Morse Telegraph Club, Inc.

Grand Chapter — Chicago, Illinois

"What Hath God Wrought" - Samuel Finley Breese Morse - May 24, 1844

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The telegraph was the first electric device to be put to everyday use and was the forerunner of today's electric and electronic communication equipment. Even computers are based on the same principle; that is, interrupting or pulsing an electric current in a controlled manner.

Samuel Finley Breese Morse (1791–1872) invented the telegraph, taking advantage of the findings of other experimenters, notably Joseph Henry, who developed the electromagnet. A moderately successful portrait painter, Morse became interested in the concept of the telegraph in 1832, while returning from Europe to America. While away from home some years earlier, his first wife died, at age 25, and it took two weeks for the news to reach him. In the course of a conversation on electricity and electromagnetism with Dr. Charles Jackson, on board the packet Sully, he conceived the idea for an electric telegraph and said he saw "no reason why intelligence might not be instantaneously transmitted by electricity to any distance."

In 1836 Morse built his first working model, a crude machine fashioned from a picture frame, a printer's port rule and wooden clockwork parts. A strip of paper moved under an electromagnet-controlled stylus, which made v-shaped marks on the paper. The marks indicated figures corresponding to numbered words, a system which of course had limitations.

Alfred Vail became interested in Morse's experiments and was accepted as a 2/16th partner. Vail's family owned the Speedwell Iron Works in Morristown, N.J. and it was there that the receiving register and simple hand key were developed to replace Morse's first instruments. Vail also aided substantially in developing Morse's letter code of short and long pulses, or "dots and dashes," which was used in an 1838 demonstration to interested friends and supporters. This code was modified and improved for the 1844 Congressional demonstration and with only minor changes, was used on U.S., Canadian and Mexican landlines until the demise of commercial and railroad telegraphy.

In 1843 Morse obtained a $30,000 grant from Congress to prepare a demonstration telegraph circuit. After much difficulty, a circuit was established between the Supreme Court chamber of the Capitol building in Washington and the Baltimore & Ohio Railroad station in Baltimore. The first practical use of the line occurred on May 1, 1844, when the Whig Party met in Baltimore to nominate candidates for President and Vice President. Alfred Vail, in Baltimore, found out from passengers boarding a train bound for Washington that the Whigs had nominated Henry Clay for President and Theodore Frelinghuysen for Vice President. He telegraphed the message to Morse in Washington. When the train arrived, its passengers confirmed the news. On May 24, 1844, Morse and Vail successfully demonstrated to Congress the practicality of the invention. Morse had promised Miss Annie Ellsworth, daughter of the patent commissioner who was a friend of Morse's, that if he obtained the grant for the experiment, she would have the honor of composing the first message. She did so, selecting from the Bible Numbers 23:23, "What Hath God Wrought."

About the same time, the potential of the telegraph was again shown when the Democratic National Convention, held at Baltimore, nominated James K. Polk for President and the news was flashed to Washington. Soon after the telegraph went into general use, newspapers began to include columns of "telegraph news" in their publications. Associated Press was the first newsgathering organization to lease a private wire from the telegraph company and United Press, International News Service and other wire services followed.

The telegraph receiving register had a moving strip of paper on which short or long marks (dots or dashes) appeared – in response to the manipulation of a sending key at some other point – by a pen attached to the armature of an electromagnet. The receiving operator transcribed these marks into a written message. As early as 1846 operators discovered they could discern letters and numbers from the sounds made by the register; a young man named James Francis Leonard is generally credited with this discovery. Writing messages from the sounds instead of transcribing from the tape was at first opposed by telegraph company management (Morse always insisted on calling his invention "the electro-magnetic printing telegraph"), but it soon became widespread and "sounders" were manufactured beginning in 1856.

Learning to telegraph is not as difficult as it might seem. Just as we learn the shape of letters and numbers in learning to read, telegraphers learn their sounds. Once the alphabet is memorized it only remains to increase speed so that entire words, instead of letters, are heard.

The telegraph was a phenomenal improvement in communications and it radically changed society. Telegraphers were held in high regard and called “lightning slingers.” Operators themselves, awed by what they were able to do, pointed to the Bible verse Job 38:35, “Canst thou send lightnings, that they may go and say unto thee, ‘Here we are?’ ” as applying to them.

About a dozen competing telegraph companies were consolidated in 1856 to form Western Union and establish a nation-wide private enterprise communications network whose effects led to far-reaching commercial and social changes. Communication that formerly took weeks could be accomplished a matter of minutes. This was dramatically demonstrated about 15 years after commercial telegraph service began.

In 1860, letters sent via the Pony Express (officially the Central Overland California and Pike’s Peak Express Company) typically took 10 days from St. Joseph, Missouri to Sacramento, California — a vast improvement over sending mail by sea around Cape Horn or by sea to Panama with a land transfer across the isthmus to another ship. Completion of the overland telegraph line on October 21, 1861 made it possible to send a message from coast to coast in an hour or two; three days later the Pony Express went bankrupt, ruining many investors.

Railroads quickly adopted the telegraph for communication and it vastly speeded up train operation. In 1851, Erie Railroad Superintendent Charles Minot was on a westbound train waiting at Harriman, New York to meet an opposing train. Meeting points were fixed by timetable and if one train was late, the other just had to wait. Impatient, Minot had the telegrapher ascertain from Goshen if the eastward train had left there. It had not, so Minot sent a message to Goshen for the operator there to hold that train until his own arrived and wrote out an order for his train to proceed against the schedule of the overdue eastward train. The engineer refused to obey the order, so Minot took the throttle and the engineer boarded the train’s rear car, certain a collision was inevitable.

