

Number 86 – July 2003

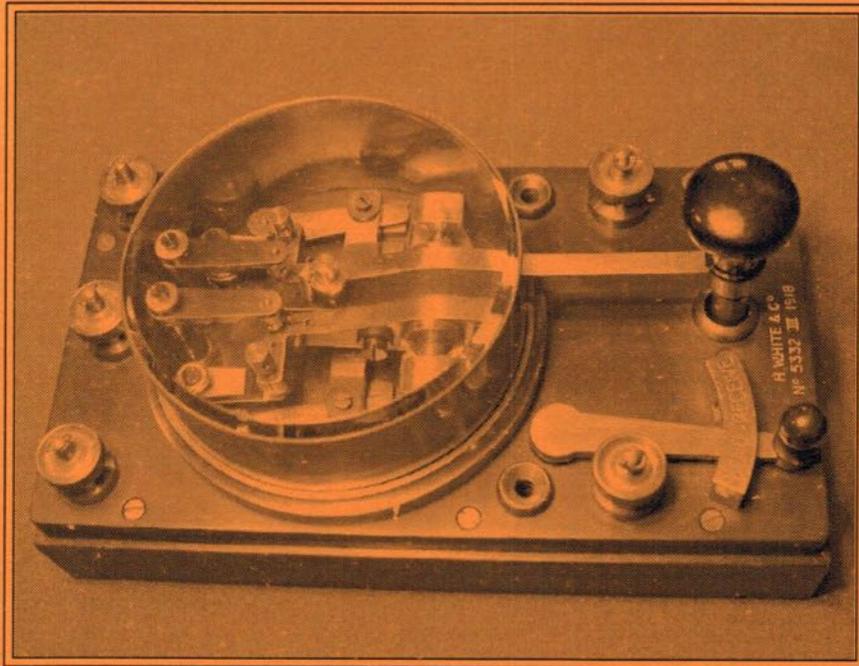
Flying
the flag
for
Morse

Morsum Magnificat

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The Morse Magazine



GPO Mk III Double Current Key



The International Journal of Morse Telegraphy

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Editorial offices (see top of page). Price including postage £2.75 each to UK; £2.95 to Europe; £3.25 (US \$5) Rest of the World by airmail. Deduct 20% if ordering 3 or more.

FRONT COVER

A 1918 GPO Mark III Double Current Key. This one is made by H. White & Co and is number 5330

Photo/Collection: Lee Grant, G3XNG.

Comment

Well, the decision has been taken. The World Radio Conference, meeting in Geneva has amended Article 25 of the international Radio Regulations. From 5th July 2003 it is no longer mandatory for individual radiocommunication administrations to require Morse code proficiency for the issue of an amateur radio license on frequencies below 30 MHz.

There remains a recommendation that a Morse test should be retained but it will be interesting to see how individual administrations react to this over the coming months. Canada, for instance, has announced that the Morse examination remains until all the regulatory changes at WRC-2003 have been reviewed.

Those of us who use Morse can continue to enjoy it. Let us hope that we can encourage newcomers to reap the rewards of a little effort in learning it.

Zyg Nilski, G3OKD

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WRC - 2003 Morse Requirement Ends

The World Radiocommunication Conference (WRC-2003) held in Geneva, Switzerland between 9 June and 4 July 2003, has decided to drop the Morse code examination as a mandatory requirement for the radio amateur license.

No administration participating in Sub-Working Group 4C3 spoke in favour of retaining the Morse code treaty requirement but Conference decided to keep Morse as a recommended amateur qualification.

It would be up to the radio administrations of individual countries to decide whether or not they retain a Morse examination requirement.

Dropping of Morse testing was one of a number of changes to Article 25 of the Radio Regulations that will take effect on Saturday, 5 July 2003 although it may be some time before the intentions of individual countries is known.

BAKOM, the Swiss Amateur Radio licensing authority, will

issue a letter approximately the end of July 2003, to all existing VHF/UHF Swiss Amateurs holding the CEPT-2 (VHF/UHF) license, granting them HF privileges. Their existing call signs will remain in the HB9MAA - HB9ZZZ range.

HB3 licensees are a relatively new special beginners (novice) category of Swiss VHF/UHF operators, who do NOT have reciprocal CEPT privileges yet, and will NOT be advanced to HF privileges under the new system. It is an internal national Swiss license ONLY. After the BAKOM letter comes out, all subsequent newly licensed Swiss call signs will be in the HB9MAA - HB9ZZZ range. The applicants will NOT take a Morse test, but will have full HF privileges.

Plaque to Honour Titanic Radio Officer

The Radio Officers' Association have donated a plaque to Godalming Museum in Surrey, to commemorate the memory of Jack Phillips, the Chief Radio Operator of RMS Titanic.

Jack Phillips is held in especial memory in Godalming as he was born nearby in Farncombe and after training worked as a telegraphist in Godalming Post Office. There are many tributes to him in the town. He died of hypothermia in a lifeboat and his body was never recovered.

The plaque which will be displayed in the Museum by kind permission of the Trustees will be one other commemoration and a reminder of his impact on marine radio, in its infancy in 1912.

The experiences with radio on that fateful night were to lead to operating procedures which lasted for the majority of the 20th Century before automated methods took over.

The loss of the 'Titanic' in 1912 has generated many stories which have passed into folk memory. Although the roles of the Radio Operators Jack Phillips and Harold Bride do have their mentions, perhaps their places in the tragedy have been overshadowed by other stories more easily understood in the public mind.

The Radio Officers' Association and the Godalming Museum hope that the display of a plaque will draw public attention to the heroic efforts made by Jack Phillips in alerting other ships to the disaster.

For marine Radio Officers, the sacrifice, devotion to duty and heroism of Jack Phillips and Harold Bride have been models for their own actions in other disasters, including armed conflicts where it has to be stressed they were civilians in the 'front line'. It was also to lead to the convention that

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Radio Officers were the next to last to leave a sinking ship, only followed by the Master.

The Radio Officers' Association was established in 1997 as what might be stylised a 'veterans' association' for those who have served as Radio Officers in the Merchant Navy.

Of deep interest to the Association is the preservation of artefacts and documentation relating to the history of marine radiocommunication in the twentieth century.

The Association's Hon. Archivist has a large index of various collections, including its own holdings and is often called upon to advise museums, film makers, genealogists and others.

Marconi & GEC Archives and Museum Closed

The role of Company Archivist and the services provided have now ceased to exist as has access to the Marconi & GEC Archives and Museum.

Information on the history of Marconi is still available at the web site <http://www.marconicalling.com> and there is limited information on the history of GEC at www.marconi.com

Marconi is looking at the future of its historical collections (The Marconi Collection, GEC Archive, Elliott Collection) and the possibilities of new permanent homes to ensure their future preservation and public access. (*Information: Louise Jamison ex-Company Archivist Marconi plc*)

Heliograph Demonstration Event

Heliographs were demonstrated during the Folk Arts Fair at Sharlot Hall Museum in Prescott, Arizona. The Trish Horn's local Girl Scout Troop 159, were amongst the more enthusiastic of participants

This is our 4th year of inclusion in the event. It is estimated that the heliographs (British, American and



Portuguese on Saturday, British only on Sunday) were demonstrated to at least a hundred or so people. A 4" square white reflector is now permanently installed on a power pole on a hill about 200 yards distant to the north giving a brilliant reflected flash

The demonstration began with Jim Riddle asking questions regarding the adjacent sundial who knows what this is, how does it work, who can read

it and it's Roman numerals. Then he related the sundial to the heliograph (the sundial uses the sun to tell time; the heliograph uses the sun to send messages, and neither requiring winding up nor replacement batteries; also having, in common that each only would work if the sun was shining. Grasping this concept was immediate.

They then pretended that we were at Fort Whipple in Prescott (Station 1 on the 1890 map) under attack, and that the reflector represented Bald Mountain (Station 2). Usually there is someone who knows

the Morse code for SOS.

Almost everyone was able to read and understand it without difficulty. An explanation was then given of the heliograph system, as it existed in 1886 during the Geronimo

Campaign, and in 1890 when Whipple Barracks and Bald Mountain (now Glassford Hill) were on line.

Copies of the Hg map were available to anyone wanting one, and anyone wanting more information was encouraged to signup for the Hg e-mailing list and website, with 22 of them signing.

(Information Jim Riddle, Prescott, Arizona)

The Ham Band CD

Some readers may not have come across "The Ham Band" and their CD of amateur radio songs entitled "Seek You". They are sung and played as country music, recorded in Nashville, Tennessee. The songs can also be heard on-line at <http://www.lastres.com/ajhuddle/hamand.html>

The composers and singers are Andrew Huddleston, OZ1XJ/OZ5E/G3WZZ and his wife Lissa Ladefoged. Morse enthusiasts might especially like the song "It's Great to QSO in Morse Again" which includes:

*And then Gordon, G4ZPY
Built me a key so good it made me cry
I'm up to speed again
And everyone agreed again
That morse will never die*

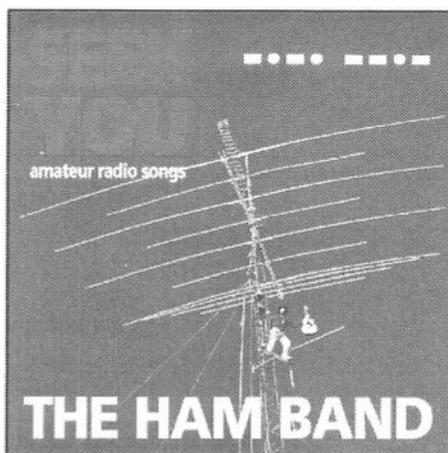
*It's great to QSO in morse again
Instead of talking till I'm hoarse again
I know I'm on my hobby-horse again
But its great to QSO in morse again*

Or how about the song "Always on the Air" including the words:

*A morse-code devotee
He was an expert on the key
At 40 words a minute, and sometimes faster
He would while the hours away
With some ham every day
And I could see that marriage
Heading for disaste*

Whilst not on Morse theme the song "Radio Widow" will strike a chord with some readers, including the chorus:

*And I'm just a radio widow
The airwaves put my man in his tomb
You won't see me cry
'cause my baby didn't die
He's just buried in his radio room
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There are 14 songs in all on the CD.

1. INTRODUCTION
2. ON THE MONDAY EVENING GREYLINE
3. ALWAYS ON THE AIR
4. I'M NOT CLIMBING UP THE TOWER ANY MORE
5. THE RADIO WIDOW
6. THE CONTEST
7. NOW IT'S NIGHT
8. IT'S GREAT TO QSO IN MORSE AGAIN
9. THE TRIP TO DAYTON
10. ROTUMA BOUND
11. OUT INTO THE WIDE BLUE YONDER
12. SEVENTY THREES
13. WE'RE THE HAM BAND
14. OUTTRODUCTION

It is available from Andrew Huddleston, Moellestien 53, DK8000 Aarhus C, Denmark. The price is £12 including postage to Europe and £13 to the rest of the world. It can also be obtained in the USA, by phoning: 1-800-721-4077

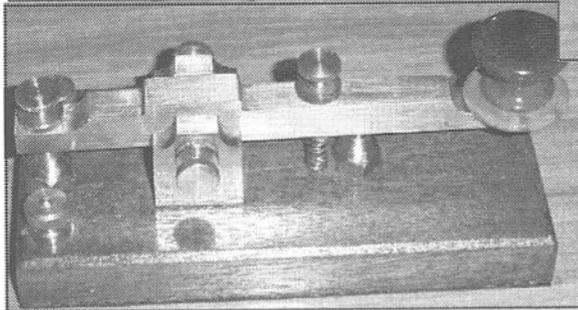
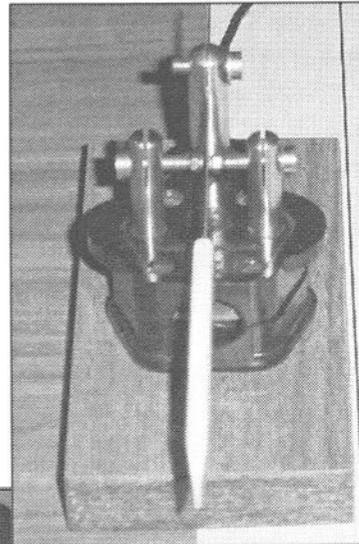
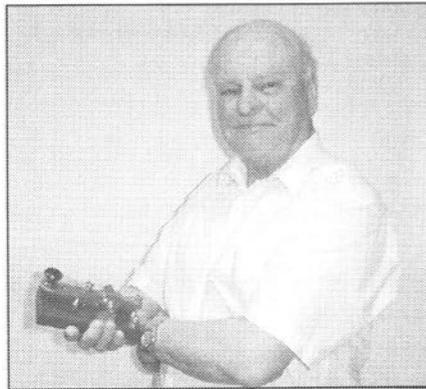
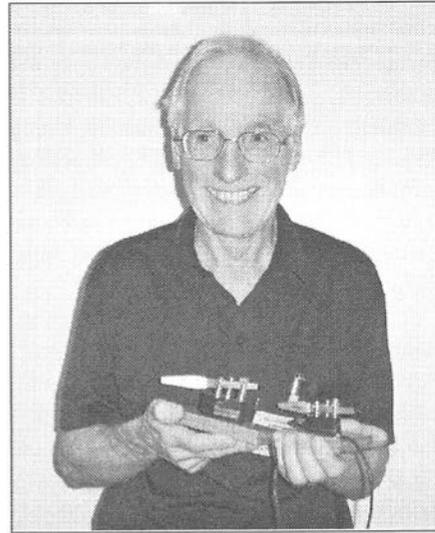
(Information: Kathy Stanfill and Andrew Huddleston. Lyrics by kind permission of Andrew Huddleston ©)

Morse Key Construction Competition

The Chelmsford Amateur Radio Society recently held a constructors competition and among the many entries were some interesting Morse keys.

