Dots & Dashes

What Hath God Wrought

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TRAGEDY OVER THE TAY

By Pat Kelly

At about 5 AM, David Mitchell awoke in his home at 89 Peddie St. in Dundee, Scotland. Dundee is situated on the north shore of the Firth of Tay, in northeast Scotland, where the Tay river widens into the Firth and then flows into the North Sea.

It was a cold, dark and bleak morning. The year was 1879, Sunday December 28th. Mitchell was an experienced locomotive engineer, or engine driver, employed by the North British Railway, (NBR), company. Quietly, so as not to disturb his still sleeping wife, Janet, he arose, dressed and made his breakfast. Then after looking in on his children, snug in their beds, he made his leisurely way to the railway yards, about a mile from his home. Being Sunday, only one train was scheduled for the run from Dundee to Burntisland (Burnt Island). and return. Burntisland is on the north shoe of the Firth of Forth about forty miles to the south.

There the train connects with the ferry to Edinburgh, located on the south shore of the Firth of Forth.

Driver Mitchell was not best pleased to be working this day, but was returning a favour for another driver. This trip of about two hours, would entail a dreary eight hour lay-over in Burntisland before beginning the return journey to Dundee at 5:27 PM. This run would end on the train's return at about 7:20 PM that evening.

At the railway yards, Mitchell met his friend and fellow railway man, John Marshall, who was to be the fireman on Mitchell`s train that day. Together the two men spent some time doing various tasks, making ready for the upcoming run. The regular locomotive scheduled for the trip was sidetracked due to a minor mechanical problem, so an engine of the 224 class was to be used instead. Number 224 was one of two steam engines of its class, built in the NBR shops in Cowlairs, near Glasgow, in 1871. A large and quite powerful machine for its time, weighing thirty seven tons, it had proved to be very capable of carrying out the work assigned to it..

Dundee was quite a large metropolis and was known world-wide for the production of jute and marmalade. Countless residents of the city and surrounding area, worked in these two industries. It was also a base for whaling and Arctic and Antarctic exploration. Add to that , a junction point for several railway lines, and you have thriving and busy city indeed.

Map of train route from Dundee to Burntisland

To digress a little. Plans had been afoot since about 1854 for a bridge to replace a train ferry that crossed the Firth of Tay from nearby Broughty Ferry to the village of Wormit on the south shore of the Firth. In 1878 the Firth was finally spanned by a single track, two mile long railroad bridge from Dundee to Wormit. Billed as the longest bridge in the world, it was designed by a well respected and successful bridge builder and engineer

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The Morse Telegraph Club, Inc.

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Position open to anyone interested

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Your Articles and Stories: MTC is always looking for original photographs, stories and articles about your experiences in telegraphy or radiotelegraphy. Please send articles and news stories to the Editor of *Dots & Dashes*.

Telegraph Talks and Demonstrations: If you or your local chapter should schedule any demonstrations, talks or other special events, please notify the International President so he can publish your event in our on-line calendar.

In This Issue

ARTICLES

IN EVERY ISSUE

The next issue of *Dots & Dashes* is scheduled for publication on December 30th, with submission deadline three weeks prior to that date.

Sidewire

Comments from the Editor of *Dots & Dashes*

By Jim Wilson

This issue of *Dots & Dashes* contains reports of both happy and of sad events. On the happy side, we have a new volunteer MTC International Secretary-Treasurer. I'll let President Jim Wades tell you the name of the volunteer and his background.

Under sad news, a former MTC International Secretary-Treasurers, Roger Reinke, has become a Silent Key. Read Roger's life story on pages 4 and 20. Roger was a major influence on establishing the 9-1-1 emergency telephone system. Roger also had a magnificent collection, hundreds of telegraph keys and sounders. Photographs of his spectacular collection appeared in previous issues of *Dots & Dashes*. President Wades has offered to assist Roger's family with appropriate distribution of Roger's telegraph key and sounder collection.

Under interesting news, the British Broadcasting Company (BBC) documentary film, "American Railroads and the Telegraph," has already aired in Brittan and is scheduled to be aired on the Public Broadcasting System (PBS) channel in November this year. Recall that this hour long documentary was filmed at the Baltimore, Maryland B&O Railroad Museum. This story made front page news in the winter 2015-16 issue of *Dots & Dashes*. MTC International President Jim Wades and Washington-Baltimore Chapter President Hubert Jewell both appear in this documentary film. You will enjoy watching this film.

Under Chapter News, you will find several chapters actively demonstrating the electric telegraph and telling the world the importance of this simple invention. The Florida Chapter, just one of our 29 MTC chapters, is very active. I would like to hear from some of our other less active chapters. Send me a photo of the members attending your annual meetings and tell us what interests your members.

The electric telegraph was the first practical use of electricity and it began our electronic revolution. Carry that important message to your neighbors!

Jim Wilson

President's Line

Jim Wades, President Morse Telegraph Club, Inc.

The Story Behind the Instruments

Most who collect telegraph instruments probably view them as artifacts in a form of industrial archeology. They represent companies, technological evolution, and broad, sweeping concepts of progress in the field of telecommunications. A few collectors likely act on a simple impulsive desire to possess a scarce artifact.

Of course, one can look at old telegraph instruments in another way. Some instruments represent a decidedly human story. For example, consider the ubiquitous Vibroplex "bug." Many bugs one encounters accompanied their owner through an entire life and career. Perhaps a particular key stood witness to the mundane encounters of a daily, working life. Others had a ringside seat to history at press conferences. Yet others transmitted news stories, sporting events or millions of dollars in stock transactions. Some went to war with their owners and others transmitted both the good news of a soldier returning home and the grim news of a son who would never return. Somewhere, there is a story to go with each old bug.

The songwriter Kate Wolf once said that she enjoyed exploring old houses because she felt as if they contained a bit of the spirit of those who had once lived there. Perhaps the same is true of old telegraph instruments.

Recently, I purchased an old bug with the serial number 677. It was obviously very early. Perhaps it was assembled by Horace Martin himself. However, this particular bug also tells the story of two telegraphers, one of whom was William B. Schragen and the other William Blum. This is some of the genealogical information provided by Mr. Blum's son, which has been edited somewhat for clarity:

"The 1916 city directory (the earliest record I have) and a 1917 WW-I draft registration form shows my uncle, William B. Schragen, working as a telegraph operator and wire chief for the Philadelphia and Reading Railroad.

In the 1920 census both my father, William

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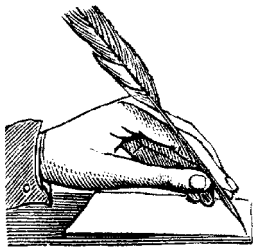

Letters to the Editor

August 3rd

Roger Woods Reinke
Age 85 - July 1st 2016

It was with great sadness that I happened upon the "SK" Notice for Roger Reinke in a recent edition of the Washington Post newspaper. In all honesty, I'm not exactly sure how long I've known Roger – it was at least a decade and in all probability longer than that. Although our friendship was a same time next year acquaintance, our annual crossing of paths at the Transportation Expo (TRANSPO - Gaithersburg, MD) was something I looked forward to each year and tracked on my calendar to make sure I didn't forget the date!

I first met Roger when we were both a tad younger. Back then, I doubt if either of us was receiving a retirement or Social Security. He was a vendor at the annual TRANSPO "flea market" and I was a railroad enthusiast, who had just become aware of the large railroad show. I was there for train stuff and had not even considered the possibility of any telegraph items.

Although I had accumulated a small quantity of telegraph keys over the years, my collection was limited to a few military items and my Dad's Vibroplex from his days with Western Union. Imagine my surprise when one of the first tables I saw upon entering the main TRANSPO building was covered with more BRASS than I had ever previously seen in one spot. Standing behind that table was Roger Reinke. Little did I know that he and I would rendezvous at that same spot for years to come.

At the time of our first encounter, my discretionary funds were severely limited, nearby sources of telegraph items were few and far between, and eBay was not yet an IP Address on Al Gore's Amazing Internet. The main thing I had going for me was that TRANSPO occurred near my birthday and I could get a modest "Budget Waiver" to purchase a couple of my own gifts. Those facts observed, it was never my impression that Roger made the yearly Gaithersburg sojourn to fatten his wallet. Rather, I believe his goal was to Spread the Brass Around and to hand out a little free knowledge and expertise along the way.

Over the years, I would always stop at his table first, then wander around the show and circle back to his table for my inevitable pre-departure purchases. It probably did not take Roger very long to figure out my somewhat obvious pattern. During my initial stop, we would chat a bit and he would alert me to specific items that might go quickly. Later in the show, he was open to bundling a few items together in order to facilitate a "Faithful Customer" discount. Further, he was willing to point me in the direction of other vendors who might have something of interest, or to caution me about prices that might be just a little too high.

Our chats were not just about my purchases. We would swap War Stories about telegraph related events that happened during the previous year. With the evolution of eBay, we would exchange observations on how it impacted prices, collecting in general and how to tell the good guys from the bad guys.

Our discussions also got into some of the minutia of restoration. In one recent instance, Roger gave me an excellent price on a beautiful Key on Base (KOB) set, with the caveat that it was working – but not quite right. He was pretty sure it was something in the coil wiring, but had not had time to dig into it before TRANSPO. Fortunately, I recalled seeing an article in "The Vail Correspondent" about coil polarity and figured out what was wrong. The actual repair required some delicate soldering of an inner coil wire, so I put it off for a while. As fate would have it, my plan was to finally get the KOB sounder "Clicking and Clacking" and inform Roger of my success during the upcoming TRANSPO - 2016.

As I read the Washington Post "SK" notice, it became readily apparent that there was a lot about Roger that I did not know. He was not just another elderly gentleman, sitting in his basement, wearing a green eye-shade and burnishing the silver contacts on his latest telegraphic acquisition. The list of his life accomplishments is long, diverse and noteworthy. At one end of the spectrum, he played a significant role in the establishment and evolution of the National 9-1-1 Emergency Telephone System. By contrast, he was also a "Goal Judge" for the Washington Capitals

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ice hockey team and Stanley Cup Championship and a referee for a broad range of youth ice hockey games.

During a recent year, I made my annual trek to Gaithersburg. I purchased my ticket and turned down the aisle that would lead me to Roger's traditional table. He was not there. Although concerned, I thought he might just have a different table location. As I walked around the building, that proved not to be the case. By happenstance, I mentioned my concerns to one of the other telegraph vendors. He was able to reassure me that Roger had stopped by during the previous day, but was not doing a table that year. He was back the following year and we shared that anecdote and a couple other "we're not getting any younger" stories. Little did I know, that would be the last time I would have the opportunity to avail myself to Roger's wit and wisdom.