On arrival at Goshen the opposing train had still not arrived so the process was repeated and eventually the two trains met at Port Jervis, saving much time for the westbound train. From this incident the system of “train dispatching” evolved, so called because it used telegraphic dispatches (then spelled “despatches”) to control train movements.

Both Union and Confederate forces employed the telegraph during the Civil War, and there also it radically changed the way things were done. Telegraph operators, many of them civilians, became indispensable to the conduct of the war, their messages enabling officers to more quickly assess the size and location of enemy forces and react much faster than before. On some occasions a telegrapher went aloft in a balloon, carrying a Morse set and trailing wires to earth, to report on enemy troop dispositions. Certainly this kind of scouting was a distinct improvement over conventional intelligence-gathering methods, though it didn’t last long because of the logistics involved.

Operators became adept at tapping and eavesdropping on enemy circuits. Some even imitated the sending characteristics of enemy operators to send false messages, and at times they taunted opposing operators by letting them know their traffic had been overheard.

Noted persons who began their careers as telegraph operators include Andrew Carnegie, Jesse H. Bunnell (Civil War operator and later a leading manufacturer of telegraph and electrical equipment), Richard Sears (founder of Sears, Roebuck), cowboy movie star Gene Autry and Chet Huntley (former NBC news co-anchor). Many railroad officials, including some presidents, began as telegraphers, and a sizeable number of telegraphers who worked in stock brokerages or commodity exchanges went on to success in those fields. Thomas Edison began work in the 1860s as a telegraph operator and his first electrical experiments related to the telegraph.

Morse’s code was not suited to the transatlantic cables nor for use in Europe, so a variation, International Morse code, emerged in 1851. When wireless came into use, both codes were used for a time, resulting in confusion and errors when European ships were in American waters, and vice-versa. Following the sinking of the Titanic in April, 1912, International Morse was made the standard for radio use.

In 1883, with the adoption of “Standard Time” by the railroads, Western Union and the Naval Observatory inaugurated nationwide “Correct Time Service.” The signals, a series of dashes with the 29th and the 50th to the 59th of each minute omitted, were transmitted beginning a few minutes before 12 noon Eastern time. In the final pause before the hour, operators in charge of standard clocks closed a switch and the pulse on the hour then closed relays which reset the clocks exactly to the second. Until this service ended in the 1960s, it was a daily ritual for all railroaders, whenever possible, to be in a telegraph office and check their watches against “the time signal.”

In Morse’s first experiments the speed of transmission was about 10 words per minute. With “sound reading” it theoretically increased to about 40 w.p.m., near the limit for sending on a hand key. Use of the typewriter made copying much easier, while the Phillips Code, a glossary of abbreviations introduced in 1879 by Walter P. Phillips, increased sending speeds. After the semi-automatic “Vibroplex” telegraph key was introduced by Horace Martin in 1904, the combination of Vibroplex, typewriter, Phillips Code and skilled operators made communication speeds in excess of 60 w.p.m. commonplace.

The telegraph was used not only by Western Union, Postal Telegraph and railroads, but by many other businesses — mining companies, meat packing houses, automobile manufacturers, oil pipelines, radio networks, telephone companies, stock brokers and commodity traders. A Quebec beer maker connected its offices in Montreal to the brewery in Lachine with an eight mile line.

Information was communicated not only by text and numbers, but rudimentary "spread-sheets" were common. A printed form, divided into rows and columns, could be conveyed by the sending operator specifying "line 3 A5, line 7 J17," etc. In this manner, railroad chief dispatchers received detailed accounts of the number and kind of cars on hand at local stations, empty cars awaiting disposition and equipment needed for loading. Another use of this technique allowed the Terminal Railroad Association of St. Louis to receive advance notice of passengers who were to change trains there. Passenger agents of each railroad could consult this report and arrange to be on hand to facilitate transfers.

One of the most interesting uses of the telegraph was reporting baseball games for radio broadcast. A telegrapher at the ball park sent a play-by-play account to a radio station back in the visiting team's home city. There another telegrapher copied the account, periodically handing slips of paper to an announcer who described the action and, in some cases, attempted to make it seem as though he was at the game.

A system of shorthand was used; for example, S1C indicated "strike one called," PTF "pitcher throws to first," B2 OS "ball two, outside," OUT 6-3 "grounded out, shortstop to first" and so on. This system developed into something of an art and several broadcasters became well known. Announcer "Red" Barber and Western Union telegrapher Harry Moorman, reporting for the Cincinnati Reds, were a particularly accomplished duo. Future President Ronald Reagan, fresh out of college and working as a sports reporter for station WHO in Des Moines, was another who took part in these re-creations, which ended shortly after World War II when improved long distance telephone facilities made broadcasting from remote sites feasible.

Very early in the Morse telegraph era, North American telegraphers began to refer to novice and inept operators as "hams," which possibly derived from "ham-handed." Since most early wireless operators came from wire telegrapher ranks, when pioneer amateur radio operators began to interfere with commercial traffic they were immediately condemned by the commercial operators as "hams" and the epithet soon came to include all amateurs.

The 1844 Morse code, now sometimes called "American" Morse, is still in limited use by railways in Mexico and Central America, and perhaps by post offices of one or two Central American nations. It perhaps also is the code used by the G&Q Railway in Ecuador. There is no longer any commercial use of this code in Canada or the United States, the last known active telegraph circuits having been silenced in 1985 or 1986.

International Morse code is still used by some ocean-going ships and by some landline telegraph systems in Asia. Amateur radio operators also use it and are probably the largest single group still doing so. It is now possible to get an amateur license without having to know code, but it is a restricted license and one must demonstrate a knowledge of code to obtain expanded privileges.

Samuel Morse had two other accomplishments of note: He invented a machine for finishing marble, and in 1827 established the *Journal of Commerce*, which is still published.

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