Denis Lewis M3BIA produced a wonderfully crafted Morse key. The contacts on the key were from a spare set of points from an old Peugeot motor car. Denis won the "First Time Entrant" prize.

Colin Page GØTRM constructed a pair of "Plug and Play" paddle type Morse keys using round pin old style mains plugs, a 15 amp and



Above: Colin Page and his "Plug and Play" key. Left Denis Lewis and his home made key.

a more compact 5 amp type. They were upturned on a wooden base and the paddle, slotted into the earth pin was a nail file which had a convenient insulated plastic finger pad. This was Quite ingenious on Colin's part, as the original concept from an article in Practical Wireless used a piece of hacksaw blade. The contacts are made from standard screws fitted with silver studs. The cost of the nail files was £1.58 and all other parts were to hand. Time to make 2-3 days. He won 3rd prize.

Further information on the club may be obtained from the Secretary David Bradley MØBQC Tel: 01245 602838 E-mail: info@g0mwt.org.uk Website: www.g0mwt.org.uk
(Information: Trevor, M5AKA)

NMC, KPH AND KFS Return to the Air Using Morse Code

For the first time since 12 July 1999 listeners around the world were able to hear three historic US coast stations on the air using Morse code.

On July 1st, Coast Guard Communications Area Master Station Pacific (CAMSPAC), Pt Reyes retired the historic "Sparks" from the

Telecommunications Specialist Enlisted Rating Badge, as the Coast Guard restructures its work force replacing that specialty with two others, the Operations Specialist and the Information Technology Specialist.

As a special part of the ceremony surrounding this change NMC will returned to the air using Morse code (CW).

The public were invited to visit NMC to participate in this event. The unit's Receiver Site, located at 17000 Sir Francis Drake Blvd on the Pt Reyes National Seashore was open to the public.

KPH activated its HF and MF transmitters to participate in this historic event and to give listeners the opportunity to hear three US coast stations on the air - possibly for the last time. KFS will also return to the air on a single frequency.

KPH transmitted on 6477.5, 8642.0, 12808.5 and 17016.5 on HF and on 500 and 426kc on MF. KFS transmitted on 17026.0kc. These frequencies were made available through the generous cooperation of Globe Wireless, the current owner of the KPH and KFS licenses.

KPH and KFS operators will listened for calls from ships on 6276.0, 8368.0, 12552.0 and 16736.0 on HF and 500kc on MF.

(Information: Richard Dillman, W6AWO, Maritime Radio Historical Society; <http://www.radiomarine.org>)

Wanted - articles on all aspects of Morse and related telegraphs - contact MM

Telegraph Treasures in Film

Telegraph items from Tom Perera's collection have been used recently in a major motion picture called 'Paycheck', distributed by Paramount Pictures.

The telegraph items used were

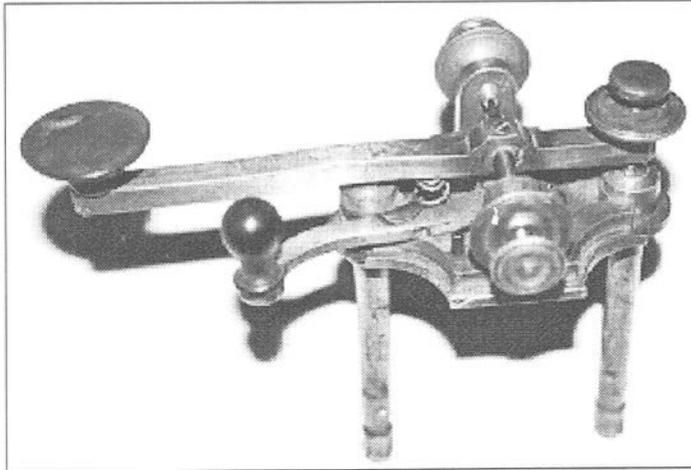
the Caton Register and the Caton Key.

The story is about an electrical engineer, Jennings (Affleck), who has been working on a top secret project for two years wakes up one day to discover that his employer has erased the parts of his memory concerning his top secret work.

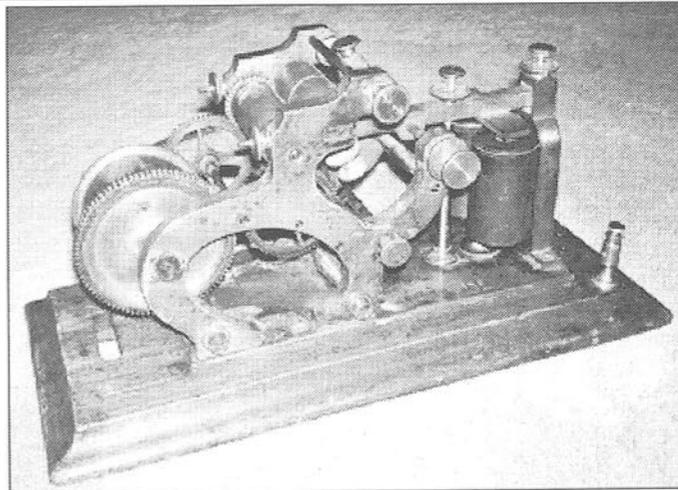
Trying to collect his "paycheck", he discovers that instead of a cash payment, he had agreed to

receive a package of seemingly meaningless objects instead. As you can perhaps guess, the Caton Register and Caton key will be included in the 'package'.
(Information: Tom Perera)

Photo/Collection: Tom Perera, W1TP



Photo/Collection: Tom Perera, W1TP



Above: Caton Key. Right: Caton Register.

Web Site Collection Updated

One hundred new photographs of telegraph instruments have been added to Fons Vanden Burghen's pages. They are part of Greg Raven's web site at www.faradic.net/~gsraven/fons_images/fons_museum.html

The new photos are on pages 11 and 12.

Marconi Radio Club of Newfoundland on LF

The Marconi Radio Club of Newfoundland is promoting interest in long wave low frequency work on 136 kHz and breaking new ground on the long waves by conducting experiments aimed at assisting Radio Amateurs of Canada (RAC) in acquiring a 136 kHz allocation and promoting interest in low frequency work.

A proposal written by club member Joe Craig VO1NA was endorsed by RAC and the proposal was approved by Industry Canada. Since then, a low frequency transmitting station, the first on 2200 metres in the Newfoundland and Labrador Section, has been on the air as MRCN members conducted various experiments including several cross-band contacts.

Signals from the station have been copied by W1TAG near Boston
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and by G3NYK in England. The latter was the first transatlantic LF transmission by a Newfoundland amateur radio station. For further information, visit the MRCN web site at <http://www.ucs.mun.ca/~jcraig/mrcn.html>

(Information Radio Amateurs of Canada)

The Life of a Radio Officer Trilogy

There are three books recounting the experiences of a Radio Officer in the British Merchant Navy between 1956 and 1963. A keen photographer, the author, John Russell has taken the unusual step of printing and publishing the books himself, in order to include a greater number of colour pictures than would otherwise be possible.

The first book records several visits to New Zealand on three different ships owned by the Shaw Savill & Albion Line and the New Zealand Shipping Company Ltd.

The second tells the story of two very different tankers. The first is a three-month voyage on a T2 tanker delivering refined fuel from Fawley to various U.K. ports. The rest of the book describes a ten-month trip on a deep-sea tanker, under charter to BP, tramping around the world visiting an astonishing variety of ports.

As in all these books the text is

copiously illustrated with colour photos from the author's own collection taken at the time, together with maps, diagrams and tickets.

The third and final part includes voyages on four different ships to West Africa, North and South America, Australia and Canada. The reader is taken from the tropical heat of the Niger delta to the sub-zero temperatures of the StLawrence in January: from the delights of beach 'barbies' at Christmas in Oz to huge steaks in Montevideo.

All books are profusely illustrated with colour pictures selected from the author's own collection taken at the time, together with maps, diagrams and visiting cards. There is a Glossary of technical terms, Kit List and a list of Books for Further Reading.

For purchase information contact John Russell, 21, Landcross Drive, Abington Vale, Northampton NN3 3LR UK. Telephone +44 (0) 1604 636536 or e-mail:

russell@landcross.freemove.co.uk

Battleship George Averoff on the Air

The museum war battleship George Averoff will be on the air on occasion of the Museum Ships Weekend event

on July 18/19/20, 2003 and July 25/26/27, 2003.

George Averoff is moored at Flisvos Piraeus in Greece. It was built in 1909, took part in the Balkan wars, WWI and WWII. During WW II the ship operated at Mediterranean Sea and Indian Ocean as part of the Greek contribution (under British general command).

Operations will take place from the original ships radio room, using amateur radio equipment. The ships original equipment has been out of order for a long time.

The modes of operation will be CW, SSB, some RTTY with six operators, using callsign SXIMBA. A special QSL card has been print for the event.

SXIMBA has been activated on air twice in the past, on July 1987 for 4 days, and again July 1994 for three days.

(Information: Yiorgos A. Graikos)



The Radio Officers Association

Membership is open primarily to former MN radio officers but is also open to anyone who has had an association with maritime communications or is interested in the subject. Members receive the quarterly newsletter QSO and its associated amateur component QRZ. There is an annual reunion and AGM. 2003 sees the meeting taking place in Newcastle-upon-Tyne. For further details and information please contact the Membership Secretary - John Russell, 21 Landcross Drive, Northampton, NN3 3LR.

MARCONI STATION TO BE BUILT AT WHITLEY BAY

Whitley Bay has been selected for the erection of a Marconi station.

The site decided upon is Promontary Point, which stretches out like a horn from the brow of the Northumberland coast to form the crescent of cliff protecting Cullercoats Bay on the north.

It is one of highest and outstanding points on the coast – an exposed and windswept promontory which is admirably adapted as a wireless telegraphy station.

The erections to be placed upon it will include a mast running perpendicularly to a height of over 200 feet.

The mast will be of pitch pine, and with it will be connected the delicate mechanism for receiving wireless messages.

The receiver will pass into a wooden building at the base – a strongly built timber structure, with the beams bolted together, and with a diagonal flooring of pitch pine.

Messrs Douglas and Son, builders, of Cullercoats, have been entrusted with this work.

(Information and photo: W. P. Jones - From The Shields Daily News, Monday, April 16, 1906)



Cullercoats circa 1919 - Note the wireless masts and hut in the top right -hand corner
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Signallers' Camps 1879 – 1914 by E. Geoffrey Walsh GM4FH (SK)

IN THE SECOND AFGHAN WAR in 1878 Major General Roberts, later Lord Roberts, took possession of Kabul and assumed the government. The Indian telegraph network had by then extended into Afghanistan but on January 6th 1879 the Viceroy wired Roberts from Calcutta:

'I think the policy of running a telegraph line through an unsettled country is always questionable. It is an almost irresistible temptation to mischief and is subject to frequent interruptions and entails large numbers of men & posts for its maintenance. I should suggest its discontinuation.'

On September 1st 1879 Roberts

was in Simla, the hill station to which the government of India moved in the summer to avoid the heat of the plains. He wired Massey in Afghanistan, a signallers' camp is shown in Figure 1:

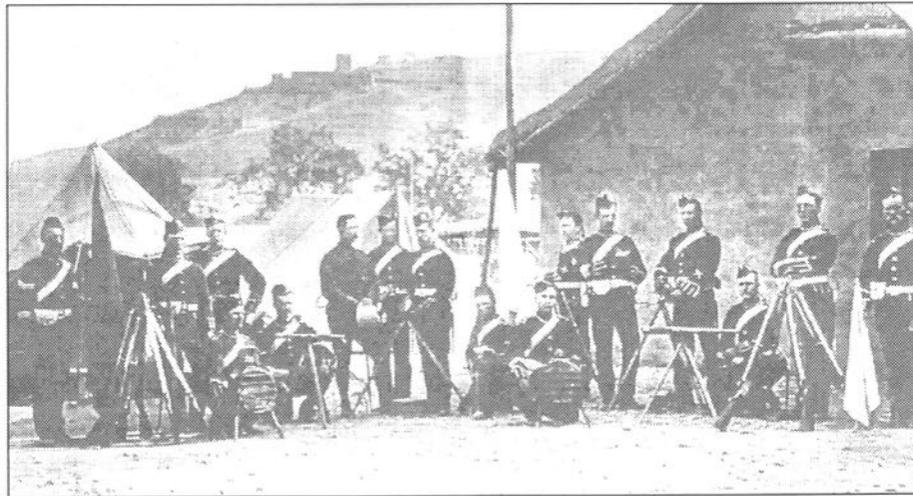


Figure 1. Camp of 72nd signallers at Sherpur in the Second Afghan War. There are heliographs, flags and signalling lamps but no sign of telegraphic equipment. Heliographs will have been the principal mode of communication.