I suspect the drive up north to Gaithersburg this coming November 6th won't be quite the same. Before starting my walk around the buildings, I might just stop by Roger's long-time vendor spot and quietly tap "Dididit Dadidah" on the wooden table top. The new vendor might be selling train schedules, or lanterns, or perhaps railroad post cards. Or, perhaps they might smile, tap "Didadit Didadit" in response and ask, "Did you know Roger?"

Rest in Peace,
Dave Williams
Stafford, Virginia.

August 20th

Check out this interesting book if you get a chance. Woolley, Scott, *The Network: The Battle for the Airwaves and the Birth of the Communications Age*, Harper Collins Publishers, 2016.

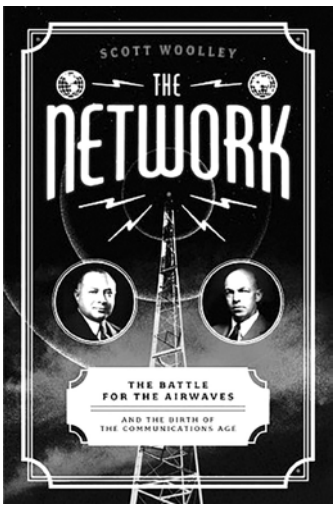
This book has lots of researched history on the broadcast industry. I just started reading it.

John Green, KX4P

September 2nd

I just had a heads up from the editor of *CQ Magazine.* My article, "American Morse Code: Our Heritage," is due to come out in the October edition of *CQ Magazine*. Maybe it will generate a little interest in telegraphy and the club.

MTC member,
George in Connecticut



September 7th

I have been a member for several years and now I am going to try to bring you up to date on my life.

I was born in the small town of Fortune Newfoundland Canada. My Father had a general business along with vessels trading with Mainline Canada in coal, produce etc. He often had to telegraph many places, so I would take the message to the Telegraph Office and I was fascinated by the Operator sending by Morse Code the message out to wherever it had to go.

I was only around 14 or 15 at the time and after finishing school, I went to Toronto to Cassan's Telegraph School and this was in 1951 when I was 17. I graduated from this school and was sent out to the town of Bowmanville Ontario just East of Toronto to work for the Canadian Pacific Railway as an Operator. It was here where I got my introduction to the real world. First of all it was no problem sending and receiving messages with the Morse code connecting to the Train Dispatcher until at 500pm the downtown office of the Canadian National Telegraph closed and all messages were received at our Office ...the Canadian Pacific Railway Office. The first message I received from the commercial office was like this: xsncd alghtu fsizyt etc, all in five letters, I broke the wire and asked what this all was and was told it was a coded message to a the Bank and it all

contained of 5 letter words or symbols as I called it. I think we got 5 cents a word for it. From then on it was no trouble but was interesting. I was doing relief work and after the Summer work was over I went home to Newfoundland. I returned to Toronto in April 1953 and the CPR did not have work yet, but they told me the Toronto Hamilton & Buffalo Railway (TH&B) was hiring, so I went to Hamilton, Ontario about 50 miles West of Toronto and was hired on April 23rd 1953 as an Operator and asthey were installing Centralized ☛

Traffic Control (CTC), I was moved to several Stations that were being closed and I was last on the list for almost 2 years, however I was kept on and spent almost 38 years with the Railway. I worked in the Yard Office at Hamilton for about 12 years sending and receiving many reports by Morse Code to Toronto and beyond and working all shifts.

After that I bid on the job at the Operator's Office adjacent to the Dispatcher's Office. I jumped at the chance, spent about many years there where we received and sent reservations for passengers to and from New York, Boston and Buffalo, all on Morse code.

It was my trial and error to try and not do things twice, so I mastered the typewriter copying messages instead of writing them out and then typing them out later. At the Yard Office I was always being ribbed as being so young and my first episode of ribbing was the Yardmaster asking me where a certain freight train was and he said to tell the Operator to KMA which I did on the Morse code, next thing I knew the phone rang and it was the Operator from the other Yard wondering what I meant as KMA meant to him Kiss My A.. I said no I meant it to Keep Me Advised. This got quite a laugh out of the Yard Office Staff and my first introduction to some of the characters that I had to work with .When over next to the Dispatcher's I learnt the Dispatcher's Job which was mostly working the CTC Panel. Eventually I went to a permanent Dispatcher's Job and spent approximately 25 years working the CTC Panel, this included many years of doing Summer Holiday Relief where I would only get about 2 months work on the Panel. then I would go back to my regular job of Operator but later I was promoted to permanent Dispatcher.

I retired in Jan 1991 after CPR took us over and closed the CTC Panel down and operated everything from Toronto. As you can see in the photo, this is the CTC Panel, it only covered approx 50 miles but was very foolproof and I enjoyed every minute I spent there…Note the Bug and Morse Key to the right on the desk.It is the one I used for a long time. We have "Open Doors" which you probably know about, and I, along with a couple of more former Dispatchers have been opening the Panel and introducing the working of the CTC as well as showing how the Morse Code worked. A friend of mine put lights on the Panel and it is a weird feeling to see everything lit up just like it was when it was working .It brings back many memories.

Here in Hamilton Ontario is also where I met my wife of 57 years and we have 2 boys working in Toronto. We live in Hamilton Ontario approx 50 miles from Toronto.

George S. Spencer (GSS)

FORMER MTC CHAPTER PRESIDENT KEEPS WINNING

When he's not training for his next half marathon, Richard Williams is an active volunteer and community member in Coronado, California. One of his favorite activities is volunteering as a docent at the Landmark Hotel Del Coronado, also called "The Del."

The Del is one of the most visited spots in Dan Diego. It has hosted guests from dignitaries to presidents. Rich in history and designated a National Historic Landmark in 1977, "The Del" provides tours to guests and tourists daily through the Coronado Historical Society.

Williams, who is a two time "Docent of the Year" at the Del, leads his tours about five times a month. His latest tour was captured on film for the upcoming KPBS series REFLECT, a documentary TV series featuring six successful aging, active, and engaged San Diegans. This documentary will premiere on KPBS San Diego in January 2015.

Producers Heidi Rataj and Theresa Hoiles chose Richard because of his active participation in the City of Coronado and the fact that at 80+, Dick runs several half marathons, 5Ks and 10Ks a month. He is competitive!

As an Army Reserve CW3 veteran, Richard found his love for running and giving back to the community during mid-life. He has made this his lifetime priority ever since.

Dick Williams served the Morse Telegraph Club for several years as President of the Washington-Baltimore WA Chapter. His move from Alexandria, Virginia to California required Dick to resign as WA Chapter President. However, Richard Williams has volunteered become our new MTC International Secretary-Treasurer. Arrangements are not yet firm.

Tragedy Over the Tay, continued from front page

Locomotive Class 224 when brought up from the river.

named Thomas Bouch.

His method of construction consisted of the liberal use of cast and wrought iron. This was also used in the construction of the large Crumlin Viaduct in Wales, and the well known Crystal Palace in London in 1851, both of which had withstood the onset of weather and the passage of time. The Crystal Palace, of course, did not have to support the weight of a loaded train. A survey of the Tay river bed found that the depth down to bedrock in the river was much deeper than previously thought, so caissons were built and sunk in gravel, not bedrock. When completed, the bridge had thirteen high girders in the middle of the span, with a clearance of 88 feet from the water, to allow for passing shipping.

A word about the river Tay. Having a length of 120 miles, it is the longest river in Scotland. Rising in the mountainous western area of the country, beginning as a small stream, it widens as it flows east until at Perth it turns south-eastward, becomes tidal, and is by now a large and important river, ranking seventh in size in all Britain.

Back in the railway yards it was now 7:30 AM, and time that the train to Burntisland got under weigh. Driver Mitchell eased open the throttle as stoker Marshall tended his fires. Over Dundee that morning the sun rose with clear skies with not a breath of wind. It was so still that several residents referred to it as “eerie”. Anchored just to seaward of the Tay bridge, was the naval school ship HMS Mars, whose Captain and officers faithfully recorded the weather of each passing day. Also in the area were several other weather enthusiasts, who kept a close watch on sea and skies. As the day progressed, the weather began changing. Heavy clouds formed, the wind rose and the barometer readings began to fall steadily. About 5 PM a strong westerly breeze was felt, accompanied by rain and sleet.

The Captain of the HMS Mars, noting the sharp squalls over the city and the Firth, and convinced that a serious storm was in the offing, ordered the ship to be secured against the elements and saw to it that all precautions for the vessel`s safety were carried out. As the strong west-southwest winds increased and the barometer continued to fall, it indicated to most of the weather watchers that an unusually severe disturbance was rapidly approaching from the west. The Tay river valley formed a kind of wind tunnel, which at times, could result in a considerable increase in wind speed, but the bridge had successfully weathered several nasty storms in the past, so few were concerned about its safety now.

The train, with several short stops at various stations, arrived at Burntisland after an uneventful trip at 9:24 AM. The engine was uncoupled from the train and moved into the engine shed, to await the evening return trip. By about 5:30 PM, Dundee and surrounding areas

Original Tay Bridge

were beginning to feel the effects of the blow, as the winds rose to gale force. Soon damage began to be widespread. Signs disappeared, tiles from the roof were whipped away in the wind, In addition, windows were blown in and and brickwork and chimney pots fell from various structures. Many people, caught in the streets or in open areas, were blown over and some sustained injuries, powerless against the strong forces of wind and driving rain, now mixed with sleet.

Meanwhile, after some idle hours spent in Burntisland, at about 4:30 PM, driver Mitchell

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and his fireman, Marshall, returned to the train and began preparing for the trip back to Dundee. While Marshall checked his fires, Mitchell inspected and oiled the necessary fittings and checked the Westinghouse brake system. This latter, was a fail-safe invention developed in the United States some years before, by engineer George Westinghouse and used on many, if not most, railways. Simply put, should any portion of the air hoses or air supply fail, the brakes were automatically applied to the whole train. In Burntisland, the engine was re-coupled to the carriages and the trip back to Dundee was ready to begin. Quite a few passengers, having spent the day visiting in Edinburgh and other areas, arrived to join the train for the return trip. Some of them had come down on the same train from Dundee in the morning. 5:34 PM duly arrived, and it was time to be off. The train progressed from Burntisland, passing several stations on the way.

