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Flying the flag for Morse

Morsum Magnificat

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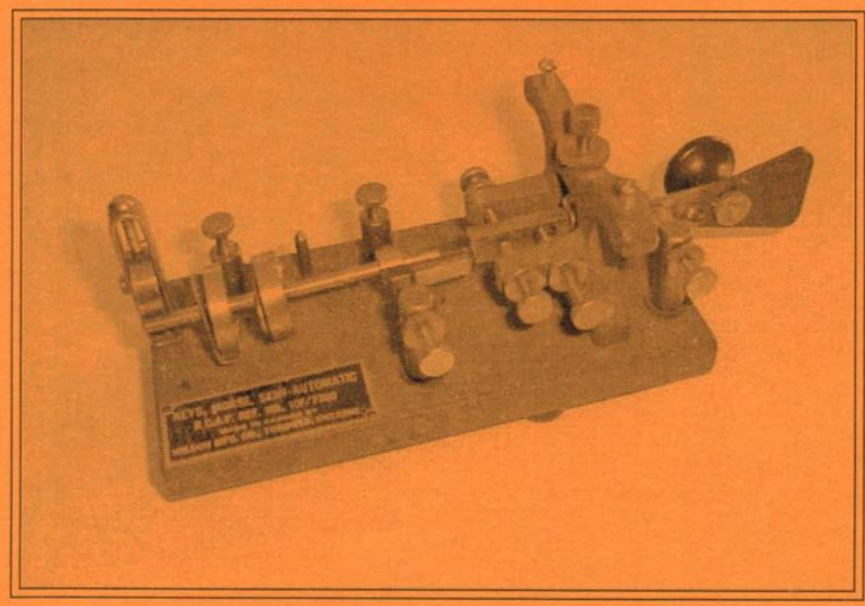
The Morse Magazine



Wilson Bug Key

The International Journal of Morse Telegraphy

Flying the flag for Morse

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MORSUM MAGNIFICAT was first published as a quarterly magazine in Holland, in 1983, by the late Rinus Hellemons PA0BFN. It has been produced four, then six times a year in Britain since 1986, and up to January 1999 was published and edited by Tony Smith, G4FAI and Geoff Arnold, G3GSR. It aims to provide international coverage of all aspects of Morse telegraphy, past present and future. MORSUM MAGNIFICAT is for all Morse enthusiasts, amateur or professional, active or retired. It brings together material which would otherwise be lost to posterity, providing an invaluable source of interest, reference and record relating to the traditions and practice of Morse.

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This is printed on the top line of the address label.
Also, we shall jog your memory with a renewal reminder included with that final issue.

MM Back Issues

Issues Nos. **34,35** and **38–79** available from the 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

1940 bug key made by Wilson of Toronto for the Royal Canadian Air Force (RCAF). This key can be turned over for use by a left-handed operator.

Photo/Collection: John Francis, G3LWI

Comment

Included in this issue is Part 1 of a two part article on The Omnigraph by David Pennes. This must be the definitive work on The Omnigraph and every serious collector will want this article on their reference book shelf.

MM is helping to promote William G, Pierpont's book, The Art and Skill of Radio Telegraphy. This is a major work on learning and using Morse and Bill Pierpont makes it available free on a number of web sites. It is now available in book form and sold on a not-for-profit basis by the Radio Amateur Education Society in Canada (see page 41).

Zyg Nilski, G3OKD

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Adverts

News

Godalming Ruled the Air Waves Titanic Weekend

Godalming, Surrey, ruled the world's air waves on Saturday 13th and Sunday 14th April when 2685 radio amateurs in over 100 countries used Morse to work GB9ØMGY set up to honour the memory of local hero, Jack Phillips, Chief Wireless Telegraphist on the Titanic which sank on her maiden voyage 90 years ago with the loss of 1500 lives. MGY was the Titanic's callsign.

The liner stayed afloat for 2 hours and 40 minutes after striking an iceberg. Jack stayed at his post sending out distress messages until losing his life when the ship went down. Answering his calls the Carpathia saved over 700 lives.

The special radio station was operated by 20 local members of the Titanic Wireless Commemorative Group who were on the air from 10.30 am on Saturday until 5.47 GMT on Monday 15th April precisely 90 years after the last signal was received.

"We believed that to exchange greetings with radio stations worldwide, using Morse like Jack would be a fitting tribute to his heroism, but the results exceeded our hopes by far", said Brian Grist, Chairman of the Group.

The radio link-up was launched on the evening of Friday 12th April by Broadcasting Consultant, Ralph Barrett, who gave a talk on the early use of radio to summon help and played taped interviews with Titanic survivors.

The radio station was run in co-operation with Godalming Museum where an exhibition on the life and times of Jack Phillips continues until Saturday 25th May. Included is a display of historic Marconi equipment.

For further information please contact the Titanic Wireless Commemorative Group: Michael Shortland, GØEFO: Tel: +44(0)1483 574996; msa-consult@dial.pipex.com

Or Godalming Museum: Derek Watson, Publicity Officer: Tel (home) +44(0)1483414673

Museum: Tel +44(0)1483426510; Email: museum@godalming.ndo.co.uk

New Morse Teaching Program

Dr Gary Bold, ZL1AN has recently released his new Morse teaching computer program for Windows. It's simplicity itself and can downloaded from www.nzart.org.nz

(Information: David Searle, GM8WNY/ ZL3)

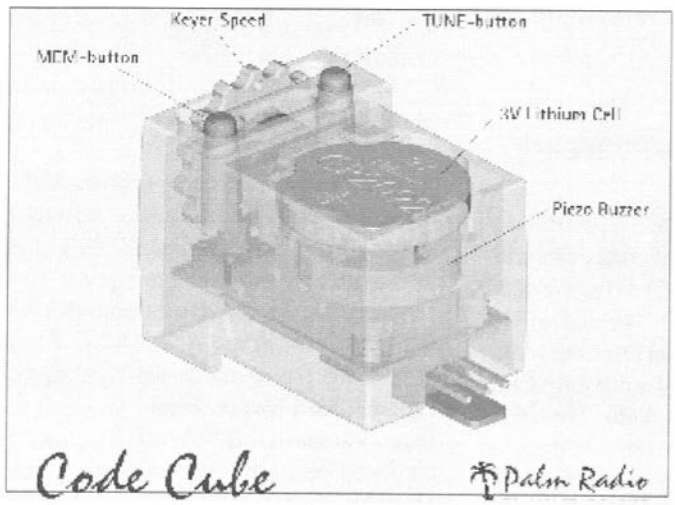
Code Cube Announced

Palm Radio Germany have produced the 'Code Cube', a full-featured electronic memory keyer that plugs into any Palm Mini Paddle with no external wiring needed. It measures a mere 25 x 25 x 34 mm and for those who prefer a different paddle, there will be a stand-alone version of the 'Code Cube' with a black aluminum housing. The 'Code Cube' utilizes the popular Jackson Harbor Press PK3 chip. It is powered by the readily available, long lasting (200 mAh) CR2032 3V Lithium Cell which is included.

The 'Code Cube' keying speed is adjustable from 5 to 39 wpm via a handy thumbwheel. The preferred speed range can be selected with a trim pot on the bottom of the PCB. There is also an integrated sidetone oscillator which drives a built-in piezo buzzer for code practicing and programming, as well as side-tone if your receiver doesn't have it. The tone frequency can be adjusted from 500 Hz to about 7KHz, covering the resonant frequency of the piezo buzzer of about 4 KHz. SMD parts are used to realize this miniature keyer.

The 'Code Cube' has two 50-plus character memories making it usable for most contest exchanges. It also features storage of the station callsign and automatic CQ. The unit will be available in black or grey color options for the plastic parts: buttons, wheel, and housing to match either your paddles or rig.

For more information visit the Palm Radio web pages at http://www.palm-radio.de



RSGB Morse Test Service 16th Anniversary Weekend

County Morse test teams will again be on the air during the 16th anniversary weekend of the 11th & 12th of May 2002. For ease of identification, all stations will use a special event GBØ prefix, followed by the county code suffix; e.g. the Isle of Wight will use the callsign GBØIOW and London GBØLDN. The Chief Morse Examiner will use GBØCW and the Deputy Chief Morse Examiner GBØMTS.

There will be a minimum of 27

stations active and a Morse Test 16th anniversary certificate will be available to any amateur who makes contact with at least 10 of the GB stations. The cost of the certificate is £2.50 (cheque or postal order made out to RSGB), $5 or 6 IRCs. Applications should be sent to the Chief Morse Examiner, David Waterworth, G4HNF, 116 Reading Road, Woodley, Reading Berks. RGS JAD. QSL cards are not required to claim the award, which is also available to listeners.

Activity will be concentrated in the 80 and 40 metre bands and in order to encourage newcomers to apply for the award each team will spend some time calling slowly in the Novice CW section of the 80 metre band, above 3560 KHz. The event is not a contest and examiners will be happy to reply at any preferred calling speed. There are no restrictions on the type of Morse key used, all are welcome to call in and enjoy the friendship.

(David Waterworth G4HNF, RSGB Chief Morse Examiner)

GACW 25th Anniversary

Alberto U. Silva (LU1DZ), Co-ordinator of GACW, CW Group of Argentina with about 600 members will be using a special callsign – AY1DZ until the end of the year. This is part of the celebrations of the 25th anniversary of the formation of the Group. Celebration include "Amateur Radio - A Safe Way for our Children" a programme which involves amateur radio stations of Argentina's high schools.

Alberto will be uploading his log every week into eQSLcc via the GACW web site at http://www.geocities.com/gacwar/

If you need a paper QSL, please send one IRC to: AY1DZ, Obligado 1175, 1846 – Adrogue, Buenos Aires, ARGENTINA

There are some other GACW members using special prefixes too for the "Amateur Radio, a Safe Way for our Children" including Radio Club Ushuaia AY8XW (LU8XW) located in the southern-most city in the world at Tierra del Fuego.

(Information: Alberto U. Silva, GACW Co-ordinator)

500 kHz Log from NMC

Eric Simmons, KB6YNO/1, is currently stationed with the U.S. Coast Guard in South Portland, Maine, U.S.A. and was one of two operators that sent the final broadcast on 500 kHz from CAMSPAC (Communications Area Master Station Pacific) in Point Reyes, California, back on July 31st, 1993.

He recently came across copies of the final log that was kept for this event whilst reorganizing his personal files and has scanned them onto a computer.

More information on the original event is available from the CAMSPAC web site at http://www.uscg.mil/pacarea/camspac/unit/history.html.

Eric Simmons, KB6YNO/1, e-mail: kb6yno@maine.rr.com website: http://www.qsl.net/kb6yno

DEPARTMENT OF TRANSPORTATION
U. S. COAST GUARD
CG-3514A (Rev. 3-67)

LOG 05
PSN 01

RADIO LOG

UNIT: COGARD CAMSPAC SAN FRANCISCO CA/NMC
GUARDING: 500 KHZ
DATE: 31 JUL 93

ENTRIES	FREQUENCY	TIME
RM3 P.J. DAHMS ON WATCH, PREV SIGN OFF NOTED, EQP NML.	ZUB	2236Z
NO SIGS		40
BEGIN SILENT PERIOD	500	45
END SILENT PERIOD	500	48
NO SIGS		53
NO SIGS		58
NO SIGS		2303Z
NO SIGS		08
NO SIGS		13
BEGIN SILENT PERIOD	500	15
END SILENT PERIOD	500	18
CQ CQ CQ DE KFS KFS KFS WX BCST QSW 476/HF A BT	500	21
WATCH RELIEVED BY RM2 J.S. WARREN AND RM3 E.S. SIMMONS, EQP NML, TFC CLR.	ZUB	2323Z
P. J. Dahms		
RM3 P.J. DAHMS		
RM2 J.S. WARREN AND RM3 E.S. SIMMONS ON WATCH FOR FINAL WATCH		
500 KHZ....PREVIOUS SIGN OFF NOTED, EQP NML.		2323Z
NO SIGS		26
CQ CQ CQ DE VAI VAI VAI TFC LIST QSW 440/HF BT//CQ CQ CQ DE NMC NMC		
NMC FOR FINAL 500 KHZ CLOSURE BCST QSW 472 KHZ AR	500	30-31
NO SIGS		36
NO SIGS		41
CQ DE NMC GA PSE AS SP	472	44
BEGIN SILENT PERIOD	500	45
END SILENT PERIOD	500	48
CQ DE NMC AA AND	472	48
SENT: CQ CQ CQ DE NMC NMC BT NOW CLOSING DOWN CONTINUOUS WATCH ON 500 KHZ AND CEASING ALL MORSE CODE SERVICES IN THE MF BAND. AS WE CONCLUDE OUR WATCH ON 500 KHZ, WE WISH THE MARITIME COMMUNITY FAIR WINDS AND FOLLOWING SEAS. WE ARE PROUD OF OUR TRADITION AND LONG STANDING SERVICES ON MF WHICH BEGAN IN 1901 WITH THE REVENUE CUTTER SERVICE ACTIVELY EXPERIMENTING WITH WIRELESS AS A REGULAR MEANS OF COMMUNICATIONS ON LAND AND SEA TO THE FIRST INSTALLATION ABOARD CUTTER GRANT IN 1903. OUR FIRST DISTRESS CALL FROM AN AMERICAN SHIP WAS RECEIVED ON 10 DECEMBER 1905 BY RELIEF LIGHTSHIP 58 AT THE NANTUCKET SHOALS STATION. THIS CONSISTED OF THE WORD 'HELP' FOLLOWED BY A REQUEST FOR AID. BY ACT OF CONGRESS ON 4 MAY 1910, EVERY PASSENGER SHIP AND ANY OTHER SHIP CARRYING 50 PASSENGERS OR MORE, LEAVING ANY PORT OF THE U.S. WAS REQUIRED TO BE EQUIPPED WITH RADIO. NECESSITY FOR IMPROVEMENT IN APPARATUS AND METHODS WAS EMPHASIZED WHEN OVER 1,500 LIVES WERE LOST IN THE TITANTIC DISASTER OF APRIL 1912. SINCE THEN THE COAST GUARD HAS FAITHFULLY AND DILIGENTLY LISTENED TO 500 KHZ, COPYING AND RESPONDING TO NUMEROUS CALLS FROM MARINERS IN NEED OF ASSISTANCE AT SEA. WE HAVE ALSO PROVIDED YOU WITH THOUSANDS OF URGENT, SAFETY AND NAVIGATIONAL WARNINGS AND RELATED CW ASSISTANCE OVER THE YEARS. WE NOW LOOK FORWARD TO SERVING YOU ON THE NEXT GENERATION OF COMMUNICATIONS EQUIPMENT AND SYSTEMS VIA THE	472KHZ	2351Z
GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS). FROM ALL COAST GUARD RADIOMEN AND WOMEN WE BID YOU 73'S DE NMC VA	472KHZ	2355Z
(TUNER) NMC NMC DE LADF4 LADF4 GA QSL QSL FINAL QSO 73 TU// LADF4 DE NMC RR TU CU EE//EE//NMC NMC DE KNFD KNFD GE 73 TU AR//		
EE//NOJ NOJ NOJ NOJ NOJ NOJ	500	55-58
NMC NMC DE OXBN OXBN GA NW QRU TU//DE NMC RR TU 73 TU SU EE//EE	500	58
CQ CQ CQ DE NMC NMC BT NW CLOSING SVC 500 KHZ FAIR WINDS AND FOLLOWING SEAS TO ALL A PLEASURE SERVING YOU BEST WISHES. NW QRU GN DE NMC VA//NMC NMC DE IBJU IBJU QSL QSL QRU AR TU//IBJU DE		
NMC RR TU 73 GN VA EE//EE	500	58-2400Z
Jean L Warren Eric L Simmons		
RM2 J.S. WARREN/RM3 E.S. SIMMONS		