'I do not like the idea of 25 Goorkhas being detached so far as Karatiga...The tribes should be made responsible for the safety of the telegraph wire, and the people who have to put it up. This always seems to me the safest plan; a small detachment would not really deter men from attacking a post or a party, if they had determined on doing it, while any accident happening to the detachment would be troublesome.'

In a critical action in 1879 the route to Kabul was blocked by a gorge held by the enemy on both sides. Sir George White succeeded however in taking the pass. He sent a telegram to General Roberts (Figure 2) saying, 'I have taken possession of the pass and the 92nd have all the Afghan guns (12), I will hold it all night.'

My uncle Jim Simmons, a telegraphist was in the reserves and was at a camp in 1905 (Figure 3). The letters 'C.P.R.G.A. (VOL)' refer to the 'Cinque Ports Royal Garrison Artillery. (VOLUNTEERS). 'There are two semaphore flags, a gun and two explosive devices, shells, mortars or petards?'

In 1907 Jim was again at a camp (Figure 4) Again the letters 'C.P.R.G.A.', are seen with 'SIGNALLERS' above. There are semaphore flags and heliographs. There is nothing electrical; the Aldis lamps have chimneys showing that they were oil fuelled. Jim is seated on the ground.

At a training camp with the 4th Signal Company in North Buckinghamshire in 1913 there are no signs of signal equipment (Figure 5).

I have taken possession of the pass
 & the 92nd have all the Afghan
 guns (12) I will hold it all
 night
 Geo White
 5/40

Figure 2. The note that will have been sent, the fairly short distance from Charasia to Kabul, by messenger or heliograph with the request to be sent by wire to Roberts. There is also the note 'Please wire to the Times as I cannot.'

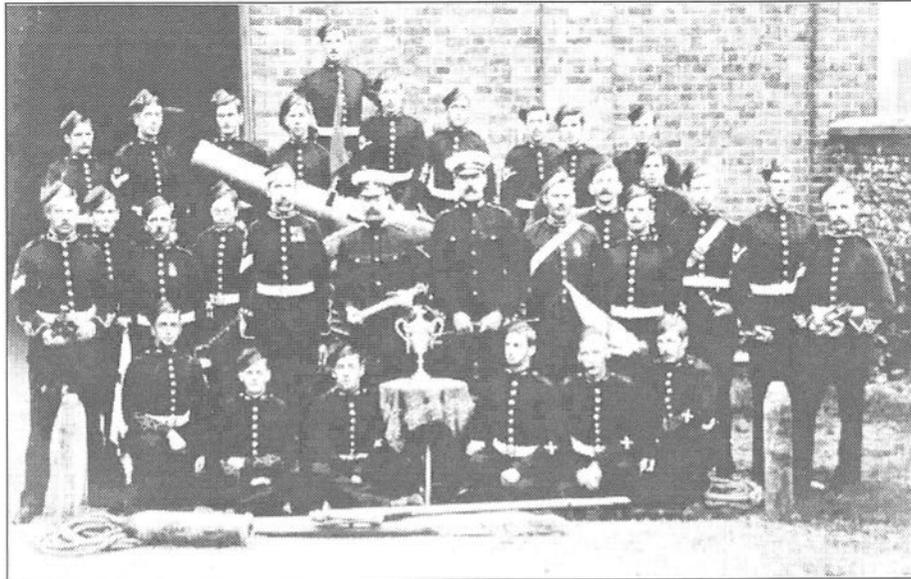


Figure 3. 1905. The 1st prize detachment at Shoebury Postcard from Jim to Miss J. Simmons, Jim's sister, of 68, St Michael's St. Folkestone. Posted in Dover Nov 1905. Jim is to the right of the Sergeant Major.

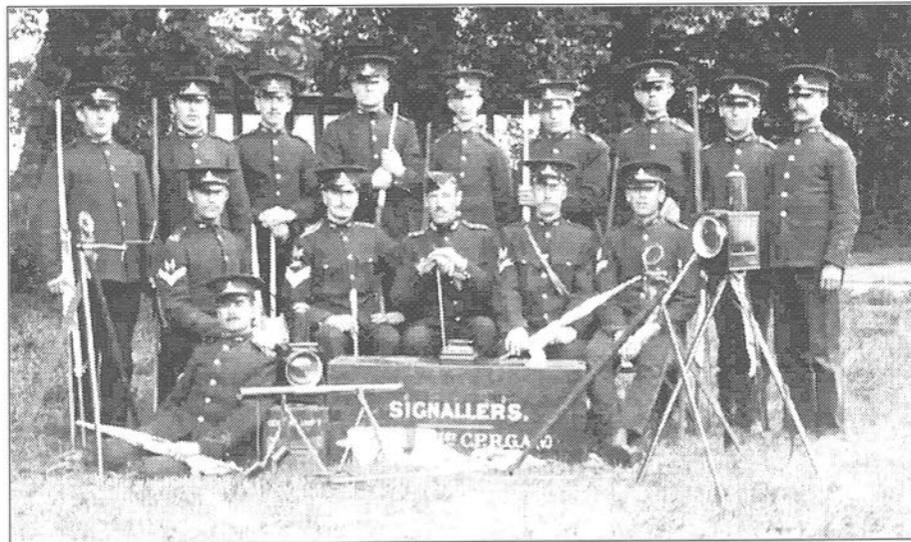


Figure 4. 1907. Postcard from Jim also to Miss J. Simmons. Postmark - Dover July 1907.

Evidently the men are having a singsong; there is a concertina player and to his right a tympanist is striking, perhaps a tin can, with a baton.

In 1914 there was another training camp with 3rd Signal Coy RE at Cheriton, near Alresford, Hants (Figure 6). Jim is in the front row on the left side. On the ground are two telegraphists, two telephonists and two clerks. Standing on the right is a man with a sledge hammer that will have been used to strike a sturdy iron spike into the ground to form a hole into which a telegraph pole will have been placed. Standing in the centre is a soldier with a pick, this would have been useful if the spike had to be driven through a road surface.

Extracts from Jim's Diary

4th August, General mobilization.

5th August, with "L" Signal Coy RE at Emigrants Home, Southampton. Being equipped and awaiting boat for France.

Sunday 16th August. Loading "African Prince" with tons of telegraph stores.

17th August 1914, Left Southampton on "African Prince" 4.00am. Sleeping on a congested deck. Very hot. No room to walk about. Arrived off Le Havre about 4.00pm. Great excitement upon entering the harbour. Jetties crowded with French people shouting "Heep! Heep! Hurrah!" Exchanging shouts of "Vive l' Angleterre" and "Vive la France" Our troops trying to sing "La Marsallaise." Sleeping on the stone floor in goods shed and unloading the boat in shifts. September 1st 1914, moved to St. Nazaire we worked thro



Figure 5. 1913 Postcard – but not posted, with Jim is standing in the centre he and others have a lanyard for a whistle which will be in the pocket.

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Figure 6. 1914. Postcard sent on June 12 1914, to Miss J. Simmons. The 'Rag-time Army'.

the Brest Penzance cable over which I spoke one day to Nic Heller in Penzance P.O. Subsequently the traffic became too heavy for this cable so our people laid a fresh cable from St. Nazaire out into the Bay of Biscay and spliced on to a German West Africa cable which again was connected to London further up the English Channel

The entry in Jim's diary for 11th March 1915 reads:

'Leaving Mametz after a night of muddle and excitement, loading up wagons etc. All signal squadron mounted on bicycles and carrying all kit. Feeling out of training for cycling with such a pack. Are we really going to see some of the war at last! We go via Marthes, Blesey, Estree, Blanche, Rely, Auch-au-Bois, Bellery, Ferfay, Cauchy-a-la-Tour, and Auchel to Lozenham where we find the corps have laid a

cable for us to the chateau grounds. Picking up the end of cable I can feel the corps calling up "V-I-B" (our call) but we cannot answer for another hour for our transport has broken down and had to be reloaded.'

As the fortunes of war varied Jim moved repeatedly, mostly in the region of the Somme, but he came through without a wound and worked in the Folkestone post office. By 1930 or so teleprinters were displacing telegraphists and his considerable skills were discounted.

Between 1878 and 1913 the technology that was used appears to have changed little. MM

Sources

Roberts in India (1993) Military papers F/M Lord

Roberts edited by B. Robson.

Durand, Sir Mortimer (1915) Sir George White

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Morse Matters

by Dr Gary Bold ZL1AN

What Does a Counterpoise Do?

More Spectrum Analyser Software

Which Paddle Keys the Dit?

What Does a Counterpoise Do?

Feedback tells me that a few more people are taking their rigs to the holiday cottage or tent, raising some wire, and tuning up on the HF bands. Most are pleasantly surprised how much DX they can work on CW, but one email I received said:

I threw up an end-fed random wire like yours and tuned up on 20 metres. But whenever I closed either keyer paddle, the keyer turned on and stayed on!

Then I remembered that you said something about a counterpoise. I strung about a quarter-wave length of wire out the window and across the grass, connected to the ground terminal of the transmatch. And the keyer worked fine! I have three questions: What made the keyer lock up?

How did the counterpoise fix the problem?

If the counterpoise is some sort of 'artificial ground' why should it be open-circuit at the far end when it 'obviously' makes more sense to

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ground the far end?

Incidentally, I searched for counterpoise on the web, and found quite a lot of conflicting information!

First Answer

I know that the keyer in use is one of the new generation microprocessor-controlled units which are small and run for ages on penlight cells. These use CMOS chips, high-impedance, low-current devices - ideal for picking up stray RF, rectifying it, and causing one or more gates to latch on. Random wires often present a high impedance at their feedpoint, and the resulting high electric field component in the vicinity of the transmitter causes the problem. In such a case you'll often feel a 'tingle' from the metal of the paddles when the transmitter is keyed. And if you do, you'll know that you have a potential problem.

Sometimes you can improve things by adding/subtracting a metre or so from the antenna wire, or connecting the keyer base to the transmitter and/or transmatch cases with short crocodile-clip jumper leads. But in my experience, these are cludges, and adding a counterpoise almost always works better.

Second Answer

The counterpoise did provide a better RF ground, an 'artificial ground' which kept the cases of the transmitting units closer to 'true' ground potential. But why should this be 'better' than a wire connected directly to a water pipe or ground-stake?

Third answer

Because if this ground wire is an appreciable fraction of a wavelength, it acts, in conjunction with the ground, as a lossy, non-uniform transmission line. It doesn't look like a 'conventional' transmission line, as we are used to seeing two conductors. The second conductor in this case is the 'image' of the ground wire in the ground itself, as shown in Figure 1. (Strip lines used in microwave circuits work like this).

The ground is always lossy, so the transmission line is lossy too, with characteristic impedance and velocity factor varying along its length, and intractable to calculate analytically. (Of course there's an image, not shown, of the antenna in the ground as well, and I have somewhat oversimplified what I think happens. Electromagnetic experts are welcome to correct me.)

There are two cases however, where we can estimate what happens. Two well-known results from lossless transmission line theory state that a half-wave line has an input impedance, Z_{in} , equal to its terminating impedance, Z_L . A quarter-wave line has an input impedance given by $Z_{in} = Z_0 Z_L$ where Z_0 is the line's characteristic impedance.

That means that a short-circuited quarter-wave line has an infinite input impedance, and an open-circuited one looks like a short circuit. These results are independent of Z_0 .

Thus an earth wire a quarter-wavelength long results in the worst possible situation! It will reflect a high impedance to ground at the transmitter

terminals (not infinite, because the line is lossy). In free space, this is about 5 metres at 14 MHz, so if your ground wire is roughly this length (or probably shorter, see later), you turn your 'ground' into a high-impedance point for RF!

It is much better to open-circuit the far end, because this will reflect a low impedance at the transmitter. And when you do this, you have a counterpoise. This is the reason that the conventional wisdom says that a counterpoise should be about a quarter-wavelength long at the operating frequency, and open at the far end.

It's sometimes stated that the counterpoise should be appreciably less than a free-space quarter-wave long - maybe only 60% as long as this. This is because the velocity factor of the transmission line it forms with its image will be much less than in free space due to the higher dielectric constant and finite conductivity of the ground - both of which vary enormously. But I have never found that the length is particularly critical, and my 20 metres of wire, simply laid along the grass, usually seems to clear up rf sensitivity on all HF bands with 50 - 100 Watts of CW going out.