On that Sunday morning, a local train had left Dundee, crossed the Tay bridge and proceeded to Tayport. Later on it returned to Dundee, again crossing the bridge. But by this time the wind was a howling gale and the noise of the storm was fearful. So strong was the wind, that it heeled the train over on a dangerous angle. While the train was on the bridge, on the return trip, the guards in the baggage car suddenly became aware of possible trouble as the flanges of the train wheels were pressed against the rails so hard, that bright flashes and streaks of sparks were seen. They quickly notified the engine crew who immediately applied the brakes bringing the entire train to a halt. An examination of the wheels and rails revealed no actual damage, and realizing that wind pressure was responsible, and that nothing could be done to remedy the situation at the time, the train continued on its way to Dundee, arriving on time shortly after 6 PM.

Little did anyone know that the wear of the passing of trains in the nineteen months since the bridge was completed, had resulted in a steady and serious weakening of the bridge structures . Bolts, cross braces, rivets and other fixtures were being slowly strained beyond their capacity. A sort of metal fatigue had set in. Undetected cracks in the metal appeared in many places and as time passed, became wider, weakening the whole fabric and framework of the bridge. Also, during erection, some girders that had been bent due to some mishap, were straightened, and were again used in the construction process.

Meanwhile the train from Burntisland, pulled by engine class 224, kept up good time, stopping at stations along the way to embark or discharge a few passengers. All seemed to be in order, but the storm still raged. Mitchell and Marshall crouched in the scanty cab seeking some protection from the gale. It was a miserable night and both men would be thoroughly wet and cold by the time the train reached Dundee.

At last the approaches to the bridge were sighted. The train had been partially sheltered by being inland, but now, nearing the Tay bridge South signal box, it was exposed to a rise in wind speed, made worse by the funnel effect of the Tay river and estuary. So far the train had made fairly good time, being only two minutes behind their schedule. The signalman in the South signal box, Barclay, had received a message from the North signal box at the Dundee end of the bridge, confirming that the track was clear for the train`s passage. The South signal box signalman soon glimpsed the lights of the locomotive approaching.. In that signal box, along with Barclay, was George Watt, a friend who was part of the railway maintenance crew. As the engine and six carriages passed him, Barclay waved to the engineer, indicating that the single track was clear. Watt remarked at the time: There`s something wrong with that train.".

Now, onto the bridge, the full force of the storm hit them. So strong was the wind, that it pushed the train over to an acute angle. Like the local train, the storm had pressed the wheel flanges against the rails so hard, that it produced streams of sparks. The five men in the guards van suddenly noticed the acute angle of their carriage. Piles of mailbags slithered across the room, followed by several packages of freight. Soon the slant became even more severe . As the train reached the fifteenth span, a wobbling effect became apparent to the passengers and crew in the lighter carriages. Due to the fifty two tons weight of the engine and tender, the engineer and fireman felt nothing.

As the train reached the first of the high girders, (span No. 29, from the south), they arrived at a piece of track where one of the bent and re-used girders was laid, still slightly out of shape. This caused each passing train to dip and swerve a little. Also, 1,500 tons of rock had been added to the roadbed. That, plus the 125 tons of the train, had strained the bridge structure even more. Engine 224 and her attendant carriages continued on for four more high girder spans . At the fifth ☛

high span, the girders buckled and collapsed. Large and very vivid flashes of flame were seen by many residents on either bank of the river and some recalled hearing the appalling noise, audible over the storm, of the shearing and tortured metal as the girders were ripped away and the engine, tender, and carriages, all cartwheeled over and disappeared, to fall through the twisted and broken metal 88 feet to the river below. There was approximately 75 passengers and crew on the train, and those who were still alive after the initial fall, were quickly drowned, some entangled in the girders, some swept down the swift river. No one survived. In the weeks that followed this horrible accident, searchers recovered about 46 bodies.

South signal box signalman, Barclay, and his friend, George Watt, braving the terrible storm, struggled along the south bank to the eastward, only to discover that all thirteen high girders, with about a thousand yards of the bridge, had disappeared. The news of the incident spread quickly and an incredulous population were shocked. So many families had been affected by this terrible accident that claimed the lives of their loved ones. Very quickly a enquiry was ordered by the Board of Trade and a commission consisting of competent engineers, builders and other experts was formed to investigate the failure of the bridge. Many were the workers, NBR employees and other witnesses, who were called to testify at this hearing. Owing to the number of people involved, the enquiry dragged on for some time. This was not only a terrible occurrence, but it impinged on the idea of the competency of British engineering. This was not to be tolerated. The public were understandably outraged and wanted the culprit or culprits found, and fast. Sir Thomas Bouch of course was called to give his testimony and it soon became clear that faulty methods of construction were, if not directly sanctioned by him, allowed to be used.

The NBR itself, tried to dissuade certain individuals and intimidate some of its own employees from giving evidence that was contrary to the company`s well being. They feared that if certain facts came to light they might be libel for damages and sued by relatives of the victims. They had. in fact, cut corners by reducing maintenance staff, employing unqualified bridge inspectors, and used sub-standard materials. Several NBR workers, such as painters and joiners, employed in various capacities on the bridge, had, over time, warned their superiors of the shaking and unstable condition of the bridge when a train passed over it. It appears that little notice was taken of their words. As it turned out, many more could have given evidence of a like nature, but were never called to do so. Of course, Bouch`s reputation was in ruins and his plans to build a bridge over the Firth of Forth were scrapped. In 1880 Bouch died, a sad and much reviled man.

In fairness, not all the bridge`s ills could be laid at Sir Thomas`s door. He was a competent and skilful engineer as proven by his successes in many large projects projects, some of which exist today. Subsequent research ,has revealed that he took his work seriously and that information on certain vital subjects was meagre or unavailable at that time. Looking back at their methods, it became plain that the North British Railway had a lot to answer for. In addition, very little account had been taken by anyone of the effects of wind on a train passing over the bridge.

But some good did come from this appalling accident. After much study, many new methods were devised which led to much improved and safer ways of bridge construction. Plans were made to rebuilt and in July of 1881 Royal Assent was obtained. The new bridge was to be constructed by Sir William Arrol and Company whose methods were very thorough and down to earth. Not only did he devise new methods of construction, but also invented various ways to solve problems that arose. This time the bridge was to be double tracked, well anchored in solid ground and properly maintained. Opened for full service in July 13th, 1887, it is still in use. Locomotive 224 was soon recovered from the river ☛

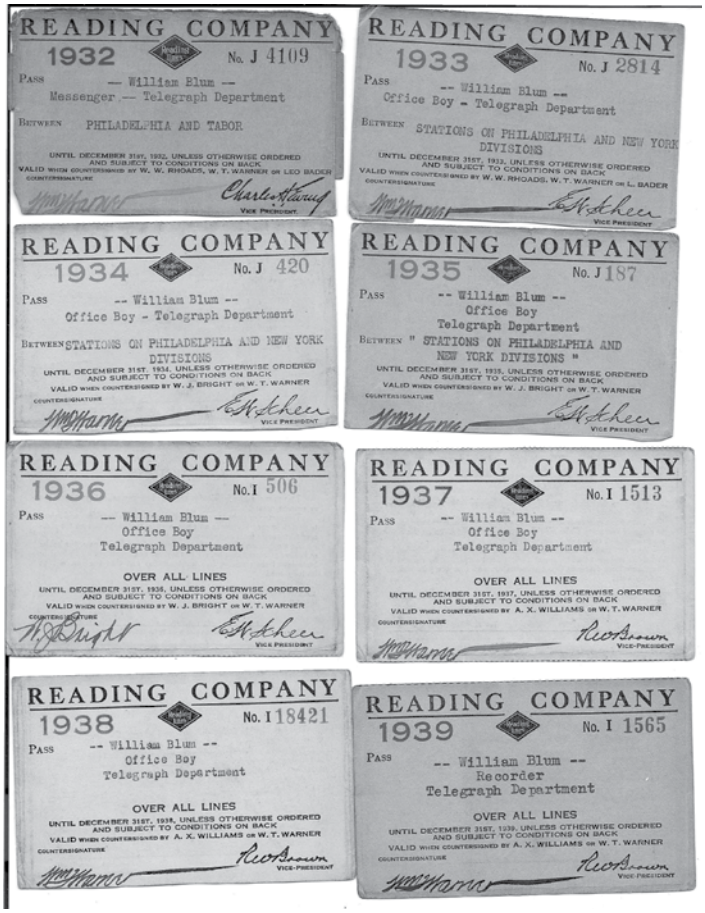
bed, and found to be not badly damaged. Sent to the factory at Cowlairs for repairs and refitting, it was once again restored to use and gave good service for the next forty years. The carriages, however, were smashed beyond repair. Most of the wreckage was recovered from the river and scrapped. Alongside the new bridge, one can still view the foundations of the wrecked first span.

Impressive memorials to the victims have since been erected on either side of the Firth. They will be remembered.

Such was the story of the first Tay bridge.

President's Line, continued from page 3

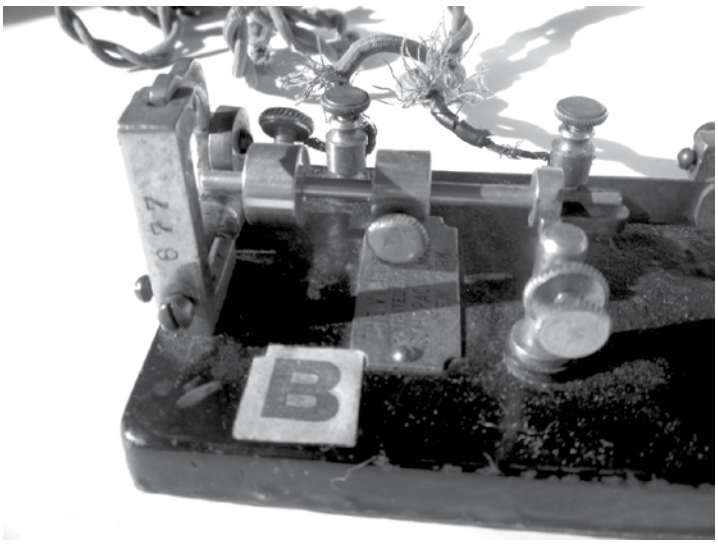
Blum, then 6 years of age, and his uncle, then 28 years of age, were living in the same house. They are on line 80 and 84 of the census record respectively. On the right of line 80 it shows my Uncle as a wire chief for the telephone co. The 1930 census shows him on line 64 as a typist for the railroad. This could be an error on the part of the census taker. The 1940 census line 7 shows that he is a telegrapher for the Reading Railroad. Also his 1958 death certificate shows he was a telegraph operator.