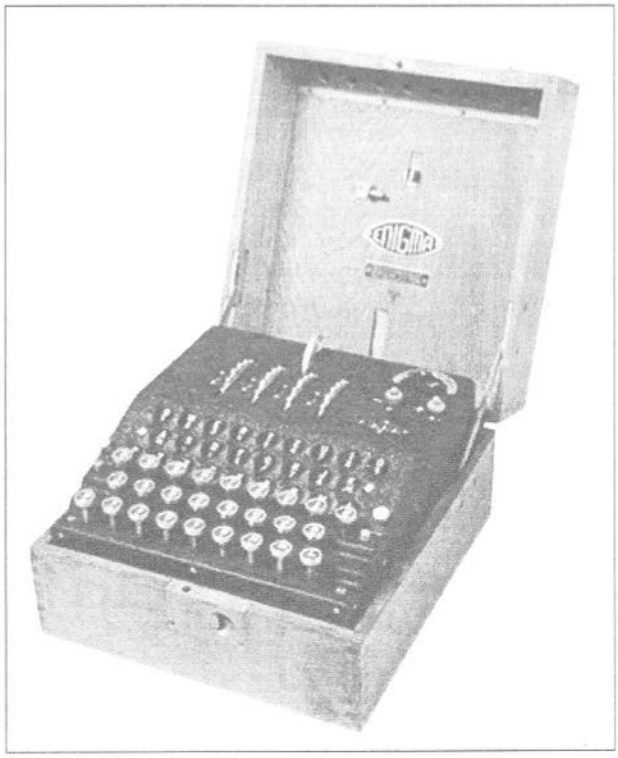
Abwehr Enigma Machine Returned

On April 1st 2000, a rare Abwehr four-rota Enigma machine was stolen from a display at Bletchley Park, the MI6 codes and cyphers centre during WWII and known as Station X. At its peak, 12000 people were employed at Bletchley Park and many others at the Y-intercept listening stations located around the UK. Thousands of intercepted Morse messages were delivered to Station X for analysis by landline or dispatch-rider.

In October 2000, the stolen Abwehr machine, minus the rotors was mailed anonymously to BBC TV 'Newsnight' presenter, Jeremy Paxman. Since then one person implicated in the theft has been successfully prosecuted.

On Easter Monday April 1st, 2002 the BBC Newsnight anchorman returned the fully restored Enigma to Bletchley Park and formally opened a new exhibition, 'Hide & Secret' in which the machine is a central feature. The Abwehr Enigma was taken on April Fool's Day precisely two years previously and is one of only three known to have survived.

The 'Hide & Secret' exhibition charts the Abwehr Enigma's history and



the amazing tale of its recovery. The Abwehr was the Intelligence Department of the German Armed Forces responsible for running overseas agents. Brilliant Abwehr Enigma codebreaking work by Bletchley Park's Dillwyn ('Dilly') Knox enabled British spy chiefs to control German agents who landed in Britain. 'Hide & Secret' tells their incredible stories. Mavis Batey, who worked alongside Dilly Knox, has advised on the exhibition.

Jeremy Paxman was given a guided tour of the surviving buildings which contain many code-breaking exhibits and demonstrations including the rebuild project of Colossus, the world's first programmable electronic computer. An Enigma machine is available for visitors to try.

Prior to its use as a code-breaking centre, Bletchley Park was used by the Diplomatic Wireless Service and the Wireless Telegraphy Hut (open weekends only) includes many interesting exhibits of historic equipment from the Morse days. Weekend visitors can also enjoy collections and exhibitions belonging to a variety of other specialist interest groups, including Airborne Command: The US Army Airborne Historical Display Group, Bombe Rebuild Project, Colossus Rebuild Project, Communications Electronic Museum Trust, GB2BP Amateur Radio Station, 65ste Nachrichten Albteilung (German Signals Battalion) and US Re-enactment Group 1941- 45 – and many more.

Bletchley Park now operates as a Trust and is open to the public. Weekend opening is 10.30 am - 5.00 pm. (last admission 3.30 pm) and weekday opening is from 1.30 pm - 5.00 pm for a guided tour only. The tour starts at 2.00 pm. It is closed on Tuesday 4 June, 2002 for one day.

More information on visits, lectures, special events, a virtual tour etc. is available on the web site at: http://www.bletchleypark.org.uk/ or e-mail info@bletchleypark.org.uk Telephone +44 (0)1908 631129. Location: Bletchley Park, Bletchley, Milton Keynes, Buckinghamshire.

GACW Cyber DX Membership

DX radio amateurs are invited to become Cyber DX members of the GACW, the CW Group of Argentina to support their promotion of ethical operating, sportmanship and CW solidarity.

Cyber DX Members will be free to use the GACW name and logo in any personal correspondence and/or QSL cards. Membership is free.

To find out more and complete the on-line membership form go to the GACW web site at : http://www.geocities.com/gacwar

Please mention *Morsum Magnificat* when contacting contributors

John George (Jack) Phillips

by John Young
(Godalming Museum)

For the 90th anniversary of the loss of the Titanic, in April 2002, Godalming Town council are refurbishing the grave of Jack Phillips and the Phillips family containing Jack's father, George, mother, Ann and twin sisters Elsie and Ethel, in the Old Cemetery, Nightingale Road. In the centre of a six foot square curb, all in white marble, is an obelisk in the shape of an iceberg, a fitting memorial to the Godalming hero.

Jack Phillips was born in Godalming, Surrey, at 11 Farncombe Street, on 11 April 1887. As a young boy, Jack sang in the choir at the Parish Church of St John the Evangelist, where there is a brass memorial plaque. He was educated at the Godalming Grammar School. On leaving he worked at the local Post Office as a telegraphist, where he learned his Morse code.

In 1906 Jack joined the Marconi training school at Liverpool and, on completion of the course, headed the list of successful candidates in the Postmaster General examinations.

Jack was considered a serious young man who stood high in the confidence of his superiors in the Marconi Marine Company. He progressed steadily to the top of his chosen profession and served on the ocean-going liners Teutonic, Lusitania, Mauritania, Campania, Oceanic, Corsican, Canada, Victoria, Danube, Pretorian and Adriatic. He spent three years at Clifden, the Marconi high powered transmitting station on the West coast of Ireland.

Jack was appointed Chief Wireless Telegraphist on the new, "unsinkable" luxury liner RMS Titanic, with Harold Bride as his junior operator. The wireless equipment on board was the most modern and most powerful of any merchant ship then afloat. It had a range of 250 - 400 miles in daytime and at night, when conditions for transmitting and receiving were more favourable, it occasionally spanned 2,000 miles. It is recorded that Jack had confided in a friend that while he was proud to be chosen to serve on the Titanic he would have preferred a smaller vessel. Jack also expressed a dread of icebergs.

In the 24 hours preceding the fateful collision with an iceberg on 14 April, 1912, the two wireless operators had been busy repairing a fault in the transmitter. As a consequence, Jack had very little sleep before commencing his watch from 8.00pm to 2.00am. It was in the hours preceding the collision that the liner achieved its highest speed of 22.5 knots. Thus, on impact, the iceberg inflicted considerable damage to many

Courtesy of Marconi plc

Jack Phillips

of the 'watertight' compartments, causing it to sink at the bow.

Jack was still sending personal messages from the passengers to America. This was his job with Marconi when he was first instructed by the captain to advise other vessels in the area of the collision with the berg. Due to the much publicised and widely believed claim that the Titanic was an unsinkable ship almost all on board carried on as before and other ships receiving this message did not immediately prepare to head for the given position of the stricken liner.

However, it was soon realized that the Titanic was sinking and Jack was instructed by Captain Edward Smith to send out the SOS messages requesting immediate assistance from all vessels in the area.

From this time onwards Jack stayed at his post, sending out the distress calls, advising on the latest position of the Titanic, urging and convincing other ships to assist in the rescue of those taking to the boats. Jack even stayed at the transmitter while Harold Bride put a lifejacket on him after the Captain gave the instruction: "Every man for himself" and had personally thanked the two wireless operators for their perseverance.

Bride was sent off by Phillips to save himself, while Jack continued transmitting. It was as a consequence of this total devotion to duty that Jack Phillips lost his life and has since become widely admired. It was this bravery and persistence which reduced the magnitude of the disaster in respect of lives lost. Jack's last message was picked up at 2.17 am and the ship foundered at 2.20 am.

The Phillips Memorial in Godalming, a garden designed by Gertrude Jekyll, with a magnificent brick cloister 80 feet square designed by Hugh Thackeray Turner, was laid out, built and opened exactly two years to the day after the sinking. The memorial is situated between the River Way and Godalming Parish Church. Within the cloister, the Wireless and Telegraph Company commissioned and had erected a memorial stone tablet to the perpetual honour of this brave young man, who died four days after his 25th birthday, leaving behind a lasting example of putting the lives of others before one's own. ***MM***

(An Exhibition entitled 'Jack Phillips and the Titanic' is at the Godalming Museum until Saturday 25th May, 2002. For further information the Museum can be contacted on +44(0)1483426510; or e-mail: museum@godalming.ndo.co.uk)

A Nodal Point in International Communications:

Dover and the History of the Telegraph

(With notes on Personal, Medical and Scottish Associations).

by E. Geoffrey Walsh GM4FH*

DOVER, the 'Lock and Key of England' and the nearest port to France, sitting on the busiest shipping lane in the world, has long been a main communication link. The Romans set up a lighthouse on the cliffs, the Normans a substantial castle but there was no navy and defence of the realm at sea was by an obligation laid on Dover, Sandwich, Hythe, Romney and Hastings to provide ships and men. These five towns were known as the *'Cinque Ports.'*

The word 'telegraph' means 'writing at a distance' and the first effective devices were optical not electrical. The best known, Chappe's, used a pole and moveable arms to send 192 different signals; observations by telescopes along a chain of stations allowed for messages to be relayed from Paris to Lille. A similar scheme of Lord George Murray in 1795 was approved by the admiralty to link London and Dover. Vision at a distance is erratic. On expecting important news from Spain the admiralty once received from Portsmouth, a more important link than that from Dover, the message *'Wellington defeated'*, but mist had descended and the full text should have been *'Wellington defeated the French...'*.

Early Electric Telegraphs

Charles Wheatstone, renowned for his inventions, proposed to Parliament in 1840 that a submarine cable be laid across the English Channel. The project was suggested to Robert Peel in 1845 but was rejected by Louis Phillippe and later supported by Louis Napoleon Bonaparte.

Rubber perishes in seawater and the project became viable with the finding that gutta percha was a satisfactory insulator. This almost non-elastic substance, the latex of a tropical tree, becomes plastic on heating and retains the shape given to it then when cooled. It is a polymer of isoprene, differing from rubber by having trans- instead of cis-isomerization.

A telegraph line was laid in 1845 along railway track between London and Dover. By 1849 many places in Britain were connected to the Central Telegraphic Station in London but the Dover line remained independent. A two needle system was used. Handles were used to reverse current direction and so cause needle deflections to the right or left.

	LEFT	RIGHT		RIGHT	LEFT
A	1	0	N	1	0
B	2	0	O	2	0
C	3	0	P	3	0
D	4	0	Q	4	0
E	1	1	R	1	1
F	1	2	S	2	1
G	1	3	T	3	1
H	2	1	U	1	2
I	2	2	V	2	2
J	2	3	W	3	2
K	3	1	X	1	3
L	3	2	Y	2	3
M	4	1	Z	1	4

Table 1. A telegraph code used with a needle instrument (Wilson 1852). Samuel Morse's code was more efficient for his knowledge of printing made him aware of the significance of letter frequency.

Originally used to signal whether the railway line was clear for another train, the two needle system, with its three wires separated messages from 'up' and 'down' stations. An example of a code used is shown in Table 1.

Calais and Paris were connected by the eighteen fifties; to bridge the channel messages were sent by carrier pigeons or ships. News from Paris sent at mid-day needed to be in the hands of the editor of 'The Times' at 3am the next morning. The time of arrival of the dispatch from France by boat depended on wind and weather.

A needle system with a single operator was slowed by the need to glance repeatedly from the instrument to the paper and vice versa. At London there were two clerks, one to read the deflections, the other to write the letters; a cab waited to rush the completed message to the newspaper office. For sending the text at Dover; the clerk used both hands to operate the two levers. Later, with Morse sounders, one operator sufficed both for sending and for receiving.

Submarine Cable Connection

On January 10th 1849 a ship, anchored off Folkestone a town close to Dover, was connected by an underwater cable 2 miles long with the telegraph wires of the South-Eastern railway and messages were successfully exchanged with London.

Figure 1. A jubilant and very rotund John Bull is celebrating the new telegraphic connection.

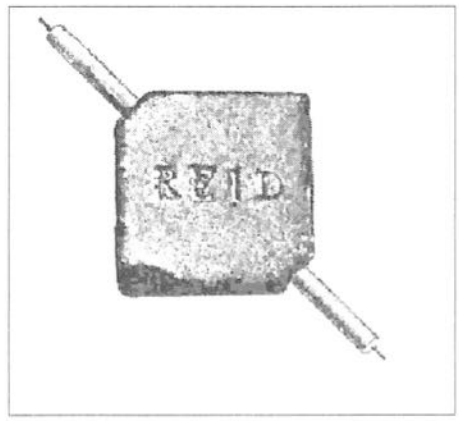


Figure 2. Lead weight as attached to the first cable to France. Bright 1898.

The first cable to France was laid on 28th August 1850. There was a central copper wire of No 14 Birmingham Wire Gauge (0.085 in) covered by ½ in thickness of gutta percha; it was made in 100 yards lengths, jointed by twisting and soldering. A lead weight attached every 100 yards sank it to the bottom (Figure 2).