You can connect such a counterpoise in parallel with the existing 'dc' ground, as I have done in my shack, or even have several counterpoise lines in parallel cut for different bands. Many apartment dwellers high in buildings have also used one or more counterpoises with success - although in this case, as

they're a long way from the ground, the 'counterpoise' will radiate, and act more like another leg of their existing antenna. Even your counterpoise from the back will radiate a little if your rig is a few metres above ground - but even so, having it should improve things.

Nevertheless, it's unlikely that even a meticulously adjusted counterpoise wire will give a near-zero impedance to ground, so some people have experimented with tunable counterpoise wires. These can be as simple as an inductor in series with the counterpoise, adjusted to maximise the RF current flowing in it - a bit like inductively loading a short whip for resonance.

The MFJ-934 Antenna Tuner/Artificial Ground is a commercial unit

which contains both a standard antenna tuner and an inductive 'ground wire' tuner. It is said to work well, and in principle it certainly should. Has anyone any experience with such units?

Which Paddle Keys the Dit?

I've recently received several enquiries along the lines of 'I'm changing to a keyer, and am confused about which way round to connect the paddle. Should the thumb key the dit or the dah?'

The short answer is that conventionally the thumb keys the dit, but I know people who key the other way round - and indeed there is some reason now for doing so. But first, some

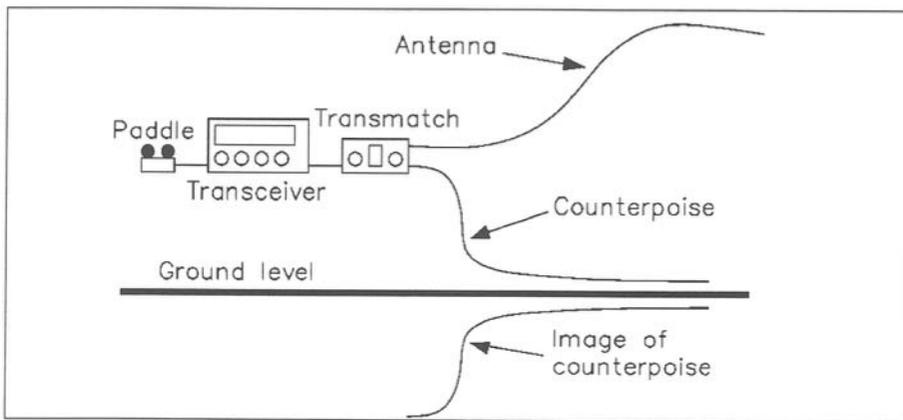


Figure 1.

FISTS CW Club – The International Morse Preservation Society



FISTS exists to promote amateur CW activity. It welcomes members with all levels of Morse proficiency, and especially newcomers to the key.

The club has awards, nets (including a beginners' net), dial-a-sked for beginners, straight key activities, QSL bureau, newsletter, and discounts from traders.

Further information can be obtained from **Geo. Longden G3ZQS, 119 Cemetery Road, Darwen, Lancs BB3 2LZ**. Send an s.a.e. or two IRCs.

history: It all goes back to the evolution of semi-automatic, vibrating-arm, sideways-actuated keys. These were developed partly to help telegraphists who had developed 'glass arm' - which we know know as RSI, and partly to help good operators send faster, more accurately and with less effort.

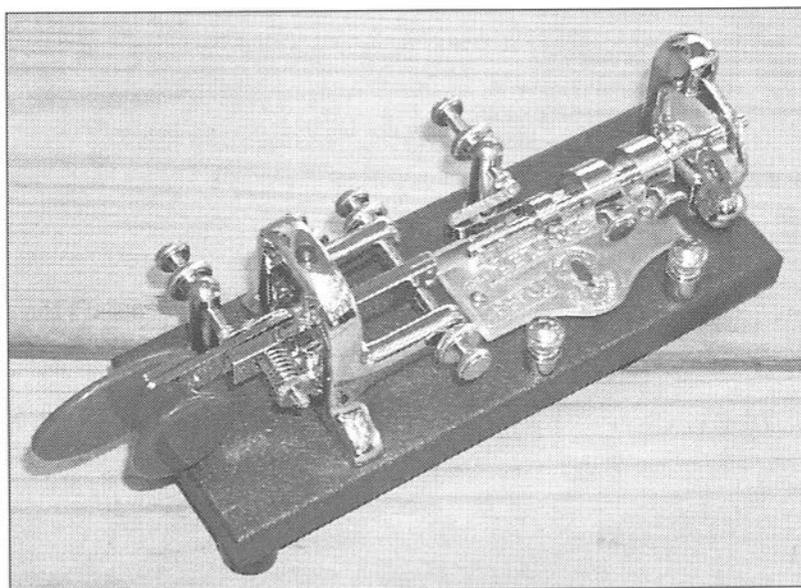
Several people patented designs in the 1880's, but these had ineffective vibration damping causing (in a review of the time) 'blurry sending and split dots'. Thus, professional telegraphists came to despise them, and denigrated them as 'only fit for a bug', because 'bug operator' at the time meant a truly lousy operator with a terrible fist.

The first successful design was patented in 1904 by Horace Martin, who solved the damping problem with a neat mechanical momentum absorber.

He called it the Vibroplex, and custom built all the first models at his home in Brooklyn. These were very successful. Business grew.

In 1920, the famous 'lightning bug' trademark logo appeared on Vibroplex keys for the first time. It's usually assumed that Martin adopted it as a triumphant retort to the design's earlier denigrators. The descriptor 'bug key' rapidly became applied to all such keys, and is still used today. I own a Vibroplex Champion, bequeathed to me by an old maritime op who used to be a technician in my department.

But I think that the most beautiful of all Vibroplex models was the Blue Racer, produced in the 1930s and shown in figure two. This is a faithful, modern reproduction which you can buy today. (Search the web on vibroplex



Vibroplex Blue Racer

to find the Vibroplex company - now reincarnated under new management). You can probably see the 'lightning bug' logo on the middle of the base.

But I digress. In a bug key, dits are formed automatically by a sideways-vibrating pendulum, but dahs have to be made manually. Martin reasoned that the thumb, the 'least agile' digit, should initiate the dits, leaving the more versatile forefinger for the dahs. Thus he defined the paddle polarity, and this was universally adopted by all other designers.

When electronic keyers came along, in the 1940's, it was sensible to adopt the same convention for their paddles, so that bug operators could easily make the transition. But there's a subtle difference! Keyers also make automatic dahs, which now become the 'easier' element - they're longer! So maybe it is more sensible to allocate dahs as the thumb's job, since most new keyer operators now start from scratch, and have never programmed their fingers with a bug. But I did, and my hand is forever programmed with thumb/dit reflexes which can never be eradicated.

Actually, it doesn't matter any more. The best and cheapest keyers are all now microprocessor controlled, and the paddle polarity can be changed at will. So do what just seems best to you.

Another email has come in from a new keyer operator. Should he select iambic mode A or B? And what's the difference? That will have to wait until another column. In the meantime, I'll just say 'go for type B', which is what I use.

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The 'First QSO' Helper Group

Charlie, ZL3CED dropped me a line to let me know how his first CW QSO went. 'It was absolutely nerve racking, but the next day I was walking around like an air head, I had really done it! I got hooked right there and then. 'It has now been a month since I had this CW QSO with Ron, ZL1TW. His help has been absolutely incredible. To date we've had 10 QSOs, and are intending to meet on Monday nights on 80m so he can push me along and provide feedback.

'Now I'm chasing DX! Sending my own CQs on 80m and 20m, and having some real good ragchews when I find someone who is going at my present speed. I did not believe I would be this far ahead after a month!

The idea of having volunteers available for the first CW QSO really works! I am living proof!

Charlie, well done, and welcome to the world-wide fellowship of CW ops! The group here is coordinated by Ron, ZL1TW and Paul, ZL1PC, who have respective email addresses z11tw@nzart.org.nz z11pc@nzart.org.nz

Just email, phone or write to either of them to set up your first CW QSO, or tune around 3520 kHz in the early evening.

Friendship, understanding and encouragement guaranteed! Incidentally, Ron tells me that the new lower-speed Morse testing requirements in many countries seem to be having an effect. There are more

low-speed (10 - 15 wpm) operators appearing on all of the HF bands, making it easier for other newcomers to obtain contacts at speeds they can comprehend. I'm not surprised, as I predicted that this would happen.

More Spectrum Analyser Software

In MM85 I showed passband curves of Lionel Sears' audio filtering program Binster. These were produced using a combination of Chris Craig's excellent Goldwave digitizing program and the professional signal processing program MATLAB. But then I stumbled across a free program, by Paul Kellett, which does all this directly! Have a look at Figure 3. This is the operating screen of 'Analyser', one of three programs contained in a distribution package called Wavetool.zip, which you can download from <http://www.mda-vst.com/> and also from <http://www.hitsquad.com/>

[smm/programs/Sonogram/](http://www.hitsquad.com/smm/programs/Sonogram/)

The package requires the dynamic link library file VBrun300.dll, which can be downloaded from <http://www.lreviews.com/dll/dsound.shtml>

Analyser takes its input either from the soundcard, or from a WAV (audio) file. If you connect the audio output from your receiver to the soundcard, you'll see a continuously updated display like figure 3, showing your audio passband. Various spectral resolutions, zero settings and ranges are possible, and, best of all, two spectral averaging functions.

These have the effect of smoothing out the sample-to-sample plot variations. Exponential smoothing is 'decaying weighted averaging', with a time-constant like an RC low-pass filter circuit. Cumulative averaging simply averages a large number of input samples, and here I've averaged 222 of them (no particular reason, I just hit '2' three times). This gave a nice average spectrum which completely ironed out

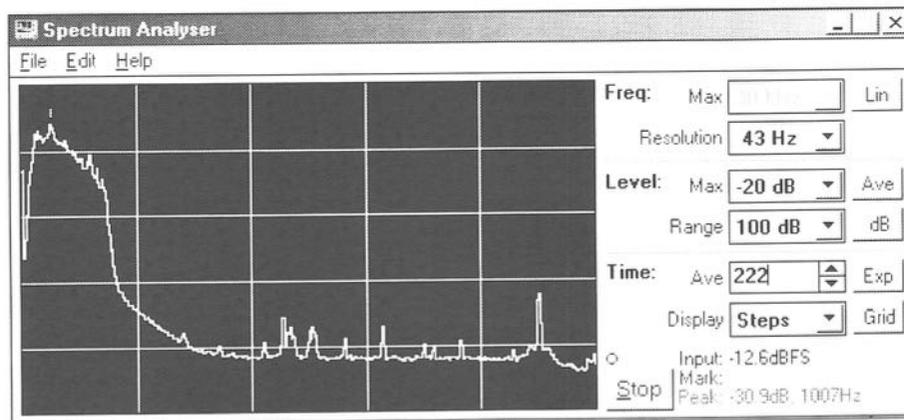


Figure 3.

occasional static crashes.

Figure 3 shows the passband of the standard (wide) CW setting of my Yaesu FT767-GX, and we see that while the skirts are satisfyingly steep, the response varies across it by about 20 dB. Accurate information is easy to retrieve, as you can move a cursor across the plot, and read out the current co-ordinates from the bottom window.

Even better, there's an option to write the frequency/level points in the graph to a two-column, tabdelimited text file, which you can import into

Excel, or some other suitable package of your choice for further processing, or to blow up portions of the plot. (If you haven't got such a suitable package, email me for a free one I'm writing in Delphi.)

If you're interested in filter responses, check this out. You'll be impressed.

See you on the bottom of the bands.

(Adapted and edited for *MM* from Gary Bold's *The Morseman* column in *Break In*, the journal of NZART) **MM**

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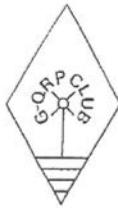


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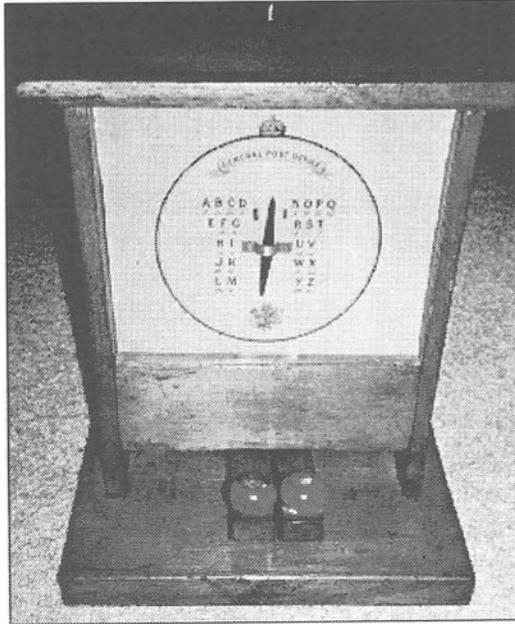
The G-QRP Club promotes and encourages low-power operating on the amateur bands with activity periods, awards and trophies. Facilities include a quarterly magazine, Morse training tapes, kits, traders' discounts and a QSL bureau. Novices and SWLs welcome.