I'm attaching my father's Reading Railroad employee passes from 1932 until 1953, during the 30's and early 40's he worked in the telegraph department. My father never told me what he did before the war for the railroad but he did save these cards, which tell the story. I'm not sure what a recorder in the telegraph department did but this Vibroplex was in his effects. Since my dad was named after his uncle and as a boy would go to the station to visit him, I'm pretty sure his uncle gave the Vibroplex to him."

Many of us have in our possession similar telegraph instruments, which we obtained new or perhaps in a well-used form from older friends and associates in the telegraph field. These are more than simple artifacts. They represent more than technology or a manufacturing progress. They tell a decidedly human story. Take the time today to write down some information about the man or woman who used the instrument, even if that person is you!

30



CHAPTER NEWS

Florida Chapter

Although the summer months are normally a downtime, Fiorida Chapter members were among sevral Living History demonstrators featured at the annual Celebration of Old Florida event at the Pioneer Settlement in Barbervile, FL on June 11th.

Using antique telegraph instruments in the old ACLRR Pierson, FL depot, now located on the grounds of the Settlement, Chapter membeers demonstrated the art and skill of American Morse telegraphy. Visitors were encouraged to try their hand at sending their names in American Morse code, a feat which delighted many but also dismayed a few. Visitors also learned of the role of the telegraph in American history and its role in the expansion of the railroad system in the United States and Canada.

Among the many visitors was a school teacher from Lake County, who displayed a remarkable beginner's touch at the key and who declared that she would include a section on the telegraph in future classes.

Warren McFarland

Twin City MS Chapter

The Western Minnesota Steam Threshers Reunion Labor Day weekend was held on September 2 – 5. We had a live telegraph operating between the two depots, which are located about a quarter mile apart. A third depot was not connected by telegraph. As part of the public telegraph demo, we encouraged people to send telegrams to someone on the grounds. We then delivered the telegrams by Western Union bicycle messengers.

This annual event takes place every Labor Day weekend for four days. It takes place on the grounds at Rollag, MN, located 26 miles east of Fargo, ND and 6 miles south of the junction of U.S. 10 and MN 32. Depending on the weather, an estimated 15 to 20,000 people attend this event.

WMSTR owns 38 steam engines and most of these participate in a twice-a-day parade, chugging up a long hill. Also, hundreds of unique farm tractors were on display. A full size steam engine with six passenger cars provide free rides to passengers all day. The circuit roundtrip takes about 25 minutes. People can ride the entire day if they like! Music and events catering to women kept the thousands of visitors entertained. More info and photographs are available at Rollage.com.

This was Shirley and my 21st year as depot agents at this event.

Signed,
Boyd Ferrell
Blackduck, MN

Winnepeg Manitoba WG Chapter

With the passing of Dan Kollesavich, the Secretary-Treasurer of the Manitoba Chapter, Bert Johnson has volunteered to look after his chapter membership. Bert describes himself as a 27 year retiree and a close friend of the Kollesavich family. Bert inquired if MTC has any new membership cards and he wanted to know the deadline for submitting chapter news.

We welcome Bert and note that the deadline for submitting articles to Dots & Dashes is approximately two weeks ahead of publication dates. The publication dates are March 30, June 30, September 30, and December 30. ~Editor Jim

Welcome Aboard!

New Members of MTC

C.D. Combs FN Chapter

Dan Peters of Manning, Iowa states that he is very familiar with the railroad from Omaha to Antonio over the Cumberland Pass and that he knows "the railroad code." "I worked out of Pagosa Springs and Monte Vista combined for twenty years," he states. The railroad went through the Rio Grande, he explained. "We lived in Dillon, Pagosa, Steamboat Springs, and Monte Vista, all the good parts of Colorado," Dan says.

"I had no particular plans after high school in Manning," he says. "I knew some of the Railroad families and one in particular." Dan adds, "I had worked on a section crew one summer." Dan further explains, "A particular friend suggested telegraphy to me and it sounded okay." So he says, "I borrowed $500 and headed to Chillicothe, MO to Telegraph School." The Milwaukee Road hired Dan and during the summer of 1950 he worked as a relief operator/agent from Perry to Colorado Bluffs, usually for two weeks at each station. Then Dan got the swing shift in each station. Next, Dan was promoted to a permanent job in the Colorado Bluffs office. 1952 was a notable year for Dan. That year, Dan got married and was drafted into the Korean conflict. "The rest is history," summarizes Dan.

MTC welcomes you to our membership, Dan.

Ralph E. Erts of Omaha, Nebraska holds the amateur radio call sign W0SMY, a license that he first earned in 1954. Ralph says, "I became interested in Morse telegraphy through my interest in railroads. I am a member of the CB&Q Historical Society. My uncle was an operator of the Milwaukee Railroad in Roundup, MI."

Ralph, you have joined a club that welcomes your skills and interests. We invite you to have fun with us.

Larry Bailey of Bellevue, Nebraska holds the amateur radio call sign W0PYA. Larry retired from the Navy in 1974 and hired on with E-Systems in Greenville, Texas. The next year, his new company transferred him to Offutt Air Force Base to work with their new contract. In the mid 1990's Raytheon bought the Greenville division. Finally, in the year 2,000 he retired from Raytheon.

Larry explains his connection to Morse code. As a kid he had been exposed to Ham radio. His Dad was a part time radio repairman who had his own small radio shop. With the help of his Dad, Larry built several crystal set receivers. The local AM radio station in Red Lion, Pennsylvania was about three miles from his house. After much tinkering, he was able to pick up the AM station. But, now and then, he heard something else on his crystal set. He described what he heard as "beeps and boops." This turned out to be his next door neighbor using Morse code. Visiting his neighbor's "ham shack" and hearing hams from both near and far impressed Larry. "I was bit by the radio bug."

In 1956, Larry joined the Navy and attended photographic school. He was then stationed in Norfolk, Virginia. Then he was sent to another training school at NAS Pensacola, Florida for electronics training. One of the instructors was teaching a class in Morse code aimed at the students obtaining their Novice amateur Radio license.

Larry passed his first Morse exam at 5 words per minute and was issued the call sign KN4NJJ. A few years later he passed the 13 wpm test for his general class amateur radio license and was issued the call sign K3ROS. After retiring from the Navy, he changed his call sign to W5UPN and later, upon passing the 20 wpm exam, he earned the call sign W0PYA.

After retiring from the Navy, the company that Larry worked for transferred him to England. He retired in the year 2000. During his stay in England he applied for and was issued a reciprocal license by the British Home Office. G5BRT was his English call sign. "Over the years, meeting numerous 'G' amateur radio operators has been interesting," he adds. He has lots of WWII radio stories which include Merchant Marine radio stories and radio QSO's on both voice and Morse with stations all over the world. "Good friends with a common interest: Morse code;" that is his motto. Amateur radio and the Morse connection have ☛

been a lifelong hobby, says Larry. "It still amazes the kid in me now as it did in 1952, that one can communicate with beeps and bops," exclaims Larry. He adds that, "something one never forgets is hearing the first time someone replied to my CQ' which is just as exciting now as them."

Larry, we welcome your continued enthusiasm and hope that MTC members can channel your excitement about Morse code into telegraph demonstrations to benefit the public.

Maple Leaf ON Chapter

Phillip King of Willowdale, Ontario joined the Morse telegraph Club in May this year. Phillip says that he is not a telegraph operator but that he has "a great interest in Canadian railroads." Phillip says that in the future he hopes to become a proficient telegrapher.

Phillip, the MTC vows to help you reach your goal as a new telegraph operator!

DISPLAYING TELEGRAPH INSTRUMENTS

By James Wades

It is often desirable to display telegraph instruments at demonstrations, historical events or for extended periods of time at temporary public exhibits at museums, libraries or the like. Of course, leaving telegraph instruments in the open is an invitation to disaster. In particular, today's children are no longer well supervised. It is often only a matter of minutes until items are broken, screws are missing, or other damage occurs, often while "mom and dad" look on passively or instead look into the glow of their "smart" phone.

A year or so ago, I purchased two locking, glass display cases from a retail supply store. These were likely intended to protect jewelry displays or the like, but they work great for telegraph instruments. We utilized two display cases at the 2015 Dayton "Hamvention," telegraph exhibit. This gave us added peace of mind when surrounded by large crowds of curious ham radio operators. During this first trial-run, we transported the instruments separately, which added to the demands on space in our automobile and increased set-up time before the display.

While preparing for two fall telegraph demonstrations this year, I decided to make one of the display cases permanent. Using spray adhesive,

Display cases in use at telegraph exhibit.

Close-up of a display case.

I put down a layer of green felt purchased at a fabric store. I then selected some typical telegraph instruments, which helped tell the story of telegraphy. These were carefully laid out, the holes were marked and started, and then the instruments were permanently mounted in the display case.

Annotation was typed out on 1.75 by 5-inch paper cards, which were then trimmed and laminated. Again, using a bit of "3M" spray adhesive, the cards were affixed adjacent to each instrument. I eventually plan to add the MTC logo and club name to the display.

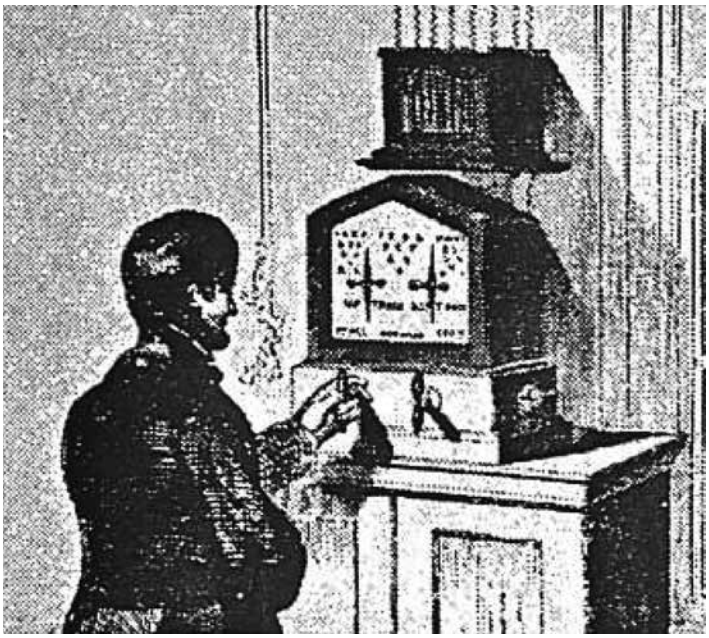
A second case will likely be arranged in a similar fashion to ease the time burden when setting up for public displays.