A horsebox at Dover served as a temporary office; wire led through a leaden pipe to below the low-water mark. The steamer started with 25 miles of wire weighing 5 tons on a reel 15' x 7' which was unwound at 4 m.p.h. as it passed over a roller at the stern; the route was plotted by buoys. The ship leaving Dover and in mid-channel is depicted in Figures 3 & 4. During the voyage communication was established with the shore, by evening a signal read 'We are all safe at Cape Grisnez' (Figure 5). As the Duke of Wellington left the town a 32 pound gun was fired by an electric current from France.

The Morse code was not used; there were problems with an early printing telegraph capable of running at 15 words per hour (Figures 6 & 7) As an example perhaps of 'spin', the instruments were decorous but in the event proved useless and a simple single needle instrument

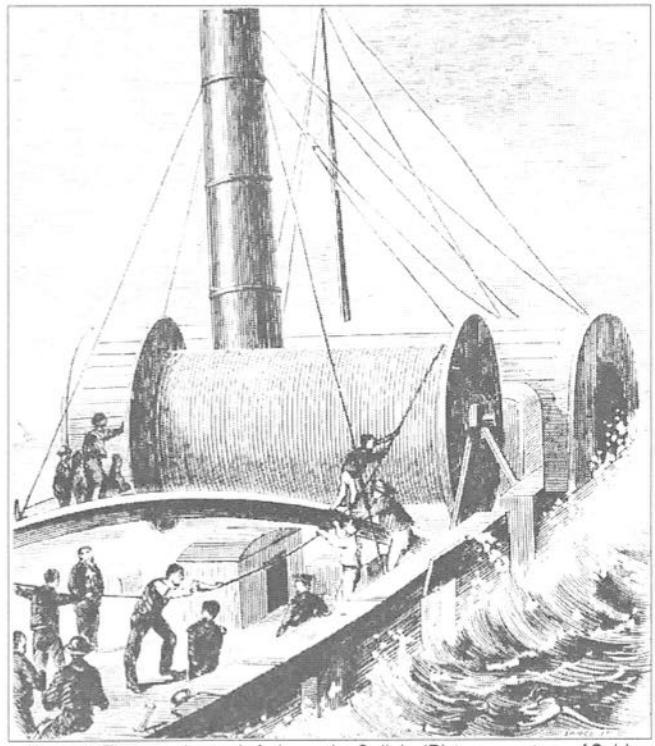


Figure 4. The massive reel of wire on the Goliah. (Picture: courtesy of Cable & Wireless Limited)

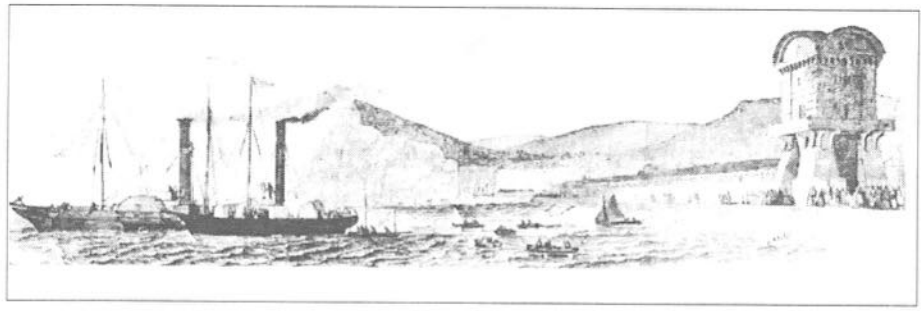


Figure 3. The cable laying ship, the Goliah, is in the background being accompanied by an HMS packet on leaving Dover harbor. 'Illustrated London News', Sept 7 1850.

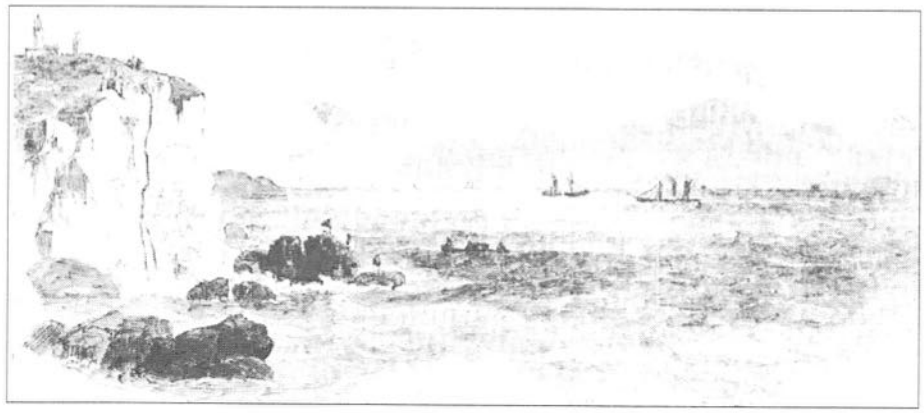


Figure 5. The electric wire can be seen running up the cliff at Cape Grisnez on the French side. 'Illustrated London News', Sept 7 1850.

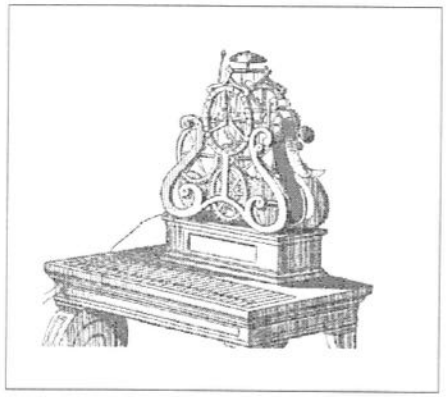


Figure 6. Elaborate 'House & Brett' instrument, with a keyboard and indicating dial. Bright 1898.

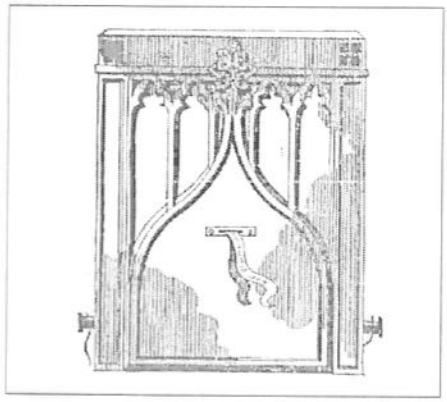


Figure 7. The decorated façade of the 'House & Brett' printer. 'Illustrated London News' Sept 7 1850.

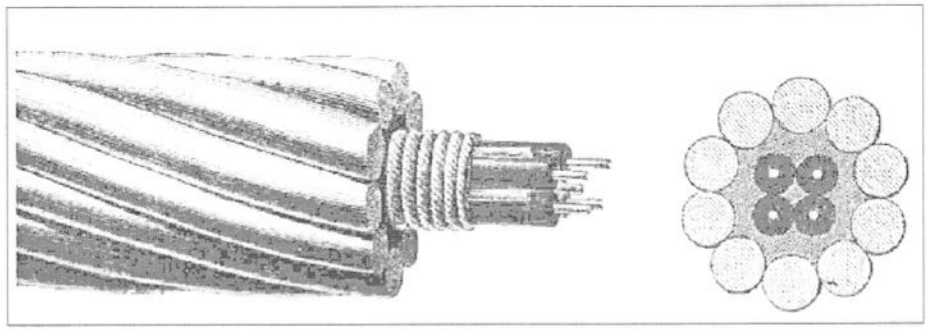


Figure 8. The 1852 cable (Bright 1898).

was used in a bathing machine on the French shore.

It was the first significant submarine cable but failed after a few hours. According to one account a fisherman had trawled up a piece. This he exhibited in Boulogne and thought it to be a new kind of brown kelp with gold in its centre. It is believed that this 'pescatore ignobile' returned again and again to search for further specimens (Russell 1865). Many believed that the failure fully justified their views that the project was a mad hoax or gigantic swindle, indulged in only by wild minds.

A more robust cable, weighing 180 tons, was laid nearby in the autumn of 1851 to run between South Foreland near Dover and Sangatte close to Calais. It had four wires instead of merely one and each, of No. 18 Birmingham Wire Gauge (0.65 in. diameter), was separately coated with gutta percha (Figure 8). A similar coating covered the four and it was also bound by yarn dipped in melted tar and tallow. As protection the cable had a tight spiral sheathing of ten galvanized iron wires each of No. 1 Birmingham Wire Gauge (0.3 in. diameter); they eventually corroded. It was laid too rapidly, and there was not enough to reach France, an extra mile had to be joined on. At first it was used only for stock market news but on November 21st 'The Times' was promptly getting news from Paris; by 1852 London was connected to most of the major continental cities (Dodd 1867).

Onward Connections

Connections through continental Europe had reached Turkey in time for a cable 340 miles long under the Black Sea to allow signals from London to be sent to British forces fighting in the Crimean war (1853-1856). For many years the connections to France through Dover played a major role in world history. In the Edwardian period some of the traffic from Dover to the continent is likely to have been handled by my uncle, Jim W. Simmons, then a telegraphist in the post office.

Long distance working had many problems as Preece & Sivewright (1876) made clear:-

'Different portions of the earth ...are frequently at different potentials. When these ...are connected together by wire we have earth currents. The currents

vary in strength and duration during different periods of the day and year, and at certain seasons they acquire such magnitude as to be called "electric storms" They then interrupt the circuits to such an extent as to render working difficult and even impracticable. On long cables they are specially prevalent, and become of such strength as to endanger the safety of the cable. They are to be guarded against in two ways 1st, by dispensing with the earth and using a second wire as the return wire, working, as it is called, in a metallic circuit. 2nd, by using condensers and working with a broken or interrupted circuit...The first method is used chiefly on land lines because it can be easily and rapidly resorted to, and on cables when there are wires available; but the second method is that which is principally used on cables, and it is very effective.'

Telegraphs in India

A licentiate of the Royal College of Surgeons of Edinburgh in 1829, William Brooke O'Shaughnessy, will have studied anatomy with cadavers provided by the notorious Burke and Hare murderers and will have been a fellow student with Charles Darwin who studied medicine for just a year. O'Shaughnessy, introduced cannabis to the West, made important studies of the use of intravenous infusions to replace the water lost in cholera and went to India as an assistant surgeon. Being especially interested in electrical matters, he was spotted by, arguably the best, Governor-General ever, a Scottish noble, Lord Dalhousie, who gave priority to communications.

O'Shaughnessy set up in the Botanical Gardens of Calcutta an experimental line of No 14 BWG iron wire running backwards and forwards for compactness on 42 rows of bamboo poles; the length was 30 miles ! His first idea was to use induction shocks to be perceived by the operator at the far end! He laid a cable under the Hoogly river and blew up a wrecked ship using an underwater cable.

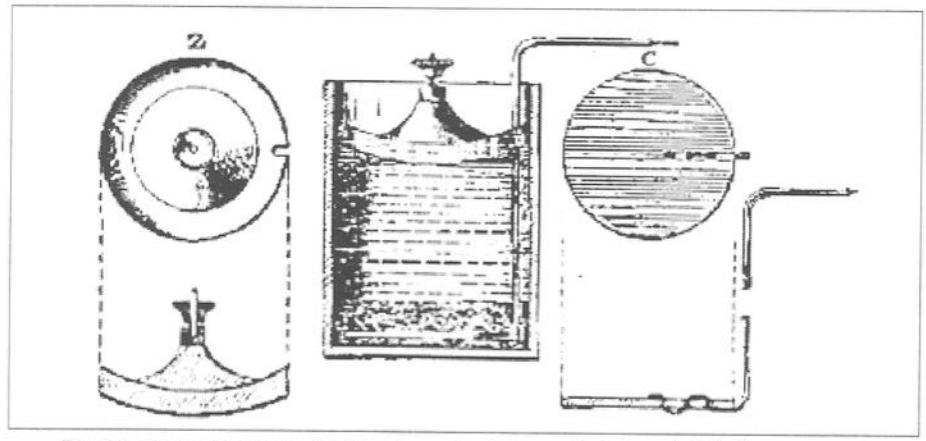


Figure 9. The sturdy copper sulphate battery extensively used for telegraphy in India. Preece and Sivewright , 1876.

Dalhousie, considering the observations promising, sent O'Shaughnessy to Britain with a letter to the Directors of the East India Company requesting support for introducing telegraphs. O'Shaughnessy, appointed Director of Telegraphs for India, became in charge of an office at the Presidency and through his efforts the major cities were linked by 4,000 miles of cable. The lines, erected by unskilled labour, had to pass through jungle and span wide rivers without bridges. Lightening strikes killed birds on the wires and sometimes destroyed telegraphic instruments; wild buffalos rubbed against and at times knocked down telegraph posts. 322 miles of the Madras line were supported on granite obelisks. Some equipment O'Shaughnessy himself devised using local materials; Morse equipment, not used initially, was ordered in 1856

A suitable battery for India was the 'Minotto'. A glazed jar with a copper plate at the bottom as one electrode was filled with copper sulphate, river water and sand was caped with a zinc electrode (Figure 9). The copper sulphate was readily available in local bazaars because it was believed to have medicinal properties. It was 1879 before a generator was used; L. Schwendler passed current from a lighting generator in Alipore through 850 miles of telegraphic line between Agra and Calcutta. Telegrams were successfully sent and no change was noticed in the brightness of the electric light, for the proportion of the current conducted away was only about .0043 of the total current.' (Higgs 1884).

London to India

On 24th March 1854 the first telegraphic message between Agra and Calcutta, 800 miles, was passed. A cable

Figure 10. Landing of the cable in the mud at Fao on the Persian Gulf. Illustrated London News.

under the Persian Gulf connected through to Karachi so by 1855 London was in rapport with Calcutta and the need to connect with India had been achieved; the difficulties can scarcely be imagined (Figures 10 & 11). By 1856 all major parts of India were linked. Signals to India from Britain may all have passed through Dover and played a major role in the military management of the Indian Mutiny in 1857. Many wires were cut but a message reached the Punjab before the telegraphist in Delhi was murdered, guards on river ferries disarmed most of the Bengali mutineers; British and loyal Punjabi forces retook Delhi and the tide turned. My great grandfather, Sergeant Michael Walsh of the 75th Foot', was in this action and received the Distinguished Service Medal for gallantry in defending the Outlook Tower on the Delhi Ridge where European women and children were sheltering. He retired to Dover and worked as a stores clerk in the Castle.

Figure 11. Erection of a telegraph pole in the East. Goldsmid 1874.

Often now derided, British rule achieved unity in the sub-continent for the first time and the tragic rifts following partition are now, alas, all too apparent. On returning to Britain O'Shaughnessy became a Knight Commander of the Bath, Dalhousie was appointed '*Warden of the Cinque Ports*', a final twist to the story!