Enquiries to **Rev. George Dobbs G3RJV, St Aidan's Vicarage, 498 Manchester Road, Rochdale, Lancs OL11 3HE.** Send a large s.a.e. or two IRCs

Showcase

Readers are invited to contribute any additional information and stories, no matter how minor, to the Editor, *Morsum Magnificat*. There have been thousands of designs of keys & telegraphy instruments. Information will be lost unless it is compiled in one place and shared with other readers.

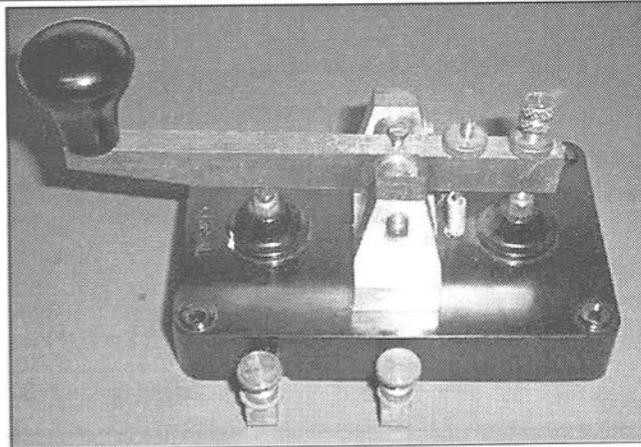
Photo/Collection: Tom Perera, W1TP



An early needle telegraph training set used by the British Post Office. The teacher sits in front of the side that is shown and operates the left and right key to move the needle left for dots and right for dashes.

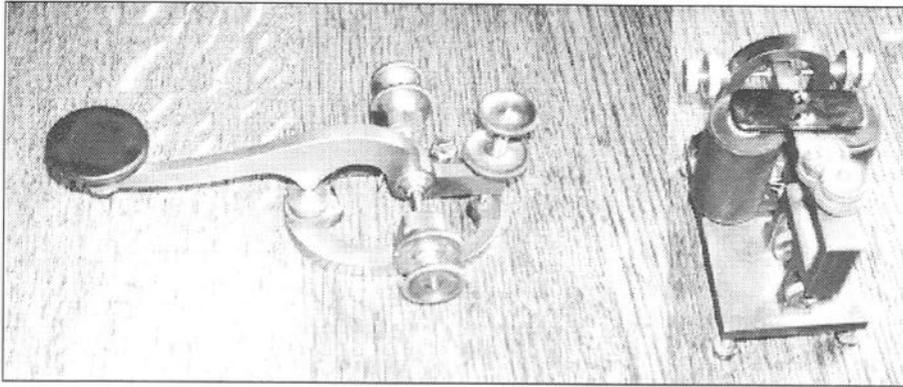
The student sits on the backside of the instrument and reads the display which, by a system of reversed levers exactly mimics the display that the teacher sees. The student writes down the message sent by the display.

Australian Post Office
Clipsal key



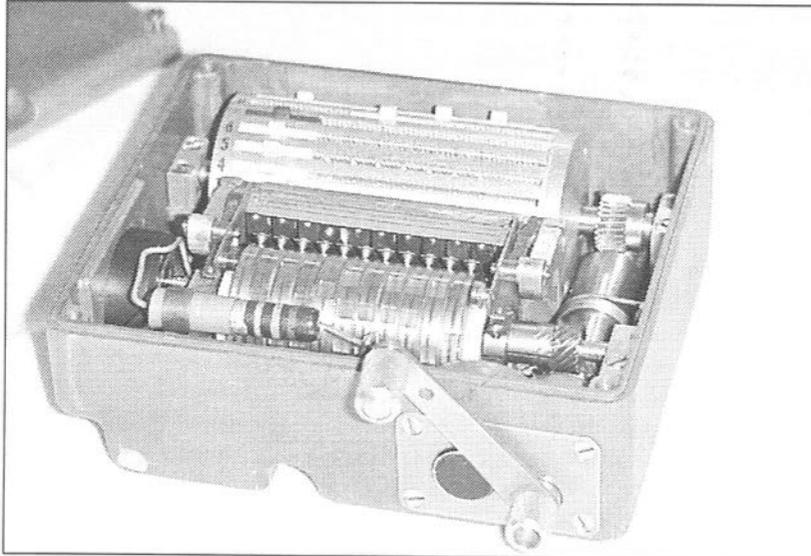
Photo/Collection: John Alcom, VK2JWA

Photo/Collection: Tom Perera, W1TP



A very early elaborate camelback key & sounder. This all brass key with leaf spring has a massive elaborately curved lever of the earliest "camelback" or "humpbacked" shape which was adopted soon after Morse's demonstration. These keys were only made for a short time because the steel shaft, press fit into the lever, tended to work loose with use. The sounder is also heavy brass but, although it was mounted on a board along with this key, I believe that the sounder may be from a later period. The original wooden base is missing. The two instruments came from a burned railroad station in Canada. Circa 1848. (From Perera's Telegraph Teleraph Collectors Guide)

Photo/Collection: Greg Ulsamer, DL1BFE



This rapid transmitter type RT-3 was used with the German spy radios SP 15 and SP 20 in the German Intelligence Service and later in the Bundeswehr in the second half of the 20th Century. It generates only following characters: W, F, V, R, 5, K, B, 9 and M. The messages were created by these characters with the help of code-tables. It is said that this item was made in UK. Any info about this fact welcome. Other info at <http://www.spyradio.de/afd.html>

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Evolution of the International Morse Code

Part 1 – European Foothold

by Tony Smith

A PREVIOUS ARTICLE (*From One Code to Another, MM19*) described the early development of the signalling code named after Samuel F.B. Morse, which was later known as “American Morse.” Some of that material is extracted and summarised in the first part of this article in order to present an overall picture of how the International Morse code evolved. Discussion of the controversy about who actually authored the American code of 1844, Samuel Morse or Alfred Vail, is not included but can also be found in the earlier article. As will be seen here, there is no controversy about who authored the first of the European codes, which led to “International Morse” as we know it today.

Original Code

Morse’s original idea, in 1832, was for a numerical dot, line and space code, linked with a code dictionary. Apart from signalling numbers representing words this code could also send numbers representing letters to enable unusual words not in the code dictionary to be spelled out in full. This was the code being used when Alfred Vail attended a demonstration by Morse

of his electro-magnetic telegraph in 1837, at which time Morse was still engaged in building up his full dictionary of numerical codes. See Figure 1.

1	-
2	--
3	---
4	----
5	-----
6	-----
7	-----
8	-----
9	-----
0	-----

Figure 1. Morse’s numerical code of 1832.

First Alphabetical Code

At a further demonstration on 24th January 1838, Morse and Vail (who had now become one of Morse’s partners in the development of the electric telegraph) used a new alphabetical code with Morse’s original port-rule sending instrument, which had been rebuilt and

improved by Vail. Instead of loading up the instrument with cast type representing numbers, they used type representing letters and doubled the sending speed of the system. It was,

however, still a cumbersome process as each message to be sent had to be loaded individually into the machine.

This first alphabetical code was the forerunner of American Morse. It used dots, lines, and spaces between groups of dots, for individual letters (the letter B, for instance, was - - - - and C was - - -). These symbols were chosen arbitrarily without regard to the frequency with which particular letters occurred in everyday use. Exceptionally, the symbol for E was a single dot, using the shortest symbol for the most common letter, anticipating a later more scientific approach to code compilation. This code is shown in Fig.2 as *First Alphabetical Code 1838*.

It had not been a simple step to proceed from a numerical code to an alphabetical code. In 1847, Vail published a booklet, *Description of the American Electro Magnetic Telegraph*, which described the Morse telegraph instruments and code used on the 1844 demonstration line between Washington and Baltimore, where Morse was Superintendent and Vail Assistant Superintendent.

Vail observed that: "*During the period of 13 years, many plans have been devised by the inventor to bring the telegraphic alphabet to its simplest form. The plan of using the common letters of the alphabet, twenty six in number, with twenty six wires, one wire for each letter, has received its due share of his time and thought. Other modes of using the common letters of the alphabet, with a single wire, have also been under his consideration.*

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Plans of using two, three, four, five and six wires to one registering machine have, in their turn, received proportionate study and deliberation. But these, and many other plans, after much care and many experiments, have been discarded; he being satisfied that they do not possess that essential element, simplicity, which belongs to his original first thought, and the one which he has adopted."

Success at Last

In 1844, after years of disappointment in trying to get government recognition of his invention, Morse was finally authorised to set up a full-scale demonstration line along the railroad between Washington and Baltimore. For this project the partnership produced yet another new code, a rearrangement of the 1838 code into a more sensible order based on the frequency of use of each letter in the English language.

An undated note by Morse shows what was done after the most frequently used letters were identified. Every letter was given a separate symbol, unlike the previous code which had the same symbol for phonetically similar letters (i.e., GJ; IY; and SZ). The symbols were weighted to determine their length, enabling the shortest signals to be allocated to the most commonly used letters and the longest to those letters used the least. A dot counted as 1; a dash was 2; a space between groups of dots 1; and a long dash (letter L) 4; while no letter was to exceed a weighted count of 5.

In the final code there was one unexplained exception to this approach. This was the letter J which Morse's notes show as - - - - counting as 5 and fitting in sensibly with the pattern of symbols used for the other letters. The final symbol adopted, however, was - - - - which broke the rules by counting as 6 and, by implication, defined J as the least used letter of the alphabet. (The letter count found the least used letters were Q - 500; J - 400; X - 400; and Z - 200).

For some reason, the rejected - - - - was used for ampersand (&), and it survives informally today in amateur radio as the signal ES with the same meaning. The 1844 code, which in time became known as American Morse, was the standard operating code on the telegraph landlines of the USA and Canada until the end of the Morse telegraph in North America in the 1960's. This code is shown in Figure 2 as *American Morse 1844*.

Lack of Interest in Europe

In 1845, Morse visited a number of European countries trying to interest their administrations in his telegraph. Concurrently Charles T. Fleischmann, an agent of the U.S. Patent Office travelling through Europe on official business, carried with him a complete telegraphic outfit which he brought to the notice of each government he visited. He reported on October 7: "*There is no doubt Morse's telegraph is the best of that description I have yet seen, but the difficulty of introducing it is in this circumstance, that every scientific man invents a similar thing*

and, without having the practical experience and practical arrangement which make Morse's so preferable, they will experiment a few miles' distance only, and no doubt it works; but, when they come to put it up at a great distance, then they will find that their experience is not sufficient, and must come back ultimately to Morse's plan. The Austrian Government is much occupied selecting out of many plans (of telegraphs) one for her railroads. I have offered Morse's and proposed experiments. I am determined to stay for some time, to give them a chance of making up their minds."

However, neither Morse nor Fleischmann had any success. Morse wrote to his daughter from London on October 9, 1845: "*I know not what to say of my telegraphic matters here yet. There is nothing decided upon and I have many obstacles to contend against, particularly the opposition of the proprietors of existing telegraphs; but that mine is the best system I have now no doubt. All that I have seen, while they are ingenious, are more complicated, more expensive, less efficient and easier deranged. It may take some time to establish the superiority of mine over the others, for there is the usual array of prejudice and interest against a system which throws others out of use."*

Having failed in his attempts to introduce the Morse telegraph in any European country, Morse sailed from Liverpool on November 19, 1845, to concentrate on the development and expansion of his invention in the United States.

	First Alphabetical Code 1838	American Morse 1844
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	---	--- -
&		- - -

Figure 2. Evolution of American Morse

First European Foothold

Two years later, in 1847, the Morse telegraph obtained its first European foothold, in Germany, through the efforts of three Americans

not authorised by Morse to represent him. The situation is explained in a letter sent by Morse to the Hon. William H. Stiles, Chargé d'Affaires of the United States at the Court of Austria:

Confidential
New York, May 12th, 1847

Sir,

I take the liberty to state that yesterday Mr Wm. Robinson, his stepson C. Robinson, and Mr Chapin all of this city sailed in the packet ship Northumberland for Liverpool. They have taken with them two of my Telegraphic instruments with a view of seeking their fortune with them in Europe. They have not gone under my sanction.

From several incidents recently related of the elder Robinson, who has charge of the expedition, the proprietors of the Telegraph in this country could not negotiate with him, not having confidence in his integrity. I write this therefore, in self defence, simply to apprise you in case they should visit Vienna, and of your being consulted on the subject, that Mr. Robinson goes to Europe with my instruments solely on his own responsibility, and not at all with the sanction of the Inventor. The two young men, I have no reason to believe, are other than worthy young men, particularly Mr. Chapin, and they are well versed in the whole management of the Telegraph.