The glass display cases make for a nice, professional exhibit. They protect the instruments from dust and curious fingers, and they make setting up a telegraph demonstration of temporary exhibit an easy task.

EARLY BACKGROUND OF OUR TELEGRAPH CODES

By Lloyd Butler VK5BR

The Original article by the writer was first published in "Amateur Radio" September 1989. Further related information initiated by Tony Smith G4FAI and Kay Weeden(and which follows) was published in the May 1990 issue of "Amateur Radio"



Cooke & Wheatstone telegraph used on the Croydon Railway 1845

This article discusses the telegraph codes which were first developed and which have led up to the codes used in amateur radio today. In tracing their background, we are briefly introduced to some of those famous pioneers of telegraphy such as Morse, Wheatstone, Baudot and Murray. For the benefit of those amateurs who have yet to be introduced to the realms of RTTY and other forms of automatic serial data transmission, detail on the format of the various codes is included in tables and figures.

Samuel F.B. Morse developed the first successful telegraph in the United States of America in the years leading up to 1837. This was coincident with work carried out in England leading to a patent taken out for the telegraph, jointly by Sir Charles Wheatstone and William F. Cooke, in 1837. (All of us are familiar with the Wheatstone Bridge which bears the name of Sir Charles.

Although the bridge was originally devised by S.H. Christie, Wheatstone introduced it as a practical device.)

The Morse telegraph receiver incorporated an electromagnet which attracted an armature connected to encode the received signal on a band of paper, moved by clockwork. Morse's assistant, Alfred Vail, later redesigned the telegraph to include an electromagnetic sounder as the receiving instrument. Morse took out a patent for his telegraph in 1840.

The Morse telegraph was different to the Wheatstone/Cook telegraph which appears to have been a type of analogue system in which an electric current controlled the strength of an electromagnetic field that determined the degree of deflection of a magnetic needle. The needle was arranged to point at a specific alphabetic letter as determined by the controlling current. Morse used a two state (either mark or space) telegraph system as is still in use today.

With Government support, Morse built his first practical telegraph line between Washington D.C. and Baltimore Maryland (a distance of 64 km) in 1843. The first message was sent over the line on May 24, 1844.

For use on his telegraph, Morse developed a code for the various alphabetic letters, numeric figures and other characters, made up of combinations of short, long and very long mark elements called dots, dashes and long dashes respectively. A dash had a time period equal to two dots, a long dash had a time period equal to four dots and the time space between dots was equal to one dot. The format of the code, somewhat different from that which we use today, is shown in table 1.

Morse actually introduced two versions of his Morse code. The code he used in 1837 had the same symbol for some of the phonetically similar letters. A new version, as shown in table 1 with unique symbols for each letter, was introduced around 1844 and became known as the American Morse code. An article by Tony Smith G4FAI (Ref 11) discusses this in more detail.

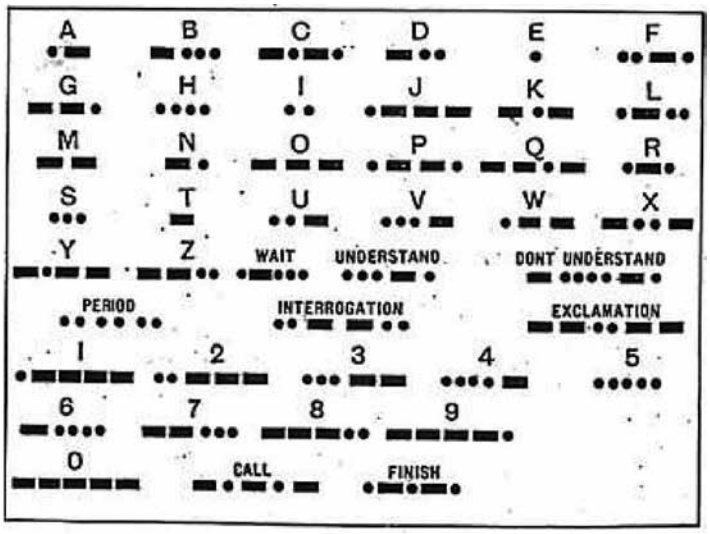
☛

A	B	C	D	E	F	G
H	I	J	K	L	M	N
O	P	Q	R	S	T	U
V	W	X	Y	Z	&	
1	2	3	4	PERIOD	INTERROGATION	
5	6	7	8	COMMA	EXCLAMATION	
9	0					

Table 1 - The original Morse Code

In 1851, the Morse code was simplified, by International Convention, to that shown in table 2. This International or Continental code is the one we all use today although at one time, both codes were apparently in use. According to a handbook by Victor H. Laughter, published in 1909 (Ref 1), Morse code was used for overland service and Continental code was used between ships of the Navy and shore stations.

The timing format for our international code has been standardised as follows: A dash has a time equal to three dots. Time space between elements of a character is equal to one dot. The time space between letters of a word is equal to three dots. The time space between words was previously equal to five dots but this was changed by international agreement in 1949 to seven dots.



The Continental or International

Table 3, originating from the G4FAI article, compare thesymbols used for alphabetic letters in the three versions of the code.

	1837 code	American Morse (1844)	International Morse (1851)
A	·–	·–	·–
B	–···	–···	–···
C	·–·	–·–·	–·–·
D	–··	–··	–··
E	·	·	·
F	··–·	··–·	··–·
G	––·	––·	––·
H	····	····	····
I	··	··	··
J	·–––	·–––	·–––
K	–·–	–·–	–·–
L	·–··	–···	·–··
M	––	––	––
N	–·	–·	–·
O	–––	–––	–––
P	·––·	·––·	·––·
Q	––·–	––·–	––·–
R	·–·	·–·	·–·
S	···	···	···
T	–	–	–
U	··–	··–	··–
V	···–	···–	···–
W	·––	·––	·––
X	–··–	–··–	–··–
Y	–·––	–·––	–·––
Z	––··	––··	––··

Changes in Morse Code over the years

Other codes have been introduced with the development of keyboard operation and machine telegraphy. Codes were developed by Jean Maurice Baudot and Donald Murray using five elements of mark or space in serial form for each character symbol. Five elements are insufficient to separately define all letters of the alphabet, numeric figures and punctuation and hence two character symbols were allocated to shift between letters and figures or punctuation so that each other character symbol performed two functions. Added to each five element symbol were also two additional elements to define the start and stop of the symbol for synchronisation.

The five element codes are still in use today in the communications services, including amateur radio, but these codes are quite different to the first code introduced by Baudot. The Baudot code was designed to suit manual operation from a pianoforte type keyboard of five keys, one for each element in a symbol. This original code is also known as the CCITT No 1 code and this is shown in table 4. (CCITT is an abbreviation for Consultative Committee for International Telegraph and Telephone).

The code used today has been based on automatic telegraph systems in which the operator is relieved of the burden of setting up individual code elements. Instead, to automatically form the elements, the operator has only a single key of a typewriter keyboard for each character. This code, which is accredited to Murray, has been defined as the CCITT No 2 code. United States amateur radio operators have generally adopted a version of a 'Military Standard' code which has a few minor symbol and punctuation changes to that of the Murray or CCITT No 2 code. The reason for the US amateur choice is largely associated with the ready availability of military surplus machines in the post-1945 years. Other amateurs, particularly in Europe, have standardised on the CCITT No 2 code. The code is shown in table 5, with variations to suit particular services. One limitation of the five element codes is that there is no provision for both upper and lower case alphabetic letters.

Sl. No. of combination	Lower Case	Upper Case	Code elements 1	2	3	4	5
1	A	1	1	0	0	0	0
2	B	8	0	0	1	1	0
3	C	9	1	0	1	1	0
4	D	0	1	1	1	1	0
5	E	2	0	1	0	0	0
6	F	*	0	1	1	1	0
7	G	7	0	1	0	1	0
8	H	+	1	1	0	1	0
9	I	*	0	1	1	0	0
10	J	6	1	0	0	1	0
11	K	(	1	0	0	1	1
12	L	=	1	1	0	1	1
13	M	)	0	1	0	1	1
14	N	*	0	1	1	1	1
15	O	5	1	1	1	0	0
16	P	%	1	1	1	1	1
17	Q	/	1	0	1	1	1
18	R	—	0	0	1	1	1
19	S	.	0	0	1	0	1
20	T	*	1	0	1	0	1
21	U	4	1	0	1	0	0
22	V	'	1	1	1	0	1
23	W	?	0	1	1	0	1
24	X	,	0	1	0	0	1
25	Y	3	0	0	1	0	0
26	Z	:	1	1	0	0	1
27	Carriage Return		1	1	0	0	0
28	Line Feed		1	0	0	0	1
29	Letter shift (space)		0	0	0	0	1
30	Figure shift (space)		0	0	0	1	0
31	Error		0	0	0	1	1
32	Instrument Idle		0	0	0	0	0

0 indicates space=positive current in a Baudot multiplex.
1 indicates Mark=negative current in a Baudot multiplex.
* indicates Free for internal use by a country or administration.

Table 4 - The Baudot or CCITT Code No 1

-Five-Unit Teleprinter-Code Alphabets.