Sources:

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Preece W. H. & Sivewright J. (1876) 'Telegraphy'. London:Longmans

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*64, Liberton Drive, Edinburgh. EH16 6NW
Email: Geoffrey.Walsh@ed.ac.uk

MM

The Elecraft K1 CW Transceiver

Portable at Easter

by Dr Gary Bold ZL1AN

A FEW DEDICATED constructors still delight in building their own gear. I wish more would do so, as the act of communicating using something that contains something of you is deep and satisfying. Ron, ZL1AJP, is one of these. He recently built an Elecraft K1 kit. A lot of people have praised this rig, so I induced him to write a review. Here's what he says:

The K1 was released not long before last Christmas, and I have number 575, which gives some indication of its popularity! A smaller version of the K2, it is a two band, 7 watt maximum, microprocessor controlled QRP, CW-only rig with an LCD display.

The kitset arrives in a small box. This appears to contain mostly a nice bound manual, and lots of bubble packing! But this hides several bags, each labeled to indicate the section they relate to, and the hardware (case sides, and PC boards) wrapped in brown paper.

Assembling as detailed in the very precise instruction book, the set rapidly starts looking like a radio. The resistors are done up in "bandoliers" for each stage, all arranged in the order laid out in the assembly instructions. A very nice touch! The first module constructed is the "Filter Board", containing all the pre-mix, Band pass low pass filters. It also has the PIC controller and a couple of crystals.

Once that section is completed, the front panel is made up, and another nice touch is a simple spacer supplied to enable all the push buttons to be mounted at the same level above the pc board. A few more components are added, then the large display driver chip, followed by the LED display. The completed unit is put to one side. The RF board is also pretty straightforward, and after a couple of pages of components, the set is ready to be fired up. It took me 16 hours to put together. One massive 12 hour stint (couldn't put it down) and 4 hours to finish off the next morning (early!)

At this point I found the only instruction I wasn't entirely happy with! This states "turn on S1. If you see or smell smoke, or a component feels hot to the touch, disconnect the power source". Now I find that a wee bit basic. Surely some indication of what sort of current you might expect would be nicer? From there, construction consists of adding sections, plugging the boards together and using the LCD display to verify that each section is working correctly.

Alignment was easy. I used a weak signal source to align the filters, which tune very sharply. The same coils are

used for transmit and receive. It was time to check it out on air. It didn't take long to work out all the menu functions and set it up to suit me.

K1 Features

The completed kit is shown in figure 1. The receiver covers either 80 or 150 kHz (preset during construction), tuned via a 10 turn pot. There's a 4 pole crystal filter with 3 selectable filter widths, a selectable attenuator, "S" meter, RIT, and XIT. Sensitivity is quoted as being 0.15uv for 10 db (S+N)/N. Band-changing is made by "double tapping" a button. Band frequencies are selected when you order. There is a choice of any two from a selection of six available bands. The built-in keyer runs from 8 to 50 wpm, with selectable iambic modes A or B, and adjustable QSK timing.

A menu allows 16 other functions to be adjusted/changed. These include sidetone pitch and volume level, power output (from 0.1 to 7 watts), bandwidth of each of the three Xtal filter settings, and optionally turning LED's on/off for power saving.

Another smaller menu selects "S" meter on/off, provides a battery voltage reading, and provides a 6 digit frequency readout from a 3 digit LCD display! When the button is depressed quickly, the readout might show, for example 14, then 014, then 14.9, meaning a frequency of 14.014.9 MHz. Normally, the readout would just show "14.9" the last three digits. It may sound strange, but is easy to get used to.

Being a simpler rig than the K2, the K1 uses a VFO which is varactor tuned, but which is very well designed, with very little drift. Elecraft claim < 200Hz per hour after 5 minutes at 25° C. For a set measuring only 2.2" x 5.2" x 5.6" there are a mighty lot of features! To

complement the basic kit, a built in automatic ATU and noise blanker are also available.

Operation

The K1 draws 700 - 800 mA at 14V on transmit, typically 50 mA on receive. I power it from a 12 amp/hr Gel cell, floating on a charger. However, it would probably last me for a week's operating on the battery alone. The receiver is very lively, and stations tune easily. A call or two soon produced results, and a UT2DX was the first call in the set's log book.

My first couple of weeks operation including a stint at the beach as a /P station. I used an 80m dipole with my Yaesu FC-901 tuner to tune up on 20m. The book says "Load tolerance: An SWR of 2:1 or better is recommended. However, it will survive high SWR operation."

The K1 was an absolute gem to use! It was hard to find fault, but I did find that the "thump" made by the AGC capacitor initially charging up on a strong signal was a bit annoying. However, a simple mod was posted which slows the charge-up time, and this eliminates the thump. I have also now installed the KNB1 noise blanker. This is quite a tricky piece of circuitry with 3 stages of amplification, AGC, bandpass filter, noise gate, and threshold control, controlled by a PIC chip. There are two settings, HI and LO. The manual says, "With HI selected, only strong noise pulses will activate the blanker, however in many cases the LO setting will be more effective" (whatever that means).

To check this out, I took it up to the Whangarei Clubrooms to try it against the resident electric fence. It was great! It completely removed the fence pulses on the HI setting.

The kit is available direct from Electraft. Their service is first class, but the way our dollar rates against the US dollar makes the price, $US 260 + postage a bit depressing. Start saving those "green stamps" from your QSLs! For ordering details, see the web site www.Elecraft.com"

I've now worked Ron several times with his K1. It sounds fine, and he has been pulling in the DX. Everybody who has this kit seems to like it. And with a good antenna and a ZL callsign, the world wants to talk to you, regardless of your power! See later.

Portable at Easter

I took the TS50s up north to my sister's farm for a few days. I operate portable from the tailgate of the wagon, in the open air, powered by a gel-cell. If there are trees around I often use my end-fed random wire. But this time I wanted to experiment with a new configuration for my Trident mobile whip. I've never mounted this permanently. I simply clamped the base-plate on which it's bolted to the roof-rack of my Commodore station wagon. This always worked fine, and gave a rapidly-deployable, non-invasive setup which grounded the antenna firmly to the vehicle roof. But now the Commodore has left me for the place to which all faithful old Commodores go, and I have a much newer Toyota Camry wagon.

But the Camry has no roof-rack. Rather than having one fitted. I decided to try non-ohmic, capacitive coupling

between the baseplate and roof. The aluminium whip baseplate is 48 cm by 8 cm, and I'd fashioned a wooden frame, padded with foam, to position it with a mean spacing of about 2 cm above the roof. This gives a plate-to-roof capacitance of only about 17 pF. For added sanitization I connected the baseplate to the tow-bar with a battery jumper cable.

On the Commodore, the whip had always loaded OK connected directly to the rig on 40, 20 and 15 metres, with an SWR of 1.5 or less in the CW bands. But I usually inserted my MFJ 945D transmatch anyway, to get an exact match, and enable operation in the SSB portions as well.

Not surprisingly, the SWR on the coax to the whip was much higher now. Nevertheless, the transmatch still brought it down to 1:1 on 20 metres, although I had to use a larger than normal inductance, with the input capacitor nearly at minimum. (This means that the transmatch characteristic impedance was high, implying a very reactive feed point impedance. I'll explain that in a forthcoming article on unbalanced transmatches).

My sister's house is on a high, treeless hill, an excellent DX location, away from the Auckland RF noise. At sunset, my first 50 watt CQ generated a pile-up from all over Europe, which grew steadily more cacophonous. I worked non-stop for an hour, getting and giving reports of 559 to 599. The pile-up was still growing when my gel-cell ran low. I promised to return in 24 hours.

Next night, the pile-up was even larger than before. In fact, several stations who had missed out the first night were waiting for me, and thanked me for coming back. Again, I worked DX non-stop until the gel-cell ran down.

For interest, I asked everybody what power and antenna they were using. The answers ranged from "25 watts into an inverted vee", to "700 watts into a 4 element monobander". Most were using 100 watts into dipoles or simple beams. The signal reports I gave didn't vary much. It's propagation conditions that are the controlling factor in my experience, and I was only picking off the strong ones.

So using tenuous capacitive coupling between the whip and the roof obviously worked, although a larger baseplate, moulded to the roof-shape with only a thin paint-protecting foam layer would be better still. Has anyone else done anything like this? Tell us about it. Two observations ocurred to me. Firstly, when 20 metres is open, from any reasonable location ZLs can work endless CW DX, with only battery power and a mobile whip. And (as I have observed many times before) you only have to call CQ once to generate a pileup.

Secondly, the interest my appearance raises every time I do this indicates how rare we are perceived to be. Everybody wants to talk to us! In fact, I've just received a couple of letters from recently qualified ops who have marginal antennas and/or locations. They had little success with DX SSB, so with some trepidation, tried CW. Both were astonished at the difference. One said, "They told me that CW was dying, but there are hundreds of stations out there! I had to work a bit to get my speed up to 15 - 18 wpm, but then, it was so easy!" ***MM***

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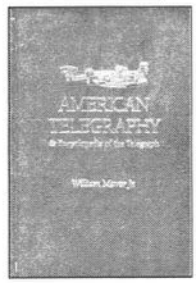

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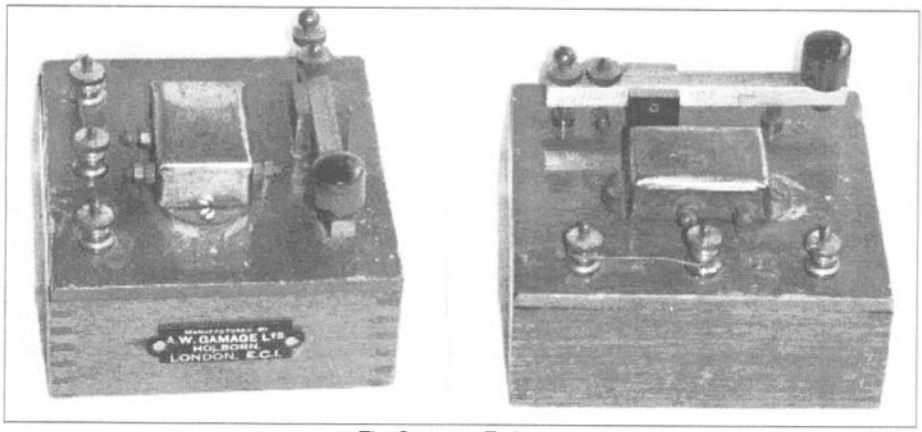
Showcase

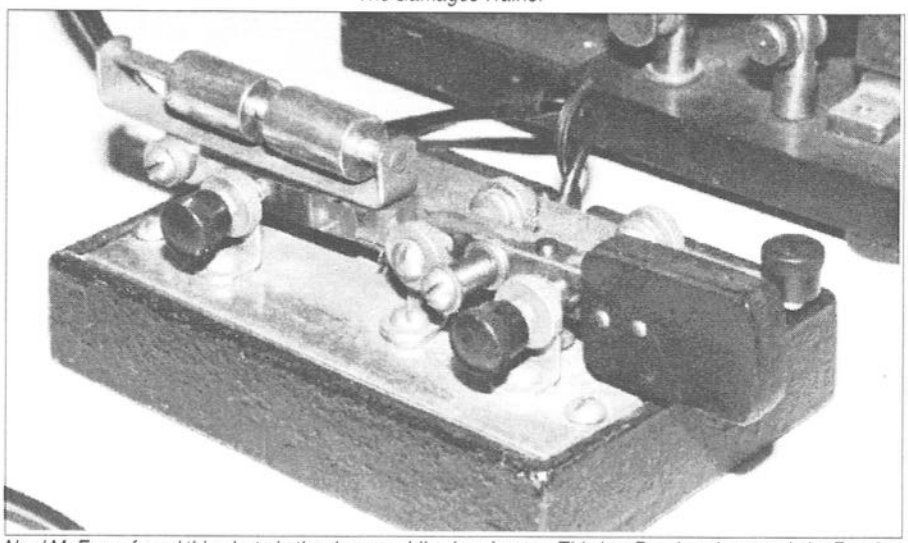
Readers are invited to contribute any additional information and stories, no matter how minor, to the Editor, Morsum Magnificat. There have been thousands of designs of keys & telegraphy instuments. Information will be lost unless it is compiled in one place and shared with other readers.

Photo: Wyn Davies



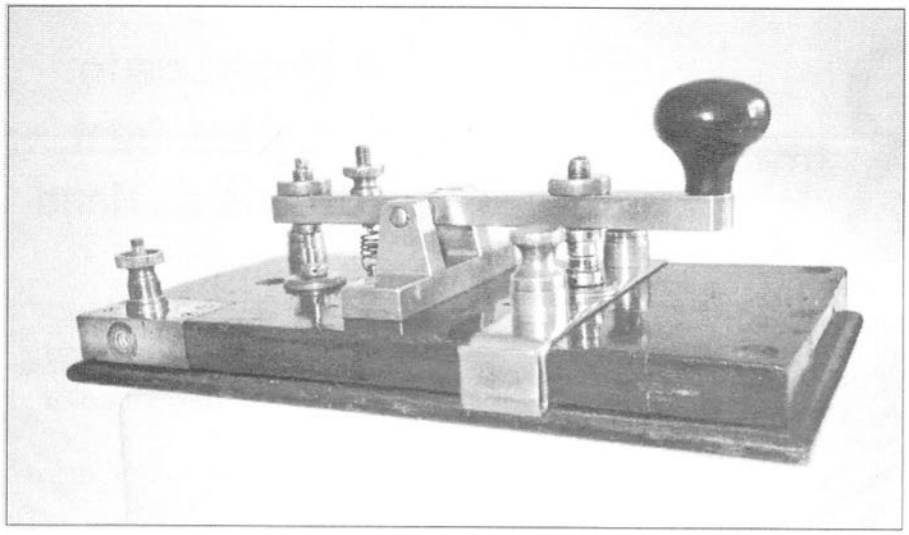
The Gamages Trainer

Photo: Neal McEwen , K5RW



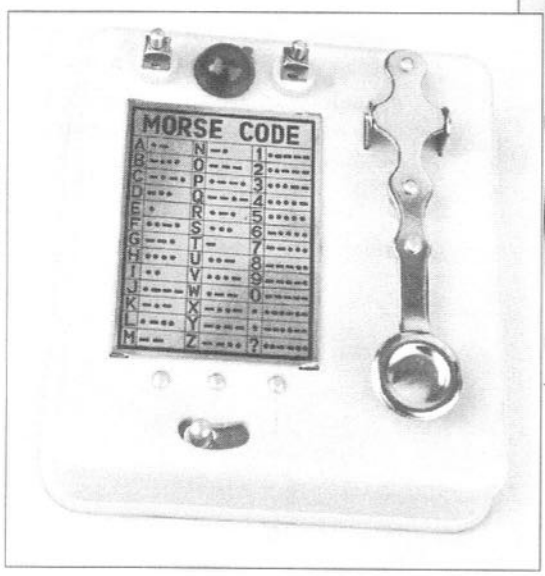
Neal McEwen found this photo in the drawer while cleaning up. This is a Peerless bug made by Peerless Mfg. Co. of Fordson, Mich. Most are unmarked; some have a simulated wood grain top. There are variations on this design. He used to have two of these but traded them away in weak moment long before realising that they were Peerless bugs.