Should the Austrian Government after all they have witnessed of my system, through my Agent Mr. Fleischmann, or in consequence of what these persons may do, be disposed to show any favor pecuniary or otherwise to the Inventor, while I should hope that these gentlemen may be amply compensated for their expense and

trouble, I should wish under the circumstances of the case, and indeed under any circumstances, that any acknowledgement to me, (if any should be offered), should be made through the honorable and accredited Representative of my country. —

I must say, in closing, that I have the gratification of seeing my Telegraphic system in complete operation over one thousand miles already; while over six thousand miles are in process of construction. The main Telegraphic line extending from Portland in Maine to New Orleans, over 1500 miles will probably be in operation by the 1st of next January.

I take this opportunity to thank you for your former kindnesses to my Agent Mr Fleischmann.

Believe me Sir, with the highest consideration.

Yr. Mo. Ob. Servt.

Saml. F.B. Morse.

Like Morse, two years previously, Robinson was unsuccessful in his efforts to introduce Morse's system in England and France, where other telegraphs were already in use. However, he had more success in Germany where, in 1848, the Hamburg-Cuxhaven optical telegraph was replaced by a wired circuit equipped with Morse instruments supplied by Robinson.

Proposing the Hamburg-Cuxhaven project in the *Hamburger Zeitung* of 30th June 1847, Robinson wrote: "The American system is without doubt the best one invented up to now. It is economical in cost and with sure results, and can be used day or night as

well as in any kind of weather.”

As the main purpose of the optical telegraph was to carry traffic for the Marine Dispatch Service, the latter argument was particularly relevant in the interest of providing an improved service for the then rapidly expanding steamship traffic.

instruments and code used on the 1844 line between Washington and Baltimore.

Gerke translated Vail's booklet into German, and it was published by Hoffmann and Campe in Hamburg in 1848. In it, he wrote: *"The translator of this document has the honour of having*

Who was Gerke?

Born in 1801, Friedrich Clemens Gerke, like Samuel F.B. Morse, was at first sight an unlikely candidate for a pioneering career in telegraphy - Morse, an artist; Gerke, a musician and poet.

Gerke's talents became evident when he was still at school, in Bad Rehburg, but his parents were unable to pay for his further education to develop them. A wealthy Hamburg merchant took him into his home with a promise of a liberal education but instead exploited him as a servant and a clerk.

He enlisted as a musician in the British Army in what was then the British Colony of Canada. He was again disappointed, this time with the life of the Army's "other ranks", and after three years bought his discharge. He returned to Hamburg in 1823 and until 1841 worked in various capacities, mainly as a musician and writer. In 1841 he was appointed Inspector of the Hamburg-Cuxhaven Optical Telegraph Company, the principal purpose of which was to supply shipping information between Hamburg and Cuxhaven.

When Robinson successfully introduced Morse's electro-mechanical telegraph system as a replacement for the optical telegraph, Gerke made a substantial contribution to the new installation, the first Morse line in Europe, including his modification of Morse's code to make it more suitable for German use. After the Hamburg Electro-Magnetic Telegraph Company was amalgamated into the telegraph administration of the North German Confederation, he became the first Inspector of the Hamburg Telegraphs, from 1869 to 1872. He died, in Hamburg, on 21st May 1888. His unsung memorial is his code which, with some small modification, eventually became the International Morse code that we know today.

Easier Code for German Use

Friedrich Clemens Gerke, originally Inspector of the optical line, took charge of the new electro-mechanical telegraph. His "handbook" for his new post was the previously mentioned booklet by Alfred Vail, which described the Morse telegraph

been called by the management of this soon-to-be-established Institute to be its Inspector and Technical Manager, because of his similar function with the optical telegraph for six years. He believes that he can predict that the Hamburg trade will benefit from this new arrangement, which will meet

every expectation, shame capricious opponents and doubters, and point out the needless shortcomings of the optical telegraph, of which he is fully aware from his many years of supervision of it."

Referring to Vail's explanation of how the code had evolved, he said: "*For our general use in German communication I have set up another easier system.... naturally with the same character elements....*"

For his code, Gerke used dots and dashes as in American Morse, but did not use the extended spaces which featured in Morse's characters. The long dash, for the letter L, was also eliminated, and the letter J was omitted from the alphabet. Within the alphabet there was now only one type of dash, equalling 3 dots in length, and within any character there was only one type of space, equalling 1 dot. The space between two characters equalled 3 dots, and the space between words or groups of figures equalled 6 dots. Twenty of the American Morse alphabetical characters were retained, although several of them had their meanings changed. For the numerals, Gerke retained the American characters, including the long dash for 0. His alphabetical code is set out in Figure 3. Numerals are discussed in Part 2 of this article.

Gerke's code, which he published in a book, *The Practical Telegrapher*, in 1851, set the pattern for European Morse, but as the telegraph spread to other German States, and to Austria, each State, apart from Prussia, devised its own variation

of the code. Gerke's concept of just two basic code elements was followed by each State, but with different combinations of those elements, thus necessitating manual translation from one code to another as messages crossed State boundaries.

Beginning of European Standardisation

On July 25, 1850, Austria, Bavaria, Prussia and Saxony signed what became known as the "Dresden Convention" to create the "Austro-German Telegraph Union". This was supplemented by three further conferences, Vienna 1851, Berlin 1853, and Munich 1855. During this period further countries joined the Union, namely Württemberg (1851), Hanover (1852), Netherlands (1852), Baden (1854), and Mecklenburg-Schwerin (1854).

The aim of the 1850 convention was to link the telegraph systems of the participating countries by the introduction of common legislation, an exchange of scientific and administrative information, and periodic meetings of the countries concerned.

The Vienna convention of October 1851 continued the process of eliminating barriers to international telegraphic communications. It stipulated that the international lines of the contracting nations should be directly connected to eliminate the need for telegrams to be physically handed across the frontier by operators of one country to operators of the other. Standard tariffs and accounting

	Gerke code 1848	Austro- German 1852	Austro- German 1858
A	--	--	--
Ä		-----	-----
B	-----	-----	-----
C	-----	-----	-----
CH	-----	-----	-----
D	---	---	---
E	-	-	-
É			-----
F	-----	-----	-----
G	-----	-----	-----
H	-----	-----	-----
I	--	--	--
J	Not used	-----	-----
K	-----	-----	-----
L	-----	-----	-----
M	-----	-----	-----
N	---	---	---
O	-----	-----	-----
Ö		-----	-----
P	-----	-----	-----
Q	-----	-----	-----
R	-----	-----	-----
S	---	---	---
T	-	-	-
U	---	---	---
Ü		-----	-----
V	-----	-----	-----
W	-----	-----	-----
X	-----	-----	-----
Y	-----	-----	-----
Z	-----	-----	-----

Figure 3. Development of European code to 1858.

systems were established, and the Morse telegraph, using a slightly amended version of Gerke's code, became the official system for international lines within the Union, effective July 1st, 1852. This amended code is shown in Fig.3 as *Austro-German 1852*.

In the 1852 code, the allocation of dots and dashes was defined in "classes". The alphabet was confined to classes 1 - 4, ie, all letters had between one and four dots or dashes. Numerals were class 5, ie, with five dots or dashes, and punctuation symbols were in class 6 with six dots or dashes. With only two elements (ie, a dot and a dash) for a given class, the number of possible variations for the first four classes is $2^1 + 2^2 + 2^3 + 2^4 = 30$. These were all allocated in the 1852 code and accordingly the letters Á or Å, É and Ñ, added later, had to be placed in class 5, comprising five dots or dashes.

The fifth conference of the Austro-German Telegraph Union, held in Stuttgart in 1857, codified and revised the agreements of the previous conferences, effective April 1st, 1858. This included the creation of formal "Service Instructions", containing the rules relating to the techniques of the international telegraph service, including the code to be used, as previously agreed. A comparison of the changes to the code up to 1858 is shown in Figure 3.

Meanwhile, several Western European states followed the lead of the Central European states, concluding bilateral treaties for international

telegraphic communications. In 1855, these states, namely Belgium, France, Sardinia, Spain and Switzerland created the "West European Telegraph Union" with provisions almost identical to those adopted by the Austro-German Telegraph Union. As both unions expanded they established links with each other while still providing telegraphic services under different sets of regulations.

European Recognition of Morse's Invention

The revised code increasingly being used across the continent, although inspired by Morse, could basically be attributed to Gerke. The electro-magnetic telegraph system used, however, *was* Morse's invention brought to Europe in 1847 without the inventor's permission by William Robinson and his colleagues. Despite Morse's 1847 letter to the chargé d'affaires of the United States at the Court of Austria, quoted above, the Morse system continued to be installed in European countries without recognition of his right to royalties for use of his invention.

In 1858, Morse published a memorial addressed directly to the governments concerned, asking for a personal gratuity in return for the savings resulting from the use of his invention in Europe. In response, representatives of Austria, Belgium, France, the Netherlands, the Papal States, Piedmont, Russia, Sweden, Turkey, and Tuscany, met in Paris to discuss his request.

Premier Waleski of France

pointed out that the principles of the telegraph were not Morse's, but the system commonly used across Europe was his. It was one of the most useful inventions of its time, and of great financial benefit to the governments concerned. In recognition of this, it was agreed that a sum of 400,000 francs, in four annual payments, be awarded to Morse, apportioned by the payment of 311.55 francs for every telegraph instrument in each country. France paid the largest sum, having 462 instruments, while Tuscany paid the smallest, having only 14 instruments. Great Britain was not party to this agreement as its telegraphs were not government owned at that time. The value of the award was about US\$60,000, and after disbursements to his partners, and to Alfred Vail's widow, Morse's share was around \$19,000.

Disappointment

Morse was somewhat disappointed at the size of the award, but accepted it with dignity. His business agent, Amos Kendall, was more forthright. In a letter to Morse dated May 18, 1858, he wrote: "*I know not how to express my contempt of the meanness of the European Governments in the award they propose to make to you as the inventor of the Telegraph. I had set the sum at half a million dollars as the least that they*

could feel to be at all compatible with their dignity. I hope you will acknowledge it more as a tribute to the merits of your invention than as an adequate reward for it."

In a further letter, of June 5, replying to one from Morse which must have been more moderate in reference to the award, Kendall wrote: "*I have to say that it is only a tribute to the superiority of your invention that the European grant can, in my opinion, be considered either 'generous' or 'magnanimous'. As an indemnity it is niggardly and mean.*"

Further recognition was given to Morse in the form of high honours awarded him by a number of European countries. These included the French Legion of Honour; The Scientific Gold Medal of Prussia; The Scientific Gold Medal of Austria; and similar awards from Spain, Portugal, Italy, Württemberg, Turkey, and Denmark. He was also made a member of the Royal Academy of Sciences of Sweden, and of the Institute of France.

He had now received the recognition he sought. His telegraph, using modified Gerke code, was in widespread use across Europe. Eight years later, that code would be formally adopted by the newly created International Telegraph Union, and would eventually be used around the world for international telegraphic communication. **MM**

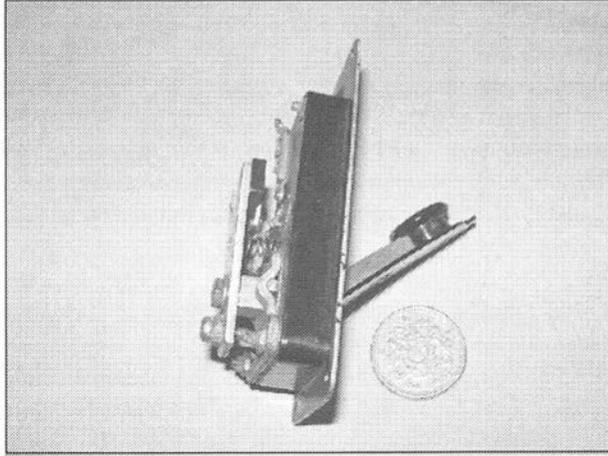
Copyright © 2002 Tony Smith G4FAI

(Part 2 of this article, in the next issue of MM, describes the creation of the ITU in 1865, and its adoption of European Morse; the gradual spread of the code round the world; the impact of radiotelegraphy; the evolution of signals for numerals and punctuation; later minor amendments to the code; changes in spacing; and more.)

Info Please!

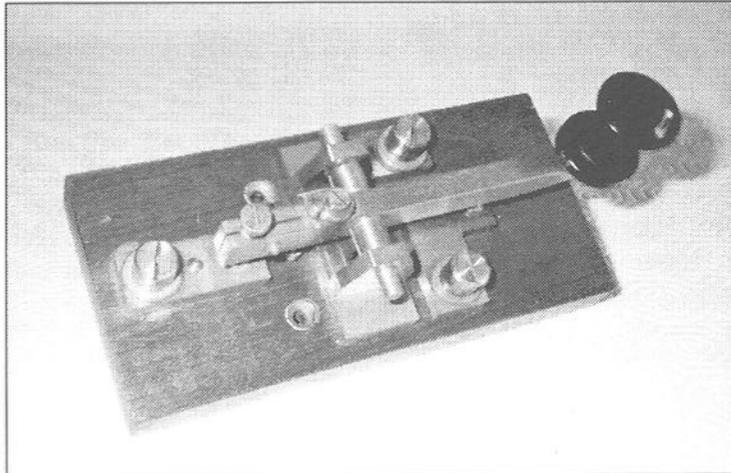
Readers are invited to contribute any additional information and stories, no matter how minor, to the Editor, *Morsum Magnificat*. There have been thousands of designs of keys & telegraphy instruments. Information will be lost unless it is compiled in one place and shared with other readers.