Bit Numbers 5 4 3 2 1	Letters Case: International Alphabet #2	Figures Case: International Alphabet #2	US Alphabets: Military Std	Weather	TWX	Telex
0 0 0 0 0	Blank*	Blank*	Blank*	—	Blank*	Blank*
0 0 0 0 1	E	3	3	3	3	3
0 0 0 1 0	Line Feed	Line Feed	Line Feed	Line Feed	Line Feed	Line Feed
0 0 0 1 1	A	—	—	↑	—	—
0 0 1 0 0	Space	Space	Space	Space	Space	Space
0 0 1 0 1	S	(Apos) '	Bell	Bell	Bell	(Apos) '
0 0 1 1 0	I	8	8	8	8	8
0 0 1 1 1	U	7	7	7	7	7
0 1 0 0 0	Car. Ret	Car. Ret	Car. Ret	Car. Ret	Car. Ret	Car. Ret
0 1 0 0 1	D	WRU	$	↗	$	WRU
0 1 0 1 0	R	4	4	4	4	4
0 1 0 1 1	J	Aud Sig	(Apos) '	↙	(Comma) ,	Bell
0 1 1 0 0	N	(Comma) ,	(Comma) ,	○		(Comma) ,
0 1 1 0 1	F	↑	!	→	½	$
0 1 1 1 0	C	:	:	⊗	WRU	:
0 1 1 1 1	K	(	(	←	¼	(
1 0 0 0 0	T	5	5	5	5	5
1 0 0 0 1	Z	+	"	+	"	"
1 0 0 1 0	L	)	)	↖	¾	)
1 0 0 1 1	W	2	2	2	2	2
1 0 1 0 0	H	†	Stop	↓		#
1 0 1 0 1	Y	6	6	6	6	6
1 0 1 1 0	P	0	0	0	0	0
1 0 1 1 1	Q	1	1	1	1	1
1 1 0 0 0	O	9	9	9	9	9
1 1 0 0 1	B	?	?	⊕	½	?
1 1 0 1 0	G	†	&	↘	&	&
1 1 0 1 1	Figures	Figures	Figures	Figures	Figures	Figures
1 1 1 0 0	M	.	.	.	.	.
1 1 1 0 1	X	/	/	/	/	/
1 1 1 1 0	V	=	;	ⓘ	¾	;
1 1 1 1 1	Letters	Letters	Letters	Letters	Letters	Letters

Notes: Transmission Order: Bit 1→Bit 5.
* "Blank" in US; "No Action" in International Alphabet #2.
† Unassigned (domestic variation, not used internationally).

Table 5 - The Murray or CCITT Code No 2 with variations

In Australia, in line with a United States trend, we refer to the code we use for amateur radio teletype (RTTY) as the Baudot code when, in fact, it would be more appropriate to call it the Murray code. According to George Henry K9GWT (Ref 6), it is actually called the Murray code in some countries.

The code used for many years in teleprinter and teletype service by the old PMG's Dept (Telecom Aust.y when this article was published.) is similar to the CCITT No 2 code. A copy of Telegraphy II (ref 9), issued around 1940 and part of the PMG Course of Technical Instruction, specifically deals with teleprinter and teletype machines and systems of that day. This publication gives no specific name to the code and refers to it simply as the five unit code.

The ASCII Code

With the development of computers and high speed data exchange, ASCII has become a ☛

The ASCII Data Code

7 6 5 / 4 3 2 1	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
0000	NUL	DLE	SPC	0	@	P		p
0001	SOH	DC1	!	1	A	Q	a	q
0010	STX	DC2	"	2	B	R	b	r
0011	ETX	DC3	#	3	C	S	c	s
0100	EOT	DC4	$	4	D	T	d	t
0101	ENQ	NAK	%	5	E	U	e	u
0110	ACK	SYN	&	6	F	V	f	v
0111	BEL	ETB	'	7	G	W	g	w
1000	BS	CAN	(	8	H	X	h	x
1001	HT	EM	)	9	I	Y	i	y
1010	LF	SUB	*	:	J	Z	j	z
1011	VT	ESC	+	;	K	[	k	{
1100	FF	FS	,	<	L	\	l	|
1101	CR	GS	-	=	M	]	m	}
1110	SO	RS	.	>	N	^	n	~
1111	SI	US	/	?	O	_	o	DEL

ACK = acknowledge
BEL = signal bell
BS = backspace (←)
CAN = cancel
CR = carriage return
DC1 = device control 1
DC2 = device control 2
DC3 = device control 3
DC4 = device control 4
DEL = (delete)
DLE = data link escape
ENQ = enquiry (WRU)
EM = end of medium
EOT = end of trans.
ESC = escape
ETB = end of block
ETX = end of text

FF = form feed (home)
FS = file separator
GS = group separator
HT = horizontal tab (→)
LF = line feed (↓)
NAK = not acknowledge
NUL = null
RS = record separator
SI = shift in
SO = shift out
SOH = start of heading
SPC = space
STX = start of text
SUB = substitute
SYN = synchronous idle
US = unit separator
VT = vertical tab (↑)

Note: "1" = mark = hole in punched tape

Table 6 - The ASCII Code

common serial data code and this code uses seven mark or space elements or bits to define each character. ASCII is an abbreviation for American National Standard Code for Information Interchange and was adopted by the American National Standards Institute in 1968. The code actually utilises an eight bit byte with the eighth bit often used for parity error check on the other bits. Additional start and stop bits are also included when operated in the non-synchronous mode as used in the teletype service. With seven bits available, all letters (including upper and lower case), all numerals and all punctuation characters are allocated a unique character symbol or byte. The arrangement of the first seven bits, for each of the characters, is shown in table 6.

The ASCII code is much more versatile than the five element codes with one bit state difference between upper and lower letters and additional symbols for control and printing operations, particularly suited to use with computers.

Start & Stop Bits

The five element codes and the ASCII code use similar start and stop elements or bits. The start bit is a zero or space signal equal in period of time to a single character bit. The stop bit is a one or mark signal with a minimum period of time between that of one and two character bits, depending on the system. The maximum stop period is as long as desired as the stop mark condition remains until the next character is initiated by the start space pulse.

Typical timing formats for a character train in the five unit and ASCII codes are shown in figures 1 and 2, respectively.

Summary

In conclusion, we see that the manual code we use today and call Morse is really a development of the original Morse code called the International or Continental code. The teletype code we use today and call Baudot is really the Murray or CCITT No2 code. Some things we manage to get right as the code we call ASCII is really ASCII.

Without doubt, the manual code we use will always be known as Morse and in Australia, the five unit code will continue to be called Baudot by the radio amateur. Not withstanding this, it is interesting to examine the background of these codes, an important part of our communications history.

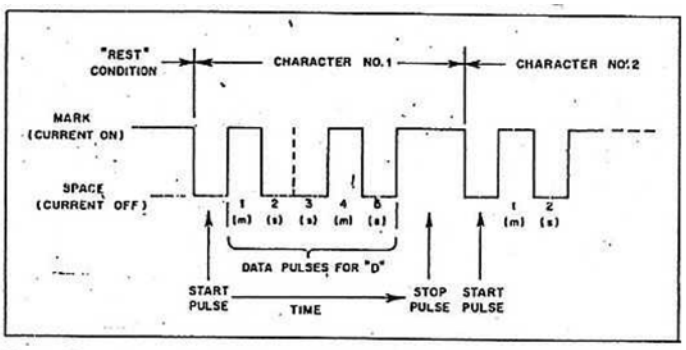


Fig. 1 — Time sequence of a typical Baudot character, the letter D.

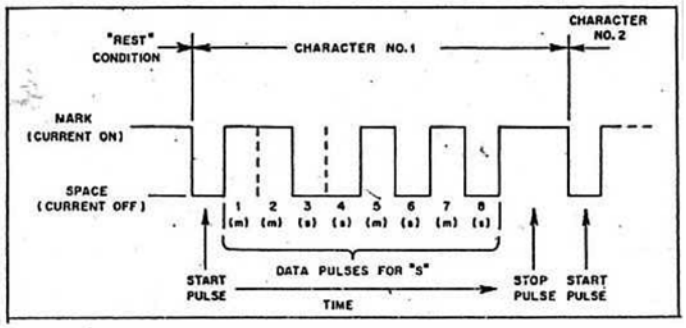
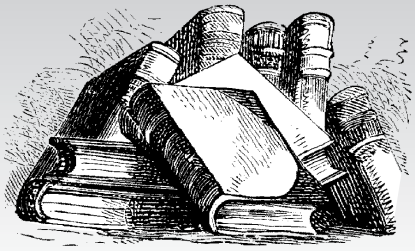
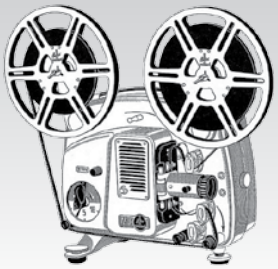


Fig. 2 — Time sequence of a typical ASCII character, the letter S. The eighth or parity bit may be set for any of four conditions: (1) always mark, (2) always space, (3) odd parity or (4) even parity. All four choices are in common usage.



J. Chris Hausler's BOOK & MOVIE REVIEWS

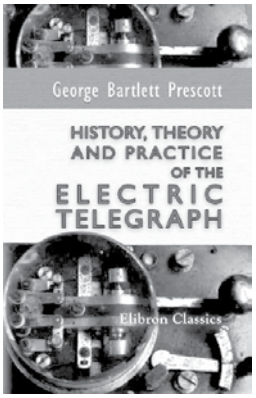


Last Summer I received a request from an MTC member asking about publications which might illustrate the historical development of telegraph technology. Since maybe other members are also interested, I have decided that it is time for another "techie" column. I promise I won't do this too often but after all I am a retired electrical engineer and thus also a "techie".

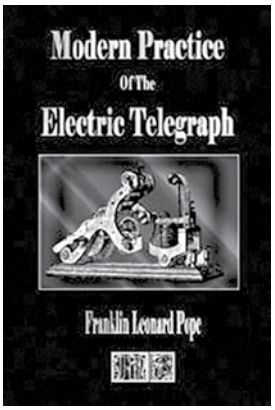
For a number of years I have had printed copies of four books on telegraph technology which were published somewhat sequentially over the first 80 or so years after the development of Morse's telegraph. Two are originals and the other two reprints. I have studied these books to better understand how this development occurred, to sort of learn "who knew what when" and what they did with this knowledge. In addition to the Morse telegraph they all also address the other available telecommunications technologies of their time as well as related technologies such as alarm systems and railway signaling. Their publication dates span from a time before the unit of electromotive force was named the "volt" and electric current the "ampere" into the first quarter of the 20th century and the initial development of carrier telegraph technology (modems) using early vacuum tubes. Each was published in a number of editions sometimes overlapping each other.

I have used these books extensively as references but have never read any of them cover-to-cover and so this column is less of a book review and more just a listing of these books. I don't claim that they are the only such books available or even that they are the best ones available. There are certainly later ones, such as that AT&T publication I reviewed in the Winter 2013 issue of *Dots & Dashes* and at least one earlier one of which I am aware although it has little technical content. That said, these four have been my principal sources for such information. All have been invaluable for enhancing my understanding of the history of the development of telegraph technology. If you are interested in this aspect of telegraphy I think you will find them useful as well. Another plus is that they are all readily available either digitally or in hard copy form from a number of sources.