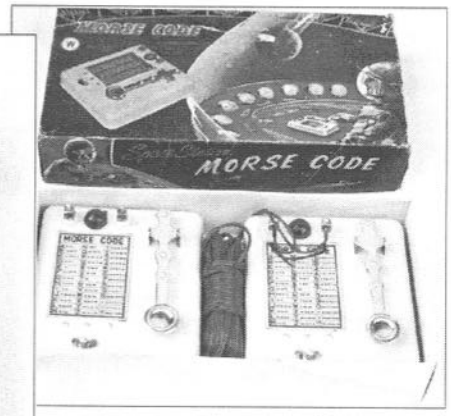
Photo/Collection: Jack Barker



A Great Find for Jack Barker: Having just read the excellent article on the Titanic by Dr Ken Jones - look what turned up at a local junk stall! – A Marconi Manipulating Key. It was in a terrible state when found and was minus a knob, side lever and nameplate. The brasswork was black and the base was covered in thick dirt and verdigris from the brass. It took three days hard going to clean up. Jack only recognised it after seeing the photo on the front of the AWA Review.

Photo/Collection: David Westwood





Space-age Morse: A 1950s/60s two-way Morse training set. Note that key has a pivoted arm and not of strap construction as is often the case.

A Technique to Straighten Bent Pivot Pins on Hand Keys

by Chris Bisaillion, VE3CBK
(Whiskeytown Wireless Collection)

RECENTLY, I ACQUIRED a nice Royal Canadian Air Force hand key with the designation 10F/556. Two problems were noticed immediately. The pivot pins were noticeably bent (see Figure 1) indicating that the lever arm had received a force from the front of the key. A replaced disk under the knob, of the incorrect diameter, further indicated that the key had received some sort of trauma. I thought about how I could bend the pivot arms back into alignment without the risk of breaking them off. If I had used pliers, it would have been hard to tell when I had achieved alignment. Here is the technique that I successfully applied.

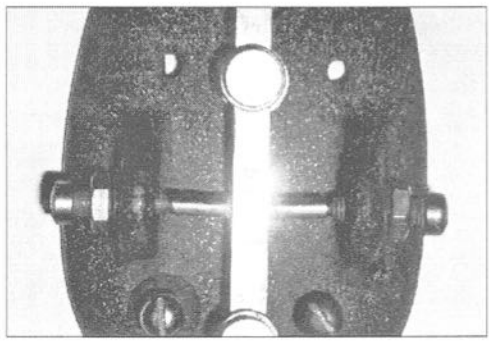


Figure 1 - Bent pivot pins.

I loosened the retaining nuts and removed the lever arm as shown in Figure 2. A small length (about 5 ½") of ¼" diameter brass rod was obtained. It already had an internal thread for use as a standoff. An advantage of brass is that it is softer than steel, and is unlikely to leave marks. An aluminium rod could have been used with similar results. The diameter of the pivot pin was carefully measured with callipers, and a drill size selected that was just smaller than the measured diameter. The drill size selected was 9/64" (0.1406").

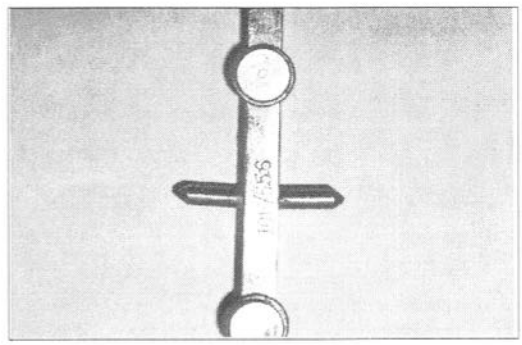


Figure 2 - Lever arm removed.

The next size up was too large 5/32" (0.1563"). The tools required are shown in Figure 3. The brass rod was drilled out with the 9/64" drill. A small jewellers file was used to carefully enlarge the hole until the brass rod fit snugly over the bent pivot pin as shown in Figure 4.

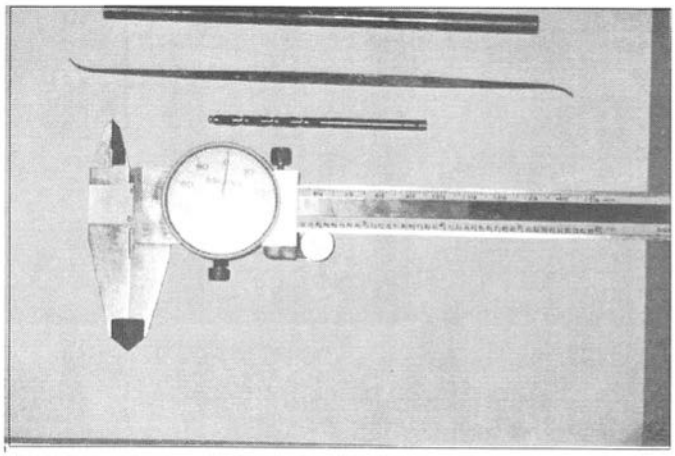


Figure 3 - Tools required.

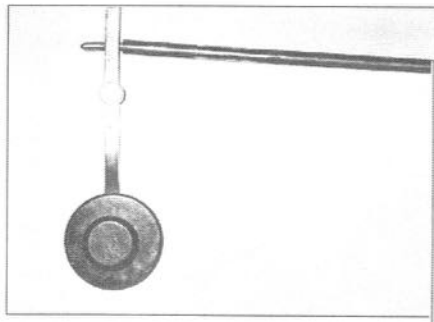


Figure 4 - Brass rod snugly fits pivot.

The lever arm was clamped in a vice, and the misalignment of about 5 degrees was very apparent due to the parallel lines of the vice as shown in Figure 5. The brass rod was gripped by hand and, by applying steady pressure, the pivot pin was brought back into alignment as shown in Figure 6. The process was repeated for the other side of the pivot pin.

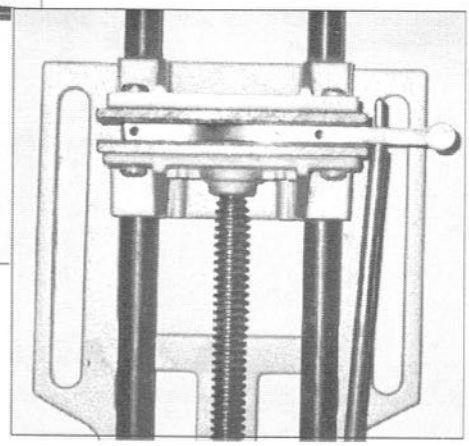


Figure 5 - The misalignment.

The lever arm was remounted using the retaining nuts. The improvement is apparent in Figure 7 and Figure 8 showing the alignment of the contacts.

After replacing the disk under the knob with the correct type, the restored key is shown in Figure 9. The satisfaction of crafting a simple tool, for perhaps a one-time use, was well worth the effort.

I am sure that other readers would like to hear of your special techniques to restore keys. ***MM***

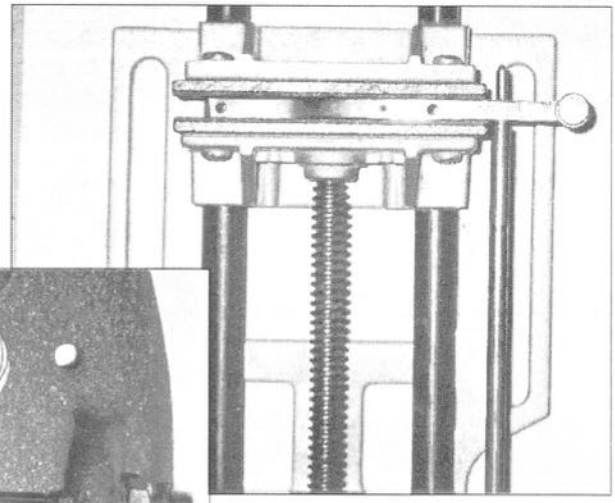
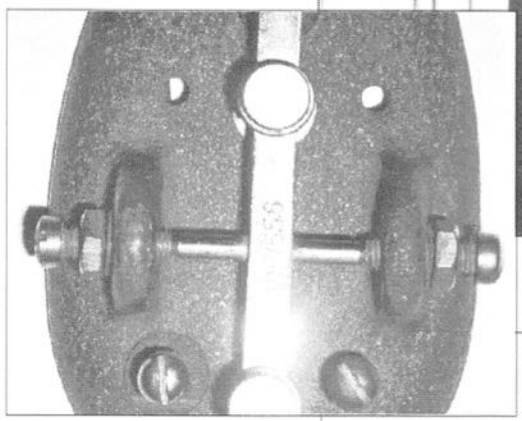
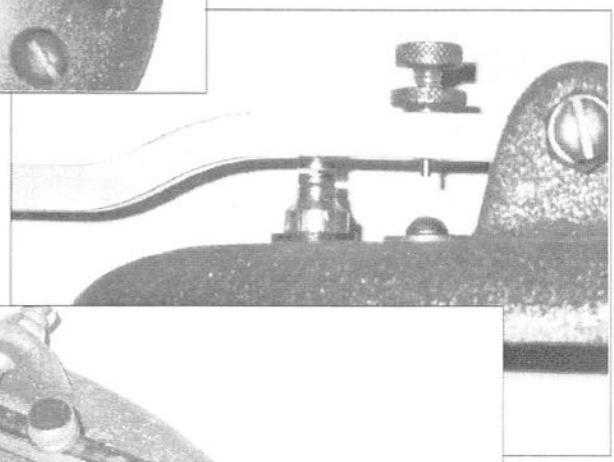


Figure 6 - realigning the pivot.

Below: Figure 7 - Improvement visible.



Right: Figure 8 - Contacts now aligned.



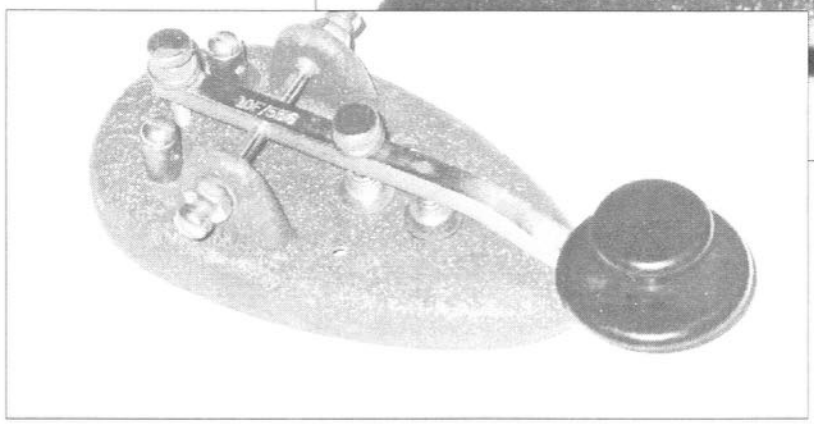


Figure 9 - The restored key.

The Omnigraph Instruments - Part 1-

by David R. Pennes, M.D.
WA3LKN

STUDENTS LEARNING MORSE code have had a variety of commercially made practice instruments available to them over the years to assist in their studies. Such devices included purely mechanical sounders that simulated the audio of a working sounder (Figure 1), inexpensively made sounder/key combination sets identical in function to the more robust instruments for commercial use, a variety of perforated tape devices such as the Instructograph, Teleplex, AA Transmitter, and others, a rotating painted cylinder device called the 'Natrometer' (Figure 2), as well as a variety of 78 RPM and later 33 RPM records and tapes. Current generation Morse code practice instruments employ microprocessor-controlled random character generators capable of almost any sending speed. PC based software programs for learning Morse code are also widely available.

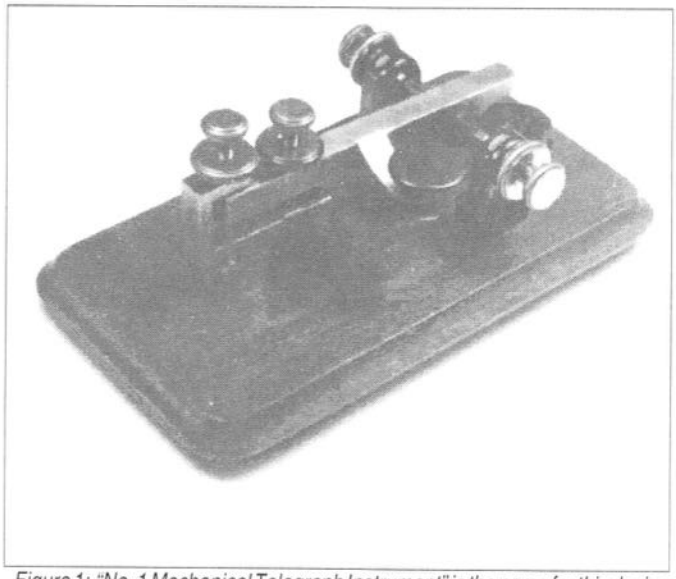


Figure 1: "No. 1 Mechanical Telegraph Instrument" is the name for this device in the 1912 J.H. Bunnell catalogue. Bunnell made another variety of mechanical sounder, and a number of other manufacturers also made such purely mechanical instruments including Manhattan Electrical Supply Company, and British companies.

