated, as was illustrated by the perfect concert of action between the armies in Virginia and Georgia during 1864. Hardly a day intervened when General Grant did not know the exact state of facts with me, more than fifteen hundred miles away as the wires ran."



General William T. Sherman

Sherman then went on to discuss the importance of the

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CIVIL WAR COMMUNICATIONS & CRYPTOLOGY
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interface of civil and military telegraph lines, field-wire, good operators, and he concludes: "This is far better than the signal-flags and torches."

Sherman's Georgia campaign in 1864-65 shows a bit of everything – of current interest and relevance.

Sherman was not, in fact, always in touch with Grant by telegraph, at least not during his several week "March to the Sea." But he had been during the Atlanta campaign that preceded the March and he would be, via the Navy (courier ships to the telegraph station at Fort Monroe, Virginia) once he reached the sea at Savannah. Furthermore, Sherman detached and re-enforced General George Thomas who proceeded north to Nashville, Tennessee, pursued by General Hood, the Confederate field commander in Georgia/Tennessee. Thomas had excellent telegraph communication with Grant in Virginia and Washington.

Two events are of particular interest regarding Sherman's largely unopposed March to the Sea.

On 9 November 1864, one week before Sherman began the March, there occurred a horrendous leak of secret Union information: an Indianapolis newspaper published an essentially accurate account of Sherman's (and Grant's) plans; that is, that Sherman would march southeast to Savannah on the Atlantic while Thomas would go in the opposite direction to Nashville. Sherman seemed unfazed by the leak and laid plans for disinformation. The confederates thus had near perfect intelligence of the unfolding Union strategy. Two weeks later, in possession of this information but perhaps influenced by deception, Confederate president Jeff Davis was certain that Sherman's objective was Augusta, Georgia, well inland, rather than Savannah. Davis telegraphed his commander in North Carolina that defense of Augusta must be the first priority and "every other consideration will be regarded as subordinate." So Davis, the confederate Commander in Chief, had outstanding, valid intelligence from a leak (and General Joe Wheeler's busy cavalry scouts and spies) along with high speed communications to his tactical commander. To no avail, however.

A second noteworthy event was a specific example of Union Sigint and attempts to use the telegraph for deception. On 20 November 1864, General Judson

Kilpatrick, Sherman's chief of cavalry was operating in the vicinity of Macon, Georgia. In accordance with Sherman's standing order, he cut down Confederate telegraph lines. One line was left open and Union personnel tapped it, intercepting a message from General Hardee to theater coordinator General P.G.T. Beauregard, which read: "For god's sake hurry up troops and save the bridge over the Oconee (River)." This was of tactical use to the Union forces but the Union operators' effort to engage the Confederate operators eventually led the latter to realize they were being spoofed.

Throughout the March to the Sea, Sherman engaged in information warfare/information operators. Confederate lines were tapped but more often destroyed as were the rail lines. What is remarkable, however, was the Confederate ability to restore communications and even railroad transportation but only after much effort and at a reduced level.

In future issues we will continue to examine the uses of the telegraphs, signal flags and fires and cryptography during the Civil War.

Lou Benson, Editor

Sources used for this monograph include:

The Memoirs of General W.T. Sherman

Lightning Man: The Accursed Life of Samuel F.B. Morse,
by Kenneth Silverman

Various articles of the Anne Arundel Historical Society
including work by the editor

Mr. Lincoln's T-Mails, by Tom Wheeler

Southern Storm: Sherman's March to the Sea, by Noah A.
Trudeau

The Military Telegraph During the Civil War, Volume I, by
William R. Plum

BOOKSHELF

While **THE LINK** will not feature lengthy book reviews, some books of special interest will be noted.

As for books about the Civil War, probably the best are the memoirs of Grant, Sherman and Confederate general Richard Taylor. All have high historical and intellectual value, and Grant's is one of the greatest such works in the English language. **Confederates in the Attic** (1998) by Tony Horwitz concerns the endurance of the Civil War in our culture, and has important historical insights such as a re-evaluation of the Battle of Shiloh. Horwitz's interview of Shelby Foote is particularly notable. Here's an excerpt from this unusual book, a recollection of Shelby Foote from his youth:

"I remember in the 1930s there was a family from Ohio in town, God knows why," Foote recalled, "and on July Fourth they drove their car up on the levee and spread a blanket and had a picnic. They didn't set the brakes on the car and it ran down into the Mississippi River and everyone said, "It served them right for celebrating the Fourth of July." Foote chuckled again, adding, "We despised Yankees, just on the face of it."

The recent official or authorized histories of the British services, MI-5 and MI-6 are important and authentic contributions to the study of intelligence and counterintelligence. For MI-5, 1909-2009, we have **Defend the Realm** by Christopher Andrew. Keith Jeffery's **The Secret History of MI-6** covers the period 1909-1949. We will have more to say about these books in a future LINK issue in the context of certain important NCM holdings on counterintelligence.

FUTURE ISSUES OF THE LINK

A few topics for future issues include: the Russian comms and crypto change of 1948-9; the evolution of communications at AFSA/NSA; outsourcing at NSA; the NCM library collections re Sigint support to counterintelligence in the 1930s and after (MASK, ISCOT, VENONA). Suggestions are welcome.

We welcome reader comments on this and future issues of **THE LINK**. Please direct comments to: **CryptMF@aol.com**.

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