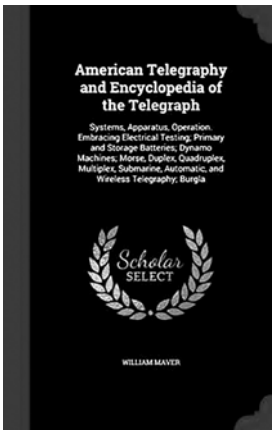
The earliest of the books were written to address the "telegraph technician", frequently at first the telegraphers themselves, who were developing the technologies "on the bench" due to first hand experience and thus gave a practical "hands-on" view of their subject. But by the early 20th century, the development of electric communications and electric technologies in general had passed to the college educated electrical engineer and the books started using the engineering language of higher mathematics rather than just bench practice to address their subject.



The earliest such book in my collection is *History, Theory and Practice of the Electric Telegraph*, by George B. Prescott. There are at least two editions of this book I've found, one, likely the first, from 1860 and one, the fourth, from 1866. The next in the series is *Modern Practice of the Electric Telegraph*, by Frank L. Pope. This was published in quite a number of editions as was the third in the sequence *American Telegraphy & Encyclopedia of the Telegraph*, by William Maver Jr. The last book in my sequence is *Telegraph Engineering*, by Eric Hausmann published in two editions, one in 1915 the other 1922. It represents the transition from bench practice to use as a textbook for budding electrical engineers. The books, again, each exemplify the development and condition of the technology as it existed at the times of their publication.



Reprints of all these books and occasionally original copies can be found from all the usual sources, Amazon and Abe books for example. All appeared before current copyright protection laws and at least two different editions of each can be found available for free download from a number of sources in various formats. With further searching, I expect that even more editions might be found. What follows is a list of links for such free download of two editions of each. I've given the Internet Archive link where I could find that issue on the Internet Archive, the Google Books link otherwise, but most issues are also available from Google books as well as, again, other sources. As the scans from the two sites can at times be different you might want to investigate both to see which you prefer. If you have problems with these links, please email me, my email address is given on the D&D masthead, and I will attempt to respond to you with a valid link.



Prescott 1860: https://archive.org/details/historytheorypra00presrich

Prescott 1866: https://archive.org/details/cu31924031307196

Pope 1872: https://archive.org/details/modernpracticeof00popeiala

Pope 1891: https://archive.org/details/modernpracticeof00poperich

Maver 1909: https://archive.org/details/americantelegra01mavegoog

Maver 1912: https://books.google.com/books/about/American_Telegraphy_and_Encyclopedia_of.html?id=HUNDAAAAYAAJ

Hausmann 1915: https://archive.org/details/telegraphenginee00hausrich

Hausmann 1922: https://books.google.com/books/about/Telegraph_Engineering.html?id=x4BRAAAAMAAJ

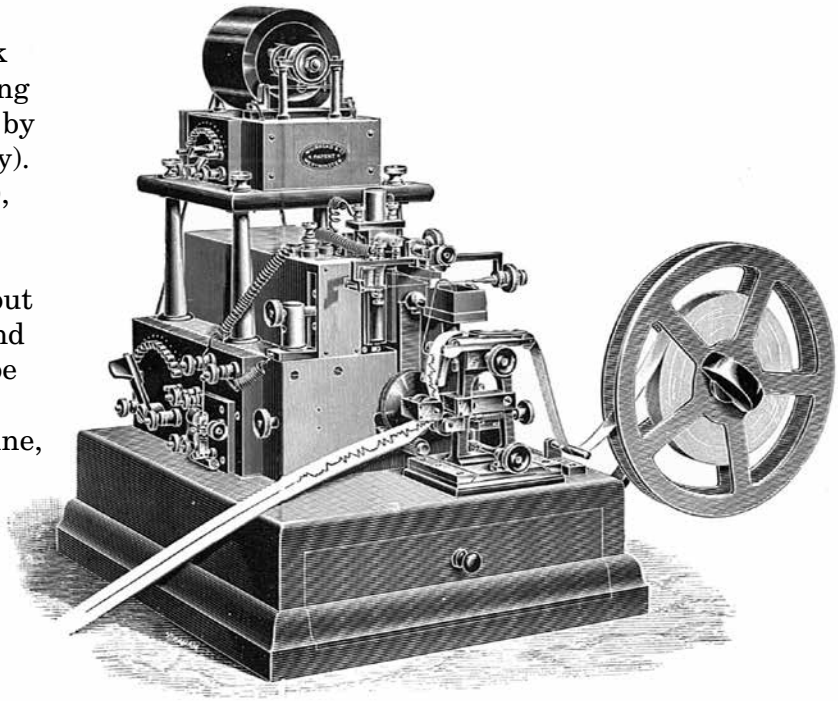
TELEGRAPH

By Mark Forsyth from the Inky Fool blog, blog.inkyfool.com
From November 18, 2013

Telegraph is one of those etymological crossroads. The graph bit, from the Greek for writing, links you to an epi-graph (something written on), a photo-graph (something written by light), or graphic (something written, originally).

Tele takes you to telescope (seeing from afar), teleport (carrying afar), and telephone (speak from afar). Tele is Greek for distant, and some people, strange people, therefore get angry about teleporting and television because portering and vision are both Latin and therefore shouldn't be mongreled up with Greek.

According to these people a televangelist is fine, but a television is Just Awful. But a telegraph (written from afar) is just fine.



"30" SILENT KEYS

News of our brothers and sisters who have closed the key

Washington-Baltimore WA Chapter

Roger Woods Reinke, age 85, of Alexandria, Virginia died on July 1, 2016. He was born in Milwaukee, Wisconsin and served in military intelligence during the Korean conflict. Upon graduation from Michigan State University in 1959, with a BS & MS degrees in Police Administration, Mr. Reinke joined the Oakland, California Police Department. Then in 1962, he accepted an appointment as Police Management Consultant with the International Association of Chiefs of Police in Washington, DC. While in this job, Roger participated in the selection process for police chiefs of several major cities including Chicago, Illinois and Portland, Oregon.

In 1976, Mr. Reinke joined the Office of Telecommunications Policy in the Executive Office of the President, where he assisted state and local safety agencies with implementation of the 9-1-1 emergency telephone number system.

Roger organized and managed the first three annual conferences on 9-1-1. He wrote extensively about its potential for the improvement of public safety emergency response, advocating computer aided dispatching.

After the transfer of OTP functions to the Department of Commerce, Roger served as chair of a federal interagency working group on 9-1-1. He was the founder of the National Emergency Number Association, which honored him with its fist life membership for his instrumental role in the establishment of 9-1-1.

Mr. Reinke's federal service included emergency communications planning and management for the National Telecommunications and Information Administration. He was the agency's representative to the National Communications System and the Joint Telecommunications Resources Board of the Office of Science and Technology Policy.

Roger retired from the federal government in 1993. Retirement gave him more time for his family, his hobbies and other interests, which included ice hockey, antique telegraphy, and church service. In 1974, Roger was appointed as a goal judge for the newly formed Washington Capitals of the National Hockey League. Roger served 30 years in that capacity.

During his lifetime, Roger amassed an extensive collection of early telegraph instruments. He also maintained a small repair shop in his home basement for the restoration of historic telegraph equipment. His collection was so pristine that the Smithsonian Institution sometimes borrowed instruments from his collection for display in U.S. national museums. Millions of museum visitors viewed some of Roger's telegraph instruments!

Roger also served as the editor of the "Key and Telegraph" column for the Journal of the Antique Wireless Association. He also served for approximately five years as International Secretary-Treasurer for the Morse Telegraph Club. And he shared his talents for numbers as treasurer of his large nearby church, the Bush Hill Presbyterian Church in Alexandria.

*The source for this information is The Washington Post Newspaper obituary, issue dated July 6, 2016 and personal knowledge by your editor, Jim Wilson.

Over the years, I visited Roger Reinke several times at his home in Alexandria, Virginia. At that time, Roger's house was only about a mile from my own house. Roger had an amazing collection of telegraph equipment which was mounted in professional display cases. I hope that Roger's extensive collection of historic telegraph instruments find a responsible home, perhaps at a museum.

My impressions of Roger include the words: intelligent, dignified, a private person who was modest about his accomplishments, and enthusiastic about the sport of ice hockey. I knew his artist wife, Nancy, who had a studio at the Alexandria Torpedo Plant Artist Colony, and I played with his big dog.

Roger had an interesting distinctive voice. He and I participated in several telegraph demonstrations together. That reminds me, during our last telegraph demo, Roger forget his gray fold-up chair, which is still stored in my garage. What a gentleman he was. I will miss Roger. MTC has lost a good friend and

telegraph historian. ~Jim Wilson

Edmonton MO Chapter

Keith N. Dowdell age 89, passed away at the home of his son Eric on July 19, 2016. Keith was a telegrapher with the Canadian National Railways. Eric found this information among his father's effects:

Keith was hired on as a railroad car checker at St. Paul Alberta on July 5, 1948. Following that, he held various positions as Assistant Agent at Elk Point, Waskatenau, Lamont and Radway until his marriage on September 3, 1949. Then he held Freight Clerks job at Vermilion until May 15, 1950 when he bumped up to the Assistant Agents spare board. This job lasted from May 16, 1950 until April 15, 1951. During this period he worked at Madistone, Holden, Viking, Tofield, Elk Point, and Manville. All of these positions were for a duration of only two weeks each. Then he went back to Vermilion for six weeks then to Cadomin, Lloydminster and Wabarmum.

Keith worked in Maidsone as a Student Operator until passing the wire test on May 30, 1951. Next he worked on the operator's spare board at Lloydminster & Vermilion, Ferintosh, Radway, back to Ferintosh, Waskatenau, Artland and Youngstown, where he worked night shift when his son Eric was born on April 4, 1952.

Various operator jobs carried him until February 15, 1954 when a new position was created as Operator at Strathcona. He won first trick here and kept this job until June 15, 1956. During this period, he was sent to Mallaig as a relief Agent Operator because the regular operator was sick. Then he was sent to Mallaig as a Relief Agent because the regular Agent had been in an accident. While there, his son Jerry was born on July 6th.

On June 15, 1956, Bailey was successful applying for a job at Lloydminster-Vermilion. He held this position until January 31, 1958, at which time the job was abolished. Bailey was working the night shift as Operator at Vermilion on the Lloydminster-Vermilion swing, meeting trains #5 & #6 when his son David was born on December 16, 1957.

He worked the Swing Operator position from February 1, 1958 until December 31, 1969. Then he worked as the First Trick Operator in Vermilion from January 1, 1970 until December 31, 1973. Next Bailey worked the First Trick Operator in Edson from January 1, 1974 until December 31, 1981. Next he served the railroad as Agent-Operator in Edson where he retired on January 9, 1987 with a total of 38 ½ years railroad service.