Among the most unusual Morse code practice devices were those manufactured by The Omnigraph Manu-

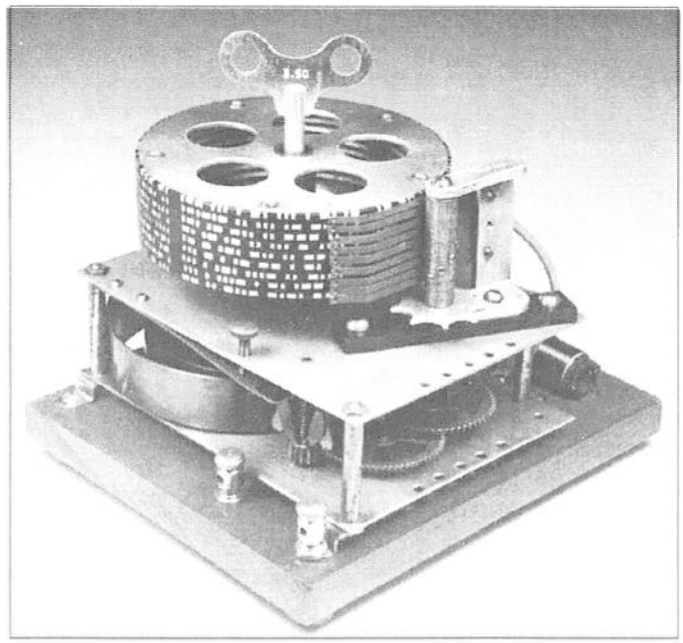


Figure 2: Natrometer. A clock motor drives a rotating aluminum drum painted in dielectric (insulating) paint. The unpainted surface is in the shape of continental code characters. A stylus in contact with the surface of the drum automatically travels from one line of Morse code to the next higher line and then back down the lines of code.

facturing Company in New York City between 1900[1] and 1931[2]. As best as can be determined, the Omnigraph company never produced anything other than Morse code practice devices, and did not produce commercial devices such as telegraph keys or sounders of any sort. Omnigraph advertisements were featured in numerous telegraph, radio and electrical publications of the day including *QST, The Wireless Age, Modern Electrics, The Electrical Experimenter, Journal of the Telegraph, Radio, Electrician and Mechanic*[3], and probably others. Omnigraphs were also marketed by major retailers of the day including Sears and Roebuck, J. H. Bunnell, Manhattan Electric Supply Company, and Wholesale Radio Service Company (New York City). The factory occupied several different New York City addresses over the 30+ year span of the company existence, judging from the addresses listed in the numerous advertisements during this time period.

The 1914 and 1919 U.S. Department of Commerce rulebooks stated that commercial and amateur radio license examinees undergo a code test that:

> "shall consist of messages with call letters and regular preambles, conventional signals and abbreviations, and shall in no case consist of simple, connected reading matter. The test will be conducted by means of the Omnigraph or other automatic instrument wherever possible"[4].

The demise of the company and its unique instruments was undoubtedly related in part to the superior capabilities,

versatility, and reliability of perforated tape devices such as the Instructograph. As dazzling as Omnigraphs were to watch in use, they were finicky and temperamental instruments to use. The multi-disc Omnigraph devices (see below) although ingenious in design, allowed for, at best, pseudo-random code generation, limiting overall utility. Although company advertisements boasted a 45 minute running time on a single winding, a properly functioning and adjusted instrument would begin to slow noticeably after about 20 minutes running time[5].

The Instruments

The company manufactured a number of instruments of varying complexity, all of which had rotating aluminum discs with Morse code characters incised into the edges of the discs as raised teeth. As the disc rotated, a tracking stylus in contact with the teeth was displaced by the raised teeth, and allowed an electrical contact to make and break a circuit, producing the Morse code characters. The instruments varied only in whether the discs turned by use of a hand crank or were motor-driven, and in the numbers of discs that could be stacked, necessitating a cam mechanism which raised and lowered the tracking stylus in the multi-disc models. Some instruments included keys, sounders, or buzzers integral to the devices, although the company also sold 'stand-alone' sounders, buzzers, batteries, and hookup wire produced by other manufacturers as accompaniments to their instruments. A student could purchase the Omnigraph instrument alone, however for a few dollars more, the student could obtain a package that included a learner's manual, a battery, a sounder or buzzer, some wire, and a straight key.

Although the company advertisements described 5 models of Omnigraphs, (Table 1), in reality, at least 15 distinct instruments were advertised or produced over the years.

The instruments were mounted on wooden bases, which on most models measured 5" X 10-1/2". Many but not all instruments bore a company identification label. Some were decals applied to the wooden bases while others were metal tags attached by small pins

COMPANY DESIGNATION	DESCRIPTION	VARIATIONS
No. 1 Omnigraph	Transmitter only or transmitter/KOB combination	Two versions (figs. 6,8)
No. 2.Omnigraph	5 and 15 disc versions	5 disc model-four types (figs. 10, 11,12,13). 15 disc model-six types (figs. 17-22.)
No. 3 Omnigraph	Single disc transmitter model with hand crank.	One version (Figure 7). Similar to No. 1 but larger size wooden base.
No. 4 Omnigraph	5 disc model with key, buzzer, and provision for headphones	Two versions, (included in No. 2 variations, above). (figs. 11,13)
No. 5 Omnigraph	Single disc model with hand crank and clock motor	Two versions (figs. 9,10)

Table 1: Omnigraph Company Instrument designations

hammered into the wooden bases.

The company supplied Omnigraphs to others who affixed their names to the instruments including the National Wireless Institute (a study-at-home correspondence school) in New York City, and A. W. Gamage, Ltd., London.

Most Omnigraphs have the notation 'Patented' or 'Pat.' embossed into the wooden bases. A circa-1910 Omnigraph catalogue has a diagram of a No. 5 instrument bearing the patent date Oct. 25, 1903. The only instrument with a patent date encountered by the author was a 5-disc instrument bearing the patent date of Oct. 23, 1904. To the best of the author's knowledge, there has been no research on the patents held by the company nor on the individuals who designed instruments.

Discs

The unique feature of the Omnigraph instruments is the use of rotating aluminum discs with raised teeth on the edge in the shape of the actual Morse code characters (Figures 3-5). Discs were of at least 3 different types (Figures 3-5) and a fourth type that appeared in an advertisement (Figure 6a) but which has never been seen by the author.

The discs were all 3-1/8" in diameter and were either thin (1/32") or thick (1/16"). Thin discs were used on the single disc instruments, and had a single central hole for the spindle, whereas thicker discs were used on the multidisc instruments, and had alignment holes in addition to the central spindle hole

Discs were available for both American Morse and Continental code.

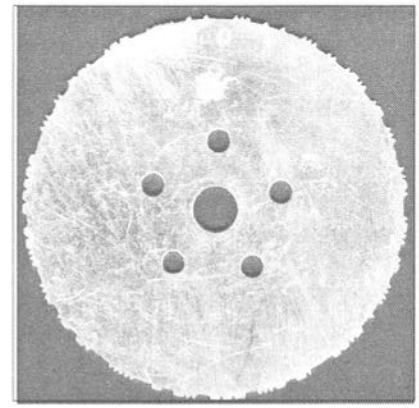


Figure 3: A typical disc from a multidisc instrument. Notice the 5 concentric holes in addition to the central spindle hole. In use, besides the central spindle post, a second post must be fitted into one of the 5 holes to align all the discs in the stack in a uniform manner to allow for coherent messages that were spread over more than a single disc. This disc is marked 9-O, representing the 15th disc of the 9-series of discs. (The letter 'O' is the 15th letter of the alphabet). Transcription of the Continental code reads: "SEE SILAS FLA HEY ABOUT 5 AND 35 SIG W LEE"

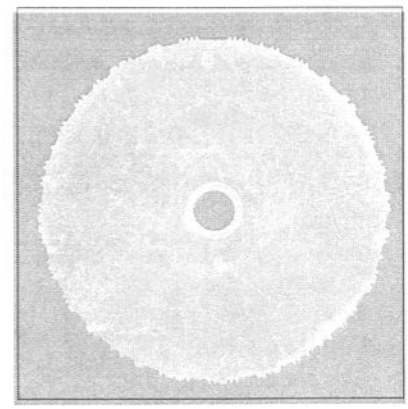


Figure 4: A typical disc used on a single disc Omnigraph instrument. A single central spindle hole holds the disc onto the rotating platter. This particular disc is marked "6". Transcription of the American Morse reads: "HR STMH FM NEW YORK 21 TO ADH. YES SIG LH"

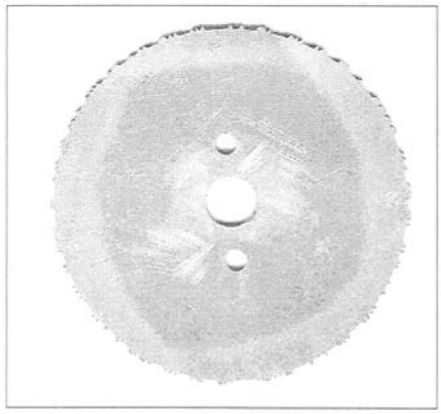


Figure 5: An unusual disc, with a central spindle hole and two alignment holes. This disc is one of a complete set of 15 found on the instrument shown in Figure 23. This disc is the last disc ('O') from the series, and bore no numerical designation. The character consisting of 4 short dashes at approximately the 2:00 position on the disc is the Morse character denoting a new paragraph[3] Translation of the Morse message reads: "ON SALE CAN YOU SEE? ANSWER SIG L RICHARDS"

The number of characters on any individual disc varied from 12 to 36[4] with the lower number of characters allowing for slower code speed in the beginning lessons and the closer spaced characters for more advanced lessons. The speed of rotation of the discs, of course was user modifiable, allowing further control of sending speed. Code was sent using the 'Farnsworth Method' indicating that the individual Morse code characters were uniform in dot and dash length and spacing with slower code speeds achieved simply allowing more time between individual characters. The thicker discs could be used on the single disc instruments but the thinner discs were physically incompatible with the multi-disc mechanism, which required a second

7-A	III SS AS HOOKER OFF LB NJ SEPT 15 TOT
7-B	BROWNS OPR STR BRITTON VIOLENT RAIN AND
7-C	WIND STM RAGED AT ASBURY SE OF US THIS MNG
7-D	DAMAGED THE TOWN AVON. 2 LIVES IN PERIL
7-E	BY FIRE ON SHIP KENNEDY BEACHED HERE. B
7-F	GEO DENTY KEY ESCEBETTS FRANK R. MILLERS
7-G	JOE TEER JOHN Z. WORTON SAMUEL T. CORBIN
7-H	NAMES FM POCKET OF ROB BENTLY SAVED.
7-I	TURKISH HUSSARS ARRESTED WHILE AT SCUTARI
7-J	MAN. Q HIGGINS ON STEAMSHIP XE MEYER.
7-K	RECD FM HATTARAS WED. 5 AM SEVENTEEN HUNDRED
7-L	WT IS ZN HOPING FOR ? S FORD IS A VYGD
7M	. IT WAS STATED IN ADVICE S. MURAD WAS PUT
7-N	TO DEATH D'S NO IS 496 ADSMEAT 370N SEA-AIR AVE 7 AM (SIG C HAROLD EBLIN.

Table 2: Transcription of the full disc series of Continental code for the 7-series of discs. (Transcription courtesy of Mr. Lynn Burlingame N7CFO).

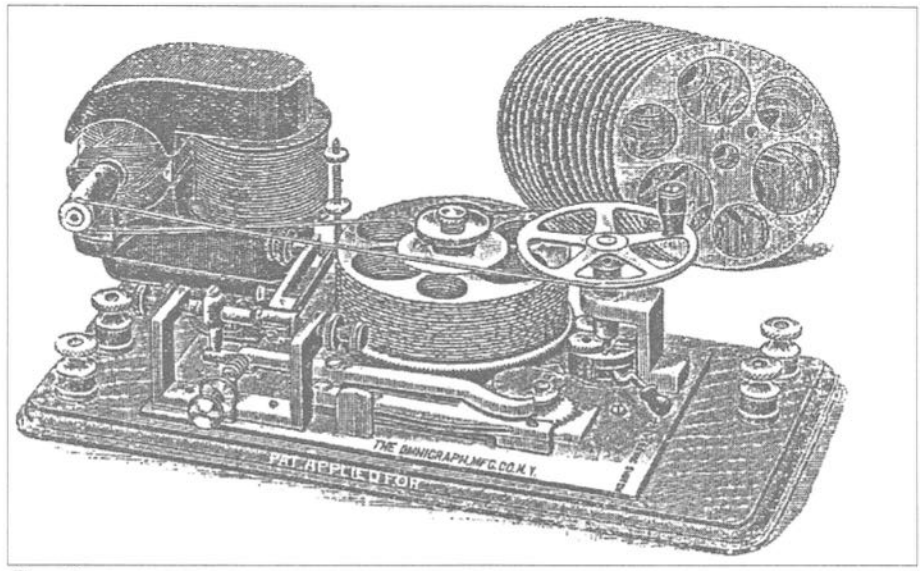
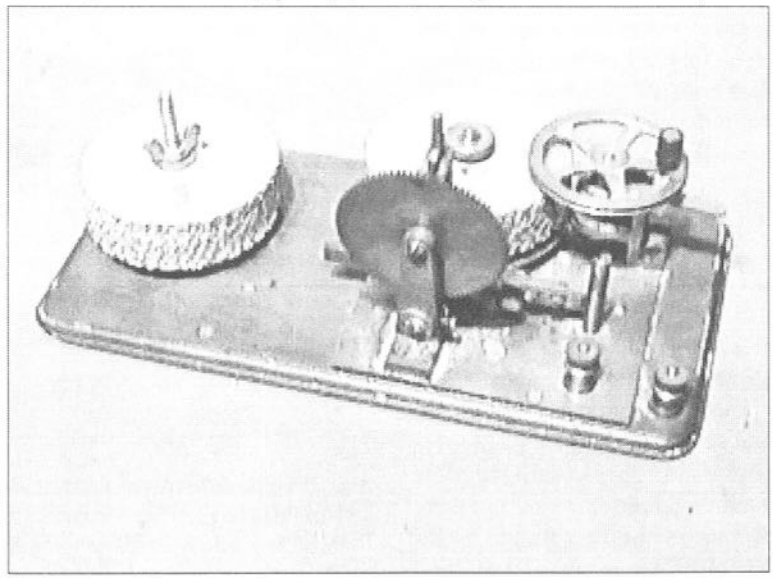


Figure 6:

(a) Above - A version of the "Omnigraph No. 2 Improved" with a different type of cam mechanism and a provision for hand cranking the instrument. Notice the different style discs with large holes. The author has never seen these discs such as these and wonders if they were ever produced.

(b) Below - Hand crank instrument with no clock drive. This unique instrument was never advertised to the best of the author's knowledge, and contained 30 Morse discs with 15 in use and 15 spares. This instrument contained the unique discs shown in (Figure 5). (Photo courtesy of Mr. Mike Feher N4FS).



alignment hole. Practice sessions included code groups, random characters, numbers, punctuation, and short messages (Table 2).

Discs that were used on multidisc instruments (5 or 15 disc models) were designated with an alphanumeric numbering system consisting of a number followed by a letter between A and O accounting for the 15 discs in the series. Other discs (Figure 5) were designated simply by a number. A set of 15 discs exists that is labeled A through O with no number designation (Figure 6b).

It is not known with certainty but it is suspected that the discs for single-disc instruments were numbered whereas the discs for instruments employing multiple stacked discs bore the alphanumeric designations.

Alphanumeric discs are known up the '9' series however it is unknown if more than 9 sets of discs exist. The lowest numbered series of discs (series 1 and 2 for example) had simple code groups whereas the highest numbered series (8 and 9) had more complex messages including numbers and punctuation characters.