Photo/Collection: George Eddowes, G3NOH



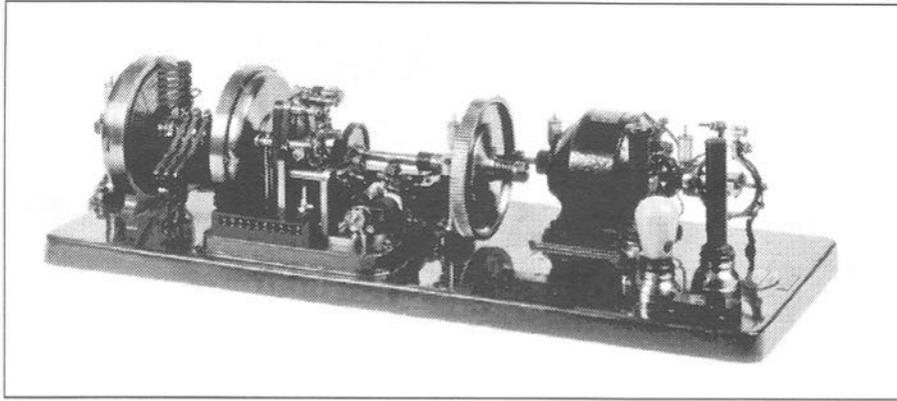
This is a key which seems to have been mounted on a front panel and can be folded away when not in use. Can anyone identify the equipment from which it has come.

Photo/Collection: Jack Barker



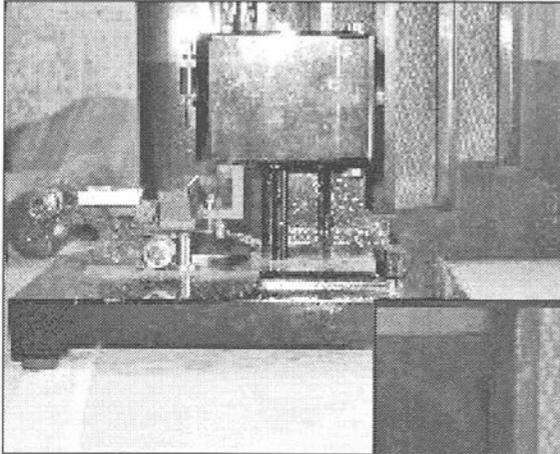
This unmarked GPO look-a-like key has similar base dimensions to the standard GPO keys but all the brasswork is much thinner. The pivot block is in two parts and there is no pivot pin holding screw on top of the lever. The contacts are quite large, the terminals are unusual and the knob appears to be original. The whole key is of excellent quality. Could this be a Webbs Radio 28 shilling special as shown on the cover of MM67? Any info please.

Photo/Collection: Fons Vanden Berghen, Halle, Belgium

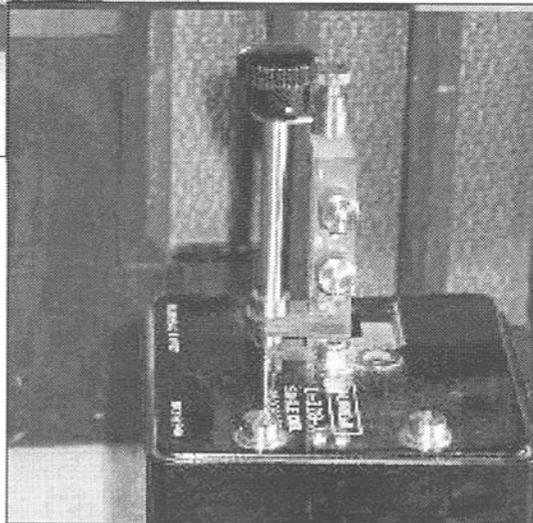


Can any reader give more about the central site stock ticker equipment from this picture. It is an Automatic Ticker Transmitter 10-B made by the Ford Inst Mfr Inc. Also info on this company is welcome! Fons Vanden Berghen, Halle-Belgium: see address in "Readers Ads"

Photo/Collection: John Clappstone



This instrument is marked 'Muirhead Recorder Type D-328-A. Has any reader any info please on its age, use etc. There appear to some parts missing. Can anyone identify these please.



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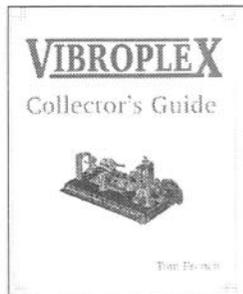
14.20 UK - 14.70 Europe - 17.00 Rest of World



American Telegraphy & Encyclopedia of the Telegraph by William Maver Jr.

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AWA Review Vol. 8, 1993 by The Antique Wireless Association Includes 45 page paper by Louis Meulstee on "Unusual Military Morse Keys" (delivery Jan. 2002)	£9.50	£10.50	£12.00
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Western Electric 1A Telegraph Key by Ted Phelps, W8TP

With regard to the Western Electric key in 'Info Please' on Page 32 of MM84. I'm the proud owner of one of those brass beauties, but without the "OW" stamped on it. Its full name is "1A Telegraph Key".

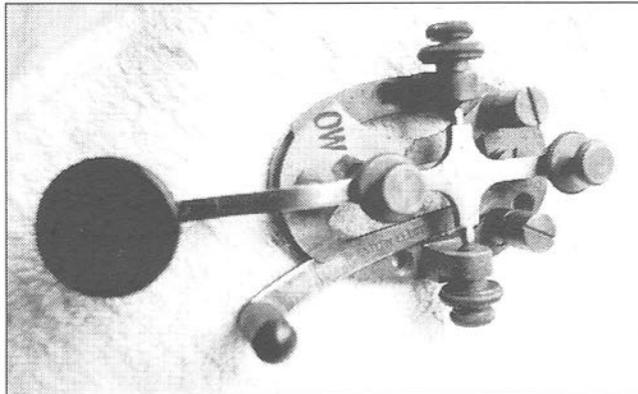
I was a W.E. engineer from April, 1946 to September, 1984 and worked two tours in the Chicago plant where those keys were hand-crafted.

Naturally, I heard about them and obtained one before I left, together with a well-worn microfilm of the manufacturing drawing used to make them. The drawing number is A-111232 and was first issued on 14th May 1915. Issue 15 is dated 9th March 1948.

NOTE:
NO MORE THAN SUFFICIENT END SHAKE TO INSURE FREE MOVEMENT SHALL BE LEFT AT PIVOT BEARINGS. THIS FREEDOM OF MOVEMENT SHALL BE SUCH THAT THE FRONT END OF THE LEVER WILL FALL BY ITS OWN WEIGHT ON THE CONTACTS WHEN THE COMPRESSION OF THE SPRING IS REMOVED.
THE CONTACT POINTS MUST NOT BE MORE THAN .210" OUT OF ALIGNMENT IN ANY DIRECTION WITHIN THE PLANE OF CONTACT.
PARTS GIVEN A GRAIN FINISH SHALL BE FINISHED IN ASSEMBLY AS SPECIFIED ON PIECE PART DRAWINGS.
THE SET AND TENSION OF THE NICKEL SILVER SPRING FOR CONTACT WITH THE CIRCUIT CLOSING LEVER SHALL BE SUCH THAT IT WILL HAVE SUFFICIENT FELLOW TO PREVENT BREAKING OF THE CONTACT BY FORCING THE LEVER DOWN ON THE BASE.
THE CIRCUIT CLOSING LEVER SHALL BE FITTED TO THE KEY WITH SUFFICIENT TENSION TO GUARANTEE POSITIVE CONTACT WITH THE NICKEL SILVER SPRING WHEN DRAWN INTO PLACE AND NOT SHAKE OR MOVE ABOUT WHEN THE KEY IS IN USE.
THE FACES OF THE CONTACT POINTS SHALL BE FLAT: THAT IN THE STUD SHALL BE PARALLEL WITH THE BASE AND THAT IN THE LEVER SHALL BE PARALLEL WITH THE UNDERSIDE OF THE LEVER.
LEVER P-95826 SHALL BE BENT IN ASSEMBLY SO THAT THE LOWER SIDE OF THE LEVER WHEN IN ITS UNOPERATED POSITION, SHALL BE MAX. .05" AND MIN. .010" FROM THE TOP FACE OF THE BASE.

Figure 2. Notes

Photo/Collection: Henri Heraud



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The drawing shown in Figure 1 is an extract from the original. Comprehensive notes are on the original and are shown separately in Figure 2.

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Your Letters

Type F (Bathtub) Key

Regarding the Type F key in MM85, page 37, this was used in several different aircraft including an open cockpit type. I have used the key mainly with R1082/T1083 sets, the predecessors to the T1154/R1155 shown in the photo in MM85 on Ansons, De Havilland Rapides, Hudsons, Dakotas etc.

Even super aircraft like the American Hudsons had the antique R1082/T1083 (with all coils) installed. I recall in 1940/41, flying with 206 Squadron in new Hudsons fresh from the USA, the R1082/T1083 equipment was installed. Also in 1941/42 with 200 Squadron in West Africa, again the old R1082/T1083 in Hudsons.

It is ironic that as I write this, on Sunday 18th May, it is 61 years to the day that I sent an SOS on one of these Type F keys. But that is another story.

*Flt Lt V. J. Reynolds (Ret'd),
G3COY/G4ATC
Stoke-on-Trent, UK*

I have had a word with an ex-Wireless Operator/Air Gunner who was shot down in 1944 and he tells me that the spring was definitely used to lock the key and send a constant signal for bearing purposes. He tells me that it was in 'Orders' to do so. He did it as

they were coming down, but said that it wouldn't have done them any good as they were too low !

*Tom Quinn, MOCSD
Middlesborough, UK*

A comment on Henri Jacob's letter about the RAF Morse key; although no doubt you will be flooded with replies from just about every reader who was a wireless op. around the 1930s/1940s!

So far as I can recall from the days when I did my signals training at Compton Bassett in 1941, we were taught to use both the Type F aircraft key and the Type D for ground station point-to-point communication.

As is well illustrated in the last issue the Type F was rear-hinged so that when it was open the lower casing did represent a "bathtub" and it was certainly called that at that time and is a common description even today.

I have never heard it called a "boatkey". The spring loading was very heavy and designed to enable the operator to key under bumpy flying conditions. As is suggested, the front spring was there to hold the key down in an emergency whilst the full enclosure gave protection against sparking at the contacts which could ignite fuel vapours. The opening arrangement would enable the key

contacts to be cleaned.

I have spoken to a friend of mine, George Holtum, GW4SLZ, a one-time aircrew operator and a pre-war regular, trained at Cranwell and Yatesbury, who tells me that the Type F key was also used with the earlier aircraft transmitter/receiver unit, the R1082/T1083, which was put into service in the late 1930s and therefore in regular use until the advent of the T1154/R1155.

*E.F.Jones, G3EUE
West Sussex, UK*

These keys were standard types for RAF Mobile Signal Units, in one of which I served from March 1944 until November 1945. All our operators considered them to be inferior to the standard ground station key, but as time went on they became quite acceptable.

Space on the small Bedford vans was at a premium and large keys would have been a liability. The Clip enabling the back contact to be switched on was never used as the 1154 transmitters were in another van with two wireless mechanics who did the tuning and maintenance of the batteries and motor generators etc.

When I was a D/F operator at a Sunderland and Catalina station some of the air operators used the clip to make their transmitter emit the long 'dash' when a bearing was requested. In my two years as a D/F operator I never had to deal with the last transmissions of an aircraft prior to its crashing, but there is no doubt the clip would be used if needed.

The bathtub design was

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probably created to cover the metal parts from being touched by loose wiring, spilt tea etc. Petrol would have entered eventually but Bomber Command personnel would probably have much to say about it.

It would be interesting to know something about the keys used on Catalinas whose radio gear was mostly of Collins manufacture.

An Atlantic Clipper once called us for a bearing and its operator was using a Vibroplex bug key. They are fitted with a shorting switch and no cover! (It was the only time that we were paid for bearings - in the form of 200 Camel cigarettes!)

*John Worthington, GW3COI
Abersoch, Wales*

Regarding MM85, Page 37, "Boat key" or "Bathtub key": I graduated from No.8 AOS at Ancienne Lorette PQ as a NAV/W and in training we used identical Marconi T1154 & R1155 equipment as shown in the top photograph on that page.