Thanks to Warren McFarland for this interesting information.

William Fischer, age 87, passed away on June 25, 2016. He was born on August 5, 1928.

If someone knows more details, please send these to me for publication in the next issue. ~Jim

Maple Leaf ON Chapter

Paul A. Leger, of Temiskaming, Quebec died on January 19, 2016. Paul learned telegraphy at Bearn, QC and started his career on the Canadian Pacific Railway in 1951 as an Operator. He worked at various railway stations in northern Ontario and Quebec. In 1956, Paul became an Agent at Nemogos, Ontario and in 1974 became Relief Dispatcher in Sudbury, ON until 1978. In 1991, Paul retired as an Operator at North Bay, ON. He had served the Canadian Pacific Railroad for 39 years.

Thanks to Don Laycock for this information. Don adds," Paul was well known in the north and he will be greatly missed."

William J. Rupert of Toronto, Ontario, age 85, deceased on April 3, 2016. Bill was born on July 25, 1931 and learned telegraphy in Belleville, ON in 1950. After working many positions as Operator on the London Divisions of the Canadian National Railways, he eventually became a Dispatcher on the London Division. Bill came from a railway family. His dad was in management at London and other offices. Bill was not only active with the Maple Leaf Chapter, but also with the Canadian Nation Pensioners Association.

Thanks to Don Laycock for this information. Don adds," Many former CNR workers will remember him, as will the Maple Leaf Chapter."

Jean-Guy Hamel passed away on June 20, 2016, at the age of 88. He was employed for over 35 years at CN Rail as an operator and train dispatcher. He was a member of the Canadian Association of Train Dispatchers/Rail Traffic Controllers from 2006 to 2016. For a number of years he did the scheduling for the Slowspeed Sessions for the Canadian Hub.

Thanks to Don Laycock for this brief notice.

James R. Harris of London, Ontario just became deceased, but I have only his returned copy of *Dots & Dashes* with a hand written note. If anyone knows ☛

more details, please send these to me tor inclusion in the next issue. Thanks. ~Editor Jim

Blackhawk GT Chapter

Ladoy Albert Watson, age 85, died on August 15, 2016. He was born on December 7, 1931. "Doc" began his career in Kansas City. He spent his career working for various railroads as a Telegrapher. Doc retired from the Burlington Northern Railroad in Galesburg, IL. He and his wife Mary raised three sons. The eldest son, Keith, learned the International Morse code and earned his amateur radio license. Keith now cherishes his father's collection of telegraph instruments.

Mary, also called "Mrs. Doc," explained that her husband, the love of her life, suffered the final four years of his life with Alzheimer's disease. "It's a horrible disease; it's a slow good bye," said Mary. "Doc" was a member of the Board of Directors for the Galesburg Railroad Museum. He participated often with telegraph demonstrations, especially amazing the children with his ability to comprehend those mysterious clicks and clacks of a telegraph sounder. Mary and Doc were blessed with and celebrated their eight grandchildren and one grandson.

Special thanks to Mary Watson for this interesting and touching information about her husband.

Florida FX Chapter

L.A. Bailey, age 89, passed away on September 16, 2016. He was a former MTC Director and was an active member of the Florida Chapter and its predecessor chapter. "Bailey," as his friends and co-workers called him, began his career in telegraphy as a Western Union messenger boy in his home town of Gainesville, FL.

After his service in the U.S. Navy at the end of World War II, he returned to Gainesville and began work as a clerk in the Atlantic Coast Line Railroad freight agency. After a short time there, he took a leave of absence to attend a telegraph school in Huntington, WVA. After successfully completing that course of instruction, Bailey returned to the ACL as a telegraph operator on the Ocla (FL) Division. He progressed as an excellent telegrapher and was put in charge of the Division Relay Office during its transition from a strictly telegraph office to one which was largely teletype.

Perhaps it was that change which led him to leave that office and begin working in several different agencies, eventually becoming agent at Clearwater, Florida. After the merger of the Atlantic Coast Line and the Seaboard Air Line, he left the railroad to become an officer in a local savings and loan bank. He remained there until his retirement.

Even though Bailey had left the railroad and its use of telegraphy, he never lost his love for American Morse code. Before dial-up or Morse KOB became available, he and the former second trick operator at Clearwater leased a wire between their homes from the telephone company, which they used almost daily. Bailey signed BA.

Special thanks to L.A.'s son Eric Bailey for this detailed information about his Father.

DO YOU KNOW?

Do you know when the International Morse code replaced the American Morse code?

Samuel F.B. Morse and his business partner Alfred Vail devised the original Morse code and used it initially with their electric telegraph system. Morse and Veil had an operating system working in 1836 and later demonstrated this system to the U.S. Congress on May 24, 1844 with the famous first official message, "What Hath God Wrought," sent by Samuel Morse at the key in the U.S. capitol to Alfred Vail at the key at the Baltimore railroad station.

The original American Morse code, also called the railroad code, continued to be used by railroad telegraphers into the 1960's. Members of the Morse Telegraph Club continue to use this code today. American Morse was the authentic code used in the 2012 Spielberg film *Lincoln*. Recall that MTC members served as telegraph consultants to film director Stephen Spielberg and that some MTC members even appeared as historic characters in this dramatic documentary film.

The International Morse code was declared to be the standard in Paris by the International Telegraphy Congress in 1865. This code was more logical, especially with numbers, and it eliminated different length dashes and difficult to interpret letter spaces. It also transmitted more efficiently over undersea cables. This code became commonly used by the military and by amateur radio operators worldwide.

HOUSE TRACK Want Ad Section

For Morse Telegraph Club Members

AVAILABLE: Book *Tales of the American Telegraph*. Issue #3 includes a photo layout. John B. Ryan, 11017 E. Sprague Avenue, Spokane, WA 99206.

WANTED: Re-enactors for Locust Grove, the Samuel Morse Historic Site in Poughkeepsie, NY. Please contact Andrew Stock, Curator of Education and Public Programs at a.stock@morsehistoricsite.org or (845) 454-4500 x13 if you are a Signal Corps re-enactor who may be interested in participation in history of telegraphy, including the annual Civil War weekend.

AVAILABLE: I can duplicate small wooden resonator boxes for both 4 ohm and 30 ohm main line sounders. You will varnish or paint these to suit your desires. The cost is $25 each. Milton Hegwood, 206 Kleven Avenue, Culbertson, NE 69024, telephone (308) 278-2152

AVAILABLE: Period attire for telegraph operators of any era. Authentic reproduction hand crafted clothing will be made to your exact fit by a certified seamstress at reasonable prices. Several MTC members already have attire provided by this talented and well educated lady. Contact Valerie Mathers at (410) 768-3162.

AVAILABLE: Pen & ink railroad drawings on stretched canvas, frame print, art print and greeting cards. See these on the website of *Dots & Dashes* member Peter Hamel at Peter Hamel Fine Art American.com. Telephone (705) 472-8860.

AVAILABLE: Book. Hubert Jewell, President of the Washington-Baltimore Chapter, offers us his biography titled, Working on the Richmond, Fredericksburg & Potomac Railroad. This book is chalked full of facts and descriptions of railroading and of Morse code communications. Hubert's book is available from the RF&P Historical Society, Inc. PO Box 9097, Fredericksburg, VA 22403-9097 or from the web site www.frandp.org. The price is only $25.15 postage paid.

AVAILABLE: Crests, "Order of Railroad Telegraphers" with emblem in the center, $12 each. Email Mary Roy at terttu@shaw.ca or mail Mary at 3874 Winlake Crescent, Burnaby, BC V5A 2G5, telephone (604) 420-1292.

AVAILABLE: Vintage Rule Books of North American Railroads, at least 30 volumes, as far back in time as 1890. To purchase this valuable set of historic documents, call, e-mail, or write to James Gaw at 54 Colonial Drive in Kemptville, Ontario, Canada K0G 1J0, j.gaw@bell.net, or (613) 258-0243

AVAILABLE: Old telegraph and railroad books. For a list of these items, send a SASE to Eugene Wood, 104 Sunset, Madill, OK 73446. (Eugene doees not have an email address).

AVAILABLE: "Morse code machine" and old billing forms from the estate of Jack Griffin. Phone Kay Griffin at (321) 231-0447 or write to Kay at 12239 Montevista Road, Clermont, Florida 34711.

AVAILABLE: RR car passes & trip passes, also old Union (ORT) cards, (some over 100 years old), Postal & Western Union paper items and some WU copied on RR telegram blanks. Send a SASE for a list to Gene wood, 104 Sunset, Madill, Oklahoma 7346-2051

AVAILABLE: Book titled *Principles of Telegraphy* by the Department of the Navy. Teletype – Printing Telegraph Systems. Description and Adjustments, Signal Distribution Test Set Teletype – general description and theory or operation for Model 28 printers. Teletype Adjustments (2) Type Bar Printer Page Printer Models 15 & 20. Maintenance Track Bulletin #248. Parts Transmitter Distributor Bulletin 1041. Tele printer Circuits and Equipment by the U.S. Army. Call Hubert Jewell at (540) 423-1014 and make him an offer on these rare items

WANTED: Old telegraph keys to be restored. I restore vintage telegraph keys from the 1800's to the turn of the century, no cheap or contemporary keys and you must have all of the major parts. No steel lever Triumph keys please. Send me a photograph of your key and I will get you an estimate of the cost to restore it. Edward D. Biter, Jr., 320 Walker Road in Dover, Delaware 19904.

Keep in Touch...

Your participation in *Dots & Dashes* is important. We need your stories, club news, announcements and reminisces to keep it lively and interesting for everyone.

Jim Wilson
Editor
Dots & Dashes

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E-mail: telegraphjim@gmail.com

For membership changes, address updates, dues and other information dealing with membership or with chapter operation, contact your local Chapter Secretary or:

International Secretary-Treasurer

Position currently open to anyone interested

Please do not send address changes for Dots & Dashes, dues renewals, etc., to the Editor. All mailing lists and membership rosters are prepared through the office of the International Secretary.

Ham Radio Web Sites

For those of you who are amateur radio operators, here are four current web sites that I find useful:

www.arnewsline.org
www.usrepeaters.com
www.qth.com
www.qrz.com

Notices & Invitations

Morse Telegraph Club, Inc.
Dial-Up Information

U.S. (KB) HUB
1-269-697-4506/4508/4513
(Michigan-Ace Holman)

CANADIAN (HN) HUB
1-888-822-3728 (toll free)

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Foreign Air Mail postage $26.00