Nine sets of 15 discs may exist for both Morse and continental code for a total of 135 discs for each code. The highest numbered disc encountered by the author is '19', suggesting that at least 19 numbered discs exist.

Morse discs were identical in appearance to Continental code discs and the company made no attempt to differentiate one from the other based on appearance. The only way to tell Morse from Continental discs is to visually inspect the discs, looking for the characteristic Morse characters that were distinct form the continental code characters.

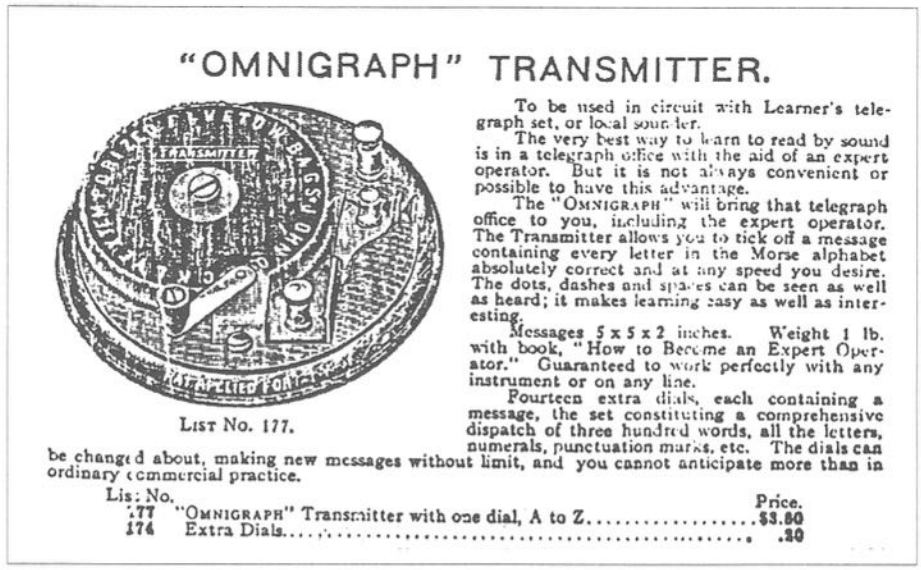
In addition to the discs that were included with the initial purchase of the instrument, additional discs could be obtained at modest cost. The company also permitted students to exchange their discs for different ones for a 2 cent per disc postage and handling fee. If one ordered 5 extra discs for a 5 disc instrument, it is suspected that the student would receive the first, second, or third set of 5 discs of a 15 disc sequence.

Transcription of the discs has demonstrated that sometimes the company mislabeled the discs. A 7-L disc owned by a collector is the same as a 7-I disc in the author's collection. Other collectors have other discs with the same messages on discs with different alphanumeric designations suggesting incorrect labeling. The author has several alphanumeric discs with the letter crossed out and another letter stamped next to it as a correction. Another disc has the letter designation on the disc upside down. The finding of inconsistent and erroneous labeling of discs suggests that disc labeling was not automated, and that human errors were not rare in labeling discs.

The author's experience and the anecdotal experience of other collectors is that most discs encountered are the thicker discs used in the multidisc instruments. The 6 thin discs in the author's possession are all American Morse.

The Clock Motors

Another feature of some of the Omnigraphs is their use of a spring-driven



"OMNIGRAPH" TRANSMITTER.

List No. 177.

To be used in circuit with Learner's telegraph set, or local sounder.

The very best way to learn to read by sound is in a telegraph office with the aid of an expert operator. But it is not always convenient or possible to have this advantage.

The "Omnigraph" will bring that telegraph office to you, including the expert operator. The Transmitter allows you to tick off a message containing every letter in the Morse alphabet absolutely correct and at any speed you desire. The dots, dashes and spaces can be seen as well as heard; it makes learning easy as well as interesting.

Messages 5 x 5 x 2 inches. Weight 1 lb. with book, "How to Become an Expert Operator." Guaranteed to work perfectly with any instrument or on any line.

Fourteen extra dials, each containing a message, the set constituting a comprehensive dispatch of three hundred words, all the letters, numerals, punctuation marks, etc. The dials can be changed about, making new messages without limit, and you cannot anticipate more than in ordinary commercial practice.

List No.		Price.
177	"Omnigraph" Transmitter with one dial, A to Z	$3.50
174	Extra Dials	.10

Figure 7: "Omnigraph Transmitter No. 1", the simplest device the company produced. The user had to supply his own battery, buzzer or sounder, wire, and key.

windup clock motor. An interesting adaptation is the use of a flying-ball governor mechanism to maintain constant speed in the face of a marked increase in the instantaneous loading, as when the stylus tracking mechanism moved from one disc to a higher disc in a stack. In reality, the sending speed slowed as the tracking stylus moved to a higher disc, and frequently would flub the first character on the higher disc.

As the stylus descended the stack of discs, frequently it would skip the adjacent disc and track to a lower disc, although this may have been secondary to wear on the cam mechanism. The clock motors on different instruments varied slightly in design over the years but all had the flying ball governor, and a friction speed control mechanism.

An experienced clock repairman indicated to the author that the clock motor resembles a Seth Thomas clock mechanism of the era with the addition of the governor, and that most likely Seth Thomas provided the clock drives to the Omnigraph company. The motor mainspring is presently an off-the-shelf item from clock repair parts sources and can easily be obtained and replaced on existing instruments if needed.

The Simplest Omnigraph

The simplest Omnigraph device consisted of a single disc mounted on a platter which was rotated by use of a hand crank (Figure 7). Advertisements in 1909 listed this model as "The Omnigraph Transmitter No. 1". The single disc supplied with the instrument had American Morse characters which sent the nonsense statement: JOHN QUICKLY

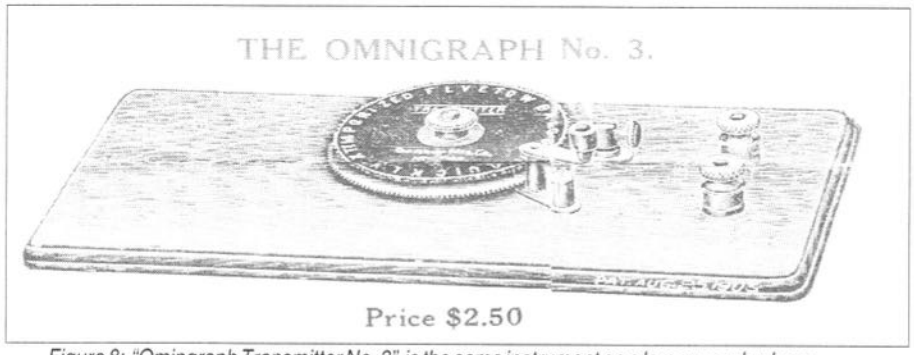


Figure 8: "Omingraph Transmitter No. 3" is the same instrument on a larger wooden base. From a c.1915 Omnigraph Company catalogue.

EXTEMPORIZED FIVE TOW BAGS, which incorporates all 26 letters of the alphabet into one sentence. No numerals or punctuation were included. An instruction booklet "How To Become An Excellent Operator" was included with purchase of the device. Additional discs could be purchased for 5 cents each.

The same device on a larger base was known as "The Omnigraph #3" in a c. 1910 catalog (Figure 8).

Omnigraph KOB

A device similar to the simplest Omnigraph (above) incorporated an inexpensive sounder and key identical to the J.H. Bunnell "Morse Learners' Outfit" advertised in the 1900 Bunnell Catalogue, and were undoubtedly supplied to Omnigraph by Bunnell. (Figure 9). There was no separate model number for this device, and it was regarded as a version of "The Omnigraph Transmitter No. 1."

Single Disc Omnigraph with Hand Crank and Motor

Due to the inconvenience of having one individual hand crank an instrument while another listens to the

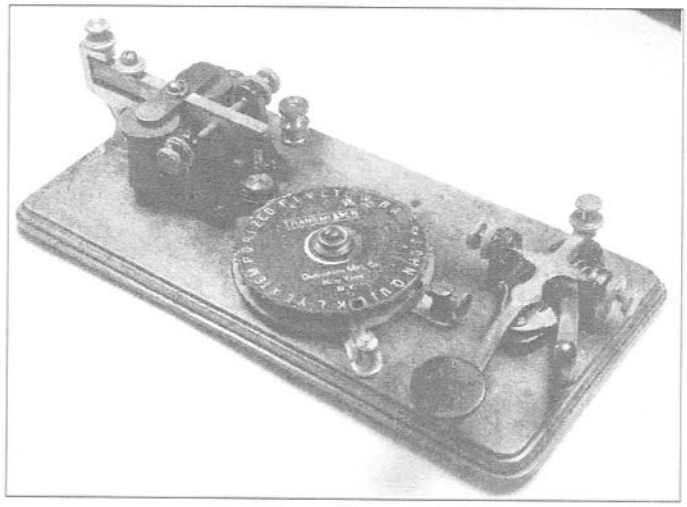


Figure 9: Omnigraph transmitter with integral key and sounder. This instrument is missing the hand crank used to turn the platter containing the disc.

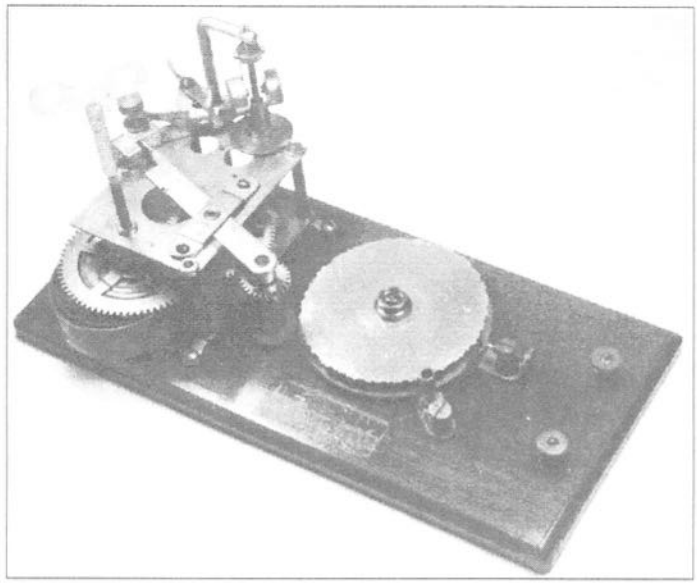


Figure 10: "Omnigraph No. 5" is the company designation for this model. At $7 around 1915, it came with a total of 3 discs and a learner's manual. This instrument is also missing the hand crank as is ***Figure 9****.*

that allowed both for hand cranking and motorized disc rotation (Figure 10). The logic behind supplying such an instrument is unclear, inasmuch as the hand-cranked mechanism would seem completely superfluous in the face of the convenience of motorized use.

Despite the ease of having automated disc turning, the user was still limited to a single disc at a time, and by having to change the disc after every use. It must have been very tedious for the student to listen to the same disc over and over, and to have to change every disc by hand. It is speculative, but undoubtedly at least some students thought to turn the disc over, thus playing the disc backwards, generating new characters. The letter A (· —) for example would then become N (— ·). A c. 1930 company catalogue illustrated a slightly different version of this instrument on a smaller base and with a more compact design (Figure 11).

code, (or even worse, trying to crank it yourself while attempting to copy Morse code), the company supplied a device

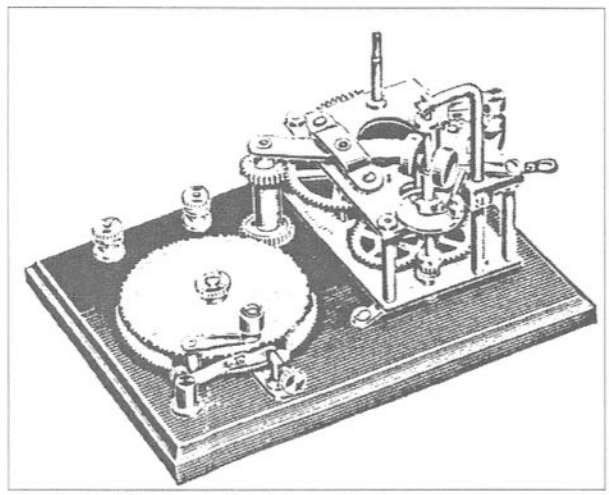


Fig 11: "Omnigraph No. 5" on a smaller base with more compact design than ***Figure 10.***

Notes and References

1 An Omnigraph catalogue c. 1930 listed the company as 'Established 1900'. The first Omnigraph advertisement the author could locate was from a J.H. Bunnell catalogue from 1900.

2 No advertisements for Omnigraphs were found after 1931 suggesting this year for the demise of the company.

3 Numerous radio and electrical publications and equipment catalogues from 1900-1931 were employed as reference materials and are too numerous to mention individually

4 Friedman, Neil D. A Clockwork Omnigraph; CQ Magazine Feb. 1981 p. 7-9.

5 Martin, Fredric W. Personal communication.

6 Friedman, Neil D. Omnigraph Disc Codes; Old Timer's Bulletin of the Antique Wireless Association. Vol. 35, issue one (Feb. 1994). p. 54

7 Reinke, Roger W. I'll Never Forget That Old Whatchamacallit; Old Timer's Bulletin of the Antique Wireless Association. (Feb. 1996). p. 39.

8 'Parks Code Wheel'; Parks Electronics Laboratories Rt. 2 Box 35, Beaverton, OR. QST May 1963.

9 Elwood, John (WW7P). Personal communication.

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MM

TO BE CONTINUED

The Titanic Wireless System

by W. P. Jones

The article, Signals from the Titanic by Dr Gary Bold in MM78 set me off delving into my notes about the methods that were available then to detect the spark transmissions. The three types that Marconi-equipped ships had fitted at the time of the Titanic were the magnetic detector, the valve diode receiver or the crystal receiver. The magnetic detector had held sway for many years before the valve detector was developed.

There were two devices which handled the signal that emerged from the mutual inductor; the first was the telephone condenser. This condenser was divided into three groups of 0.55, 0.11 and 0.22 microfarads. Three brass plugs enabled 7 different combinations of condenser to be obtained. By variations this was used to sharpen the tone of the signals in the headphone to improve reception.

The second instrument was the multiple tuner which contains variable inductances and condensers for the aerial receiving circuit. It had 4 ranges, which covered 80 to 150 metres, 150 to 1600 metres, 1600 to 2000 metres and 2000 to 2600 metres.

When the ship was not in communication with another station the safe watch-keeping channel was monitored with the multi tuner in the 'stand-by' position with the aerial condenser shorted and no inductance in circuit. During communications the multi tuner was brought in to play to tune the aerial for maximum signal strength.

As regards the asymmetric mountings of the magnets in Dr. Bold's figure 2 schematic, there were only two positions for the magnets with respect to the mutual inductor coils. The first would be with poles S-N / N-S (normal position) with this position it will be seen that like poles are together this produced a hissing sound in the headphones when the band was moving.