All radio traffic was by hand keying a "Bathtub". We were expressly forbidden to tune up until the aircraft engines were running and charging the batteries. Once this happened we would clamp the spring clip over the shoulder around the knob base to carry out our transmitter adjustments. It was difficult to send on the Bathtub with a gloved fist in -30° with the aircraft bucking around in turbulence.

I still have my old "Bathtub" key "salvaged" after training some 60 years ago. I've replaced the perished

rubber seal (under the knob) with chamois leather.

One feature that intrigues me still is that both top contact screws incorporate internal springs that create a really tight, non-vibratory clamp on wiring.

*Neville Copeland, ZL2AKV
Upper Hutt, New Zealand*

SAQ Grimeton 17.2kHz

Many thanks for your timely reminders about CW events across the world, these are always very welcome and bring to our attention many things that would otherwise be missed.

With reference to the transmission from SAQ on the 29th of June, very few of us have equipment capable of receiving at this frequency has any reader made a recording of what I am sure must be a unique CW sound?

*Dave Lawrence, MM0BPS
Ayr, UK
d.f.l@btinternet.com*

SAQ and KPH Reception

I tried to listen to the special transmission of SAQ, Grimeton and KPH, Point Reeves.

About SAQ, Grimeton the propagation here was horrible. I could hear what I suspect to be the carrier frequency but no results at all.

About KPH, I think I heard it, but reception was poor due to bad atmospheric conditions. It was the first time since the 25th of May that we had

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rain and the temperature was about 20-22°C early in the morning and about 30-35°C in the afternoon. But I suspect that through the QRM, I did hear their call sign on 12808,5 kHz. Anyway, for both stations I sent a signal report.

In September last year, I was in San Francisco and visited the Point Reeves transmitters. I could not get in because it was closed but still very interesting.

*Robert A.Loup, HB9IJG
Morges, Switzerland
horas@bluewin.ch*

Key Adjusters

Many straight keys, e.g. the standard GPO key, have one adjustment for the gap. Altering the gap does not change the pressure that is needed to close the key. Other keys, e.g. Marconi 365EZ, have two gap adjusters; a back one which works in the same way as the GPO key and a front one which also changes the pressure needed to close the key when the gap is changed.

Why are two adjusters provided? The cost of the key must be increased by fitting the second adjuster. I wonder if this is a hang over from the original Marconi 365 key which had a complex system of phased contacts. It could have been cheaper to leave the second adjuster in place rather than re-engineer the key, possibly other makers simply copied this arrangement.

Incidentally is there a recommended way to set up a key which has two sets of gap adjusters?

*Gerald Stancey, G3MCK
Rutland, UK*

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GBR Final Transmission

Does anyone have a recording of the last transmission of GBR that I could arrange to copy please. Please contact Cyril Markie, 172 Daventry Road, Coventry CV3 5HN, UK. Phone +44 (0) 2476-504126.

MM85 Info Please Italian Key

With reference to the illustration on page 36 of MM85 of what is thought to be an Italian key. It so happens that I have one which appears to be identical.

It was sent to me by an Italian friend, I2BFF. Unfortunately there is no provenance as to origin but it certainly looks pre-war.

The lead is brown cotton covered, twin lead to a two pin plug, which is a black plastic moulding with Twin brass split pins.

The key is virtually all aluminium with four horizontal holes along the arm and the knob is black plastic with a skirt.

The base is lightweight hollow brown Bakelite.

Markings: A figure 6, underlined, followed by figures '250' and on the opposite side, a triangular badge with a square cross insert.

With the key came a warning from its previous owner: "Not forced Aluminium screw. The old oxide is very strong!!"

I2BFF is a keen Morse key collector so it is quite possible that it is from that country. I will try and find out.

*E. F. Jones, G3EUE
West Sussex, UK*

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Interested in Stock-Tickers

Do you own an old stock ticker? Are you interested in old stock tickers? I am compiling a list of ticker owners so that we may swap information, history, production change information, parts and just general knowledge and interest.

Any model that prints on paper tape is applicable. Send an email to eugene_hertz@yahoo.com to join the list. Or drop a letter to Eugene Hertz, 23 Summit Terrace, Dobbs Ferry, NY 10522, USA.

Trains, Times & Telegraphs

Regarding the article in MM85, page 15, "Trains Times & Telegraphs I", Figure 1, right-hand picture of the clock face lettering. When I first entered Wellington Telegraph Office in 1946 (after war service in the RNZAF), this same clock code system was still in use on New Zealand Morse circuits.

The first line (preamble) from the distant station (via a sounder) was transcribed on the message form in pencil! It would be something like this:
OT BGR DARGAVILLE 16 or OT (ordinary telegram) 2.36 PM DARGAVILLE

(the distant town) and 16 words in the address, text and signature.

Any figures in the message would be confirmed by the receiving operator before receiving the next message. Urgents would have 'DOT' following the lodging station and 16/1 in the word count. Money orders would be 'MOT' or 'UMOT' (transcribed with violet ink pencil on a special form).

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Savings messages would be 'SBT' or 'USBT' and the reply would be 'RSBT' or 'URSBT'.

Each telegraphist had to be fluent in deciphering the lettered lodgement time to transcribe on the form to be delivered. This cumbersome time coding system was dispensed with when most Morse lines were closed down in favour of machine-printing.

The preamble was rationalised to:
H246 16 DARGAVILLE 2.36PM,
placing the word count and any instructions after the channel number. From memory, this happened in the mid 1950s.

*Neville Copeland, ZL2AKV
Upper Hutt, New Zealand*

MM 84 "H. White" Key

With regard to the request for information about the 'H. White' key on page 32 of MM84 I can strongly recommend the interesting booklet entitled "A history of the GPO Mark 1,2 and 3" on by Dennis Goacher. It is full of technical information on this key design and others in use by the GPO. A list of manufacturers is also included. It is available from the MM Bookshelf.

*Fons Vanden Berghen
Halle, Belgium*

599 in Malta

Recently I was in holiday in Malta without any radio equipment but still received CW without my rig! The attached photo explains how.

*Rolf von Allmen, HB9DGV
Ostermundigen, Switzerland*



Inappropriate Telephone Jingle

Just a note about telephone jingles. I remember one provider's network transmitting 'CONNECTING PEOPLE' in CW over its phones, although I've not heard it for a while.

*Chris Mortimer, G0WBC
Leicester, UK*

THE MORSE ENTHUSIASTS GROUP SCOTLAND



MEGS was formed in 1991 to encourage the use of Morse, especially by newcomers. Regular skeds are held using our callsign 'GMORSE' each Monday and Thursday from 7 until 9 p.m. (local time) around 3.530MHz. Among other services, we offer Morse practice tapes free of charge, other than postage. This offer is now also available to *MM* readers. Membership is open worldwide, the 'Scotland' in our title simply shows place of origin. Lifetime membership £1.00.
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by William G. Pierpont, NØHF

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I HAVE much telegraph surplus including NOS 1950's US Navy Flameproofs - CMI & CJB 26003A - \$65 including USA mail; slightly higher elsewhere. Also includes copy of key's 11page milspec. Dr. Joe Jacobs, 5 Yorktown Place, Northport, NY - 11768, U.S.A. Phone +1-631-261-1576; Fax +1-754-4616. E-mail: joekey@aol.com

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TEXTBOOK WANTED: Handbook of Technical Instruction for Wireless Telegraphists, seventh edition (1942 - 44) edition by Dowsett and Williams (Iliffe). A good price is offered, plus postage costs. David Smith, ZL2BBB,

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FASZINATION MORSETASTEN - German Telegraph Keys Collector's Guide, 180 p., 400 photos & diagrams, 250 key designs from more than 100 manufacturers in German speaking countries. •25.00 plus •4.10 postage and packing. Greg Ulsamer, Logumer Str. 66, D-26723 Emden, Germany. E-mail: dl1bfe@emsnet.de"

TELEGRAMS FOR SALE from 1901 to 1955. A number of them are with advertisements and some on commemorative forms. Ranjit Singh, AN-18-c Shalimar Bagh, Delhi-110088, India. E-mail: singh_ranjit70@hotmail.com
www.indiatelecards.net

WANTED: Early paddles such as the Nikey, Autronic, Ham-key HK1 & HK2. Ray Bullock, 40 Little Harlescott Lane, Shrewsbury SY1 3PY, England. Tel: +44 (0) 1743 245896.

WANTED TO BUY: GPO Type 56 key and Marconi side-lever Morse key with brass hardware on a wooden base. Letters to: D. Johnson, W5FZ, 15514 Ensenada Drive, Houston, TX 77083-5008, USA. Or Email: w5fz@arrl.net

I AM A KEY COLLECTOR with over 300 different keys from 20 countries and have 50 keys available for swapping. Write to Henri Heraud, F6AOU 9 Avenue de Bellevue, 91130 RIS ORANGIS, FRANCE.

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WANTED: Back issues of *Morsum Magnificat*. Volumes 1 thru 23, 25, 27, 28 and 30 are needed. Please contact Dennis P. Skea, KC2CCZ, 25 Argent Drive, Poughkeepsie, New York 12603, USA. +1 (845) 298 - 0951

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WANTED TO BUY: Telegraphic Code Books, as used to reduce the costs of telegrams by replacing common phrases with codewords. Would be interested in both originals or photocopies. I am a hobbyist in Cryptography and am fascinated in different ways data is and has been represented for different purposes (e.g. speed, economy, confidentiality etc.) Also interested in related items. Letters to Mark Darling, 132 Knowlands, Highworth, SN6 7NE, United Kingdom or e-mail: darling@patrol.i-way.co.uk

EXCHANGE: I have MM magazines, issues 36-80 inc(45mags)to exchange for a Vibroplex double-paddle. Can collect/deliver in UK. Phone Keith +44 (0)7946-663109.

FOR SALE: *Morsum Magnificat* nos 6, 9-11, 13-54, 56, 58, 60-76. 65 copies £125 o.n.o. including postage and packing. Geoff Newland, 32 The Grove, Winscombe, North Somerset BS25 1JH. Telephone (mobile) 07802 786564. E-mail: MM@GeoffNewland.co.uk

FOR SALE: MM issues 41 - 83 complete as new, Offers for the lot. Heathkit Electronic Keyer Model HD 1410 unmarked with manual, offers, plus carriage. E. H. Trowell G2HKU, 'Hamlyn', Saxon Avenue, Minster, Sheerness, Kent, ME12 2RP, UK. Telephone 01795 873100.

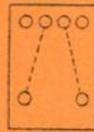
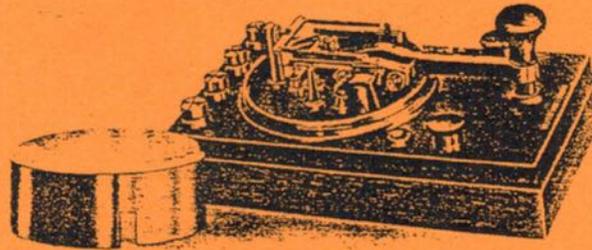
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BERNARD'S Method of learning the Morse Code.

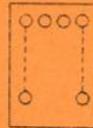
E	● Englishmen	R	● ■■ ● Rowlocks
I	●● Invariably	W	● ■■ ■■ When
S	●●● Support	L	● ■■ ●● Loose
H	●●●● High	P	● ■■ ■■ ● Play
A	● ■■ Authorities	J	● ■■ ■■ ■■ Jangling
U	●● ■■ Unless	F	●● ● ■■ ● Frictions
V	●●● ■■ Vindictive.	G	■■ ■■ ● Galloping
T	■■ The	Z	■■ ■■ ●● Zig-zag
M	■■ ■■ Managing	K	■■ ● ■■ Knights
O	■■ ■■ ■■ Owners	X	■■ ●● ■■ Xpeditely
N	■■ ● Never	C	■■ ● ■■ ● Capture
D	■■ ●● Destroy	Y	■■ ● ■■ ■■ Your
B	■■ ●●● Bills	Q	■■ ■■ ● ■■ Queen
1	● ■■ ■■ ■■	6	■■ ●● ●●
2	●● ■■ ■■ ■■	7	■■ ■■ ●● ●●
3	●●● ■■ ■■ ■■	8	■■ ■■ ■■ ■■
4	●●●● ■■ ■■ ■■	9	■■ ■■ ■■ ■■
5	●●●●● ■■ ■■ ■■	0	■■ ■■ ■■ ■■

Bernard's Method of Learning Morse Code (Wyn Davies)

TELEGRAPH KEYS—continued.



LEVER UP



LEVER DOWN

A 1230.

<p>Pattern No.</p> <p>A 1230</p>	<p>Reversing Key. Post Office latest pattern. Similar in function to A 1227, but the contacts are differently arranged, two being fixed to subsidiary steel levers pivoted on—but insulated from—the trunnions of the key. The contacts always short-circuit in passing from the upper to the lower position and <i>vice versa</i>, and cannot be arranged to break circuit. Can be used as either A or B key</p> <p>4½ in. x 8½ in. x 3¼ in. 3½ lb.</p>	<p>Code Word.</p> <p>Price.</p> <p>5 5 0</p>
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