In the second position the magnet has less influence on the mutual inductor and the hiss is eliminated. This breathing affect interfered with and made weak signals difficult to read - it was a matter of operator choice. The re-arrangement would entail removal of the bracket, which holds the magnets. The second arrangement would reduce the receiver's sensitivity. With the Hissing present it was indicative that the band was still moving. The clockwork when fully wound would drive the band for approximately 100 minutes and it ran silently.

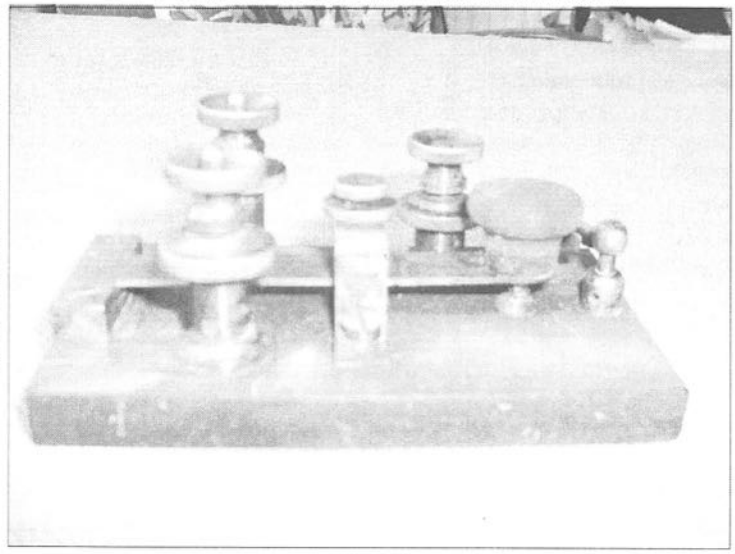
The standard 1.5 kW wireless transmitter, used on many ships at the

time, was designed to transmit on all wavelengths between 220 and 800 metres. There was a changeover switch so that rapid changes could be made from 450 to 600 or 800 metres. It was a double switch, which altered the primary circuit while the other arm alters the aerial tuning inductance. Little ebonite blocks suitably engraved 300, 450, 600 and 800 metres were fitted into the spiral inductance of the primary. The 5 kW set used on the Titantic and her sister ships, some times described as "battleship" covered transmitting wavelengths of 300 metres to 1000 metres, and 1200, 1800 or 4500 metres. The spark frequency was 400 to 700 per second. *MM*

Info Please!

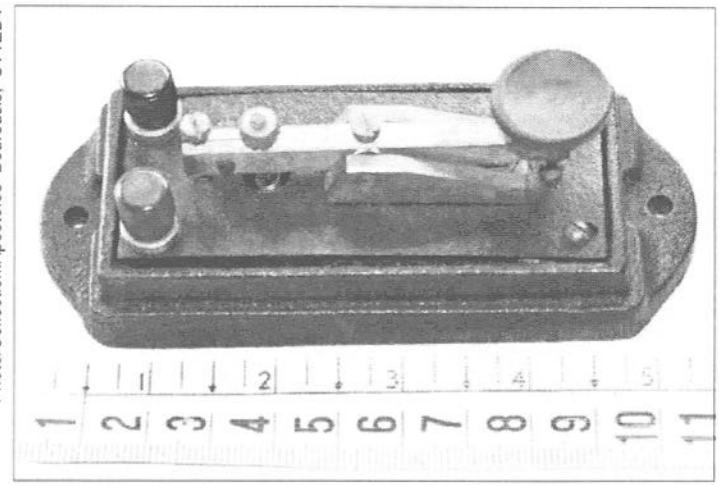
Readers are invited to contribute any additional information and stories, no matter how minor, to the Editor, Morsum Magnificat. There have been thousands of designs of keys & telegraphy instuments. Information will be lost unless it is compiled in one place and shared with other readers.

Photo/Collection: Geoffrey Walsh, GM4FH



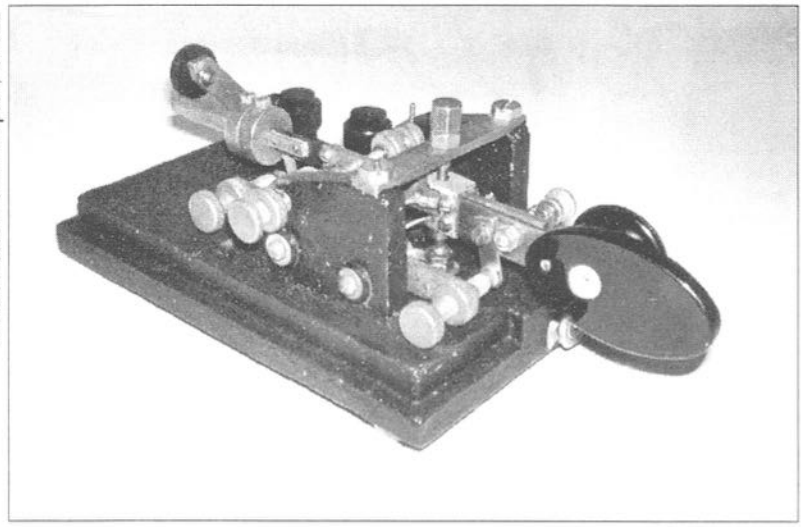
There is nothing to identify the maker of this strap key but its use is unknown. It could have been for electrophysiological observations. Any information would be welcome.

Photo/Collection:Apostolos Bourousis, SV1EDY



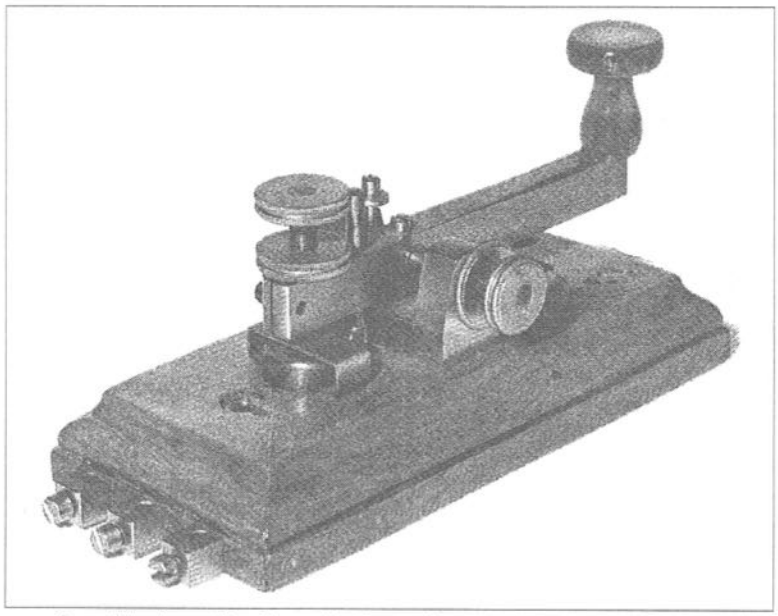
This key was obtained recently by Apostolos Bourousis, SV1EDY. Can anyone provide information about it?

Photo/Collection: Jim Phillipson, G4BEZ



Jim Phillipson was given this key about 35 years ago and it has since been somewhat modified. He has also seen a straight key built on the same heavy cast-iron base and was informed that the keys were made by The Northampton Plating Co. Does anyone have any more information on the key or the maker?

Photo: Don Breen



Some friends sent Don Breen this picture of a very interesting key from museum exhibition in Olten, Switzerland. Very little information is given about the key. Can any readers help?

Your Letters

Readers' letters on any Morse subject are always welcome, but may be edited when space is limited. When more than one subject is covered, letters may be divided into single subjects in order to bring comments on various matters together for easy reference. Please note that the views in readers letters are not necessarily those of MM.

Info Please MM79 AWA Key

Last year in September, I asked an old friend in Melbourne, Doug Twigg if he knew the history of the AWA Manipulating key. I owned one years ago, with a slightly different operating knob to that on page 32 of MM79. Doug came back and this is a précis of his reply:

Yes, I know this key very well; it has been around in a lot of radio stations in Australia as long as I have been in radio communications, at least since WWII, maybe earlier!!

I first saw them in use at the RAN (Royal Australian Navy) shore stations, at Harman (Canberra) et al. Then in DCA (Dept of Civil Aviation) aeradio stations, especially the older ones like Melbourne, Mildura, Launceston and Hobart.

As you know AWA used to operate all coastal and aeradio stations in Australia before WWII, before the OTC (Overseas Telecommunications Commission) and the DCA took over their operations, but the older stations were built by AWA and the radio equipment installations were manufactured by AWA, including the Morse keys - everything!!

AWA also installed the radio equipment in most of the ships flying the Australian flag, also Australian registered aircraft. They also provided the radio staff to operate and maintain them.

Well so much for the history, but there were a lot of AWA manipulating keys around, particularly the type in the picture you sent to me. Later Clipsal started manufacturing Morse keys along with other electrical hardware. These became common in the 50's and 60's, as AWA withdrew from this type of market.

Doug was Principal Radio Technical Officer for the Australian Antarctic Division for many years, served as a radio officer, and an officer in charge of Antarctic stations as well. As a youngster, he was trained by the RAN as a radio telegraphist. He can read both radio CW and sounder Morse.

Allan Moore VK1AL
Berlin, Germany

Just a few comments on the AWA key on page 32 of MM79. The key on page 46 in MM57 and this one are not identical. There are at least two versions of this key with minor differences.

The MM57 key has a half centimetre higher lower contact support (fixed to the base) and therefore a

correspondingly higher fulcrum than the MM79 key. The labels differ from each other and the MM79 key has distinctive grooved washers under the two outer terminal screws.

The knobs seem to vary considerably - maybe from later replacements by owners or perhaps whatever was available during WWII, was used. However I believe the knob shown in MM79 is the correct one for this version. The other version seems to have mainly carried a 'WT 8 AMP' type of knob with no skirt. I have seen others with a larger flatter type with a skirt beneath. Maybe one version was made for civilian use and the other military.

I think the vintage would be late 1930s to early 1940s and were made for the military for use in radio sets. AWA (Amalgamated Wireless Australasia) made a variety of electrical items - radios, TVs, refrigerators etc amongst other things.

I have recently contacted the firm and was told the company is no longer a manufacturer and in an entirely different business. They had no records pertaining to Morse keys. This may be of some interest to readers.

Ron McMullen
NSW, Australia

Info Please MM79 p33

Just a note to say I have just received my MM and I noticed Dave Pennes querying a key which he thinks is British.

The 'Musonic' Buzzer Box is very similar to the buzzer on my Gamages Key. I have searched the internet and 'Musonic' are still trading, if in fact they are one and the same company (www.Musonic.co.uk) They sell Hi-Fi parts, record sleeves, stylus bits and pieces.

They say that they have been trading for over forty years which makes me think they are the same people. Maybe they have records of who they supplied with buzzers in the good old days!

Richard Putnam, GØILN
East Sussex, UK

History of the Australian Telegraph

I've embarked on the task of writing about the beginnings of the telegraph in Australia and I wonder if any readers have knowledge of the beginnings of the electric telegraph in Victoria.

Much has been written about Todd but almost nothing about Samuel McGowan the pioneer who began it all in 1853/4 in Melbourne, Victoria. I have learned a lot about the actual spread of the system in Victoria, the promotion of the idea by the Argus newspaper, McGowan's reports to parliament and a little from a centenary publication of Korowa CE Girl's School. However I've yet to find any significant primary sources, e.g. letters, diary etc..

I believe that some of the family may be still live in Ontario from where he came and members of the family of his wife Annie Benson may still live here and in Canada. No one has written any significant piece on the man himself.

Firstly are any readers aware of letters, diaries, archives etc that may be of help or descendants

Secondly has anyone any advice and can you point me towards historians etc., who may be able to give me some guidance.

I would appreciate any assistance. The State Library and National Library here don't seem to have more (that they know of). The Australian archives has little. My address is 23 Palm Av., Bendigo 3550, Australia. Telephone +61 (o3) 5443 3655. E-mail: nelsonpe@impulse.net.au

Peter Nelson

Army Signallers

I came across an old photo of what I think are British Army signallers. However on the reverse of the card are the words "CARTE POSTAL" which suggests a French connection – prhaps WWI.

If you look carefully the Morse keys can just be seen on top of the small signalling lamps. The men look very proficient with their semaphore flags. These were the days when flags, lamps and wire telegraphs were the main means of military communication.

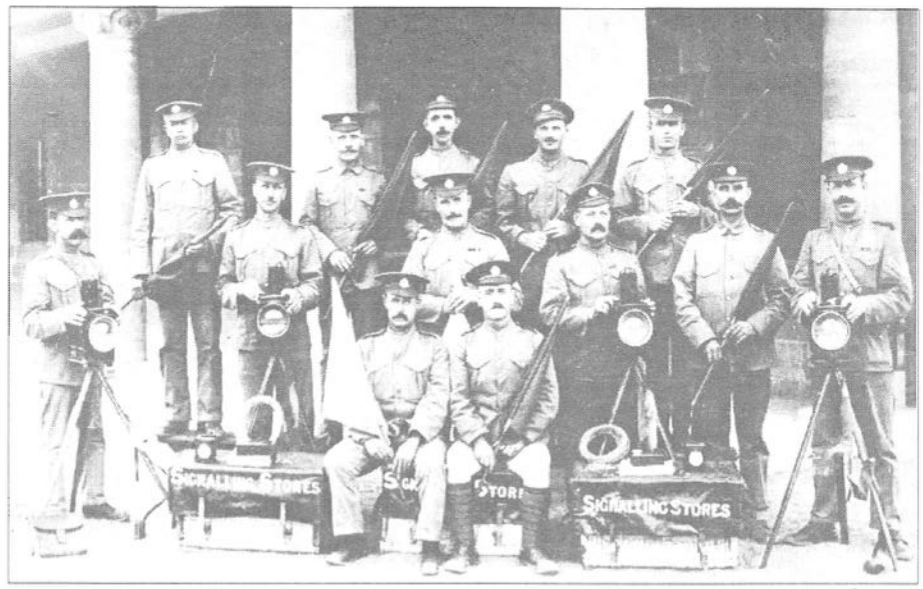
I would be very interested to hear form anyone who can provide further information; date, regiment, place etc.

Bill Jones
South Shields, UK

Channel Islands Enigma Machine

For readers planning to visit Jersey this year, there is an Enigma machine on display at the German Underground Hospital.

Ken Grigor
Plymouth, UK



Key Notes

Merrick Vertical Bug

With reference to the photo of the Merrick Vertical Bug on the front cover of MM77, two other keys made by John B. Merrick, VE3AWA have been featured in MM. The first is a semi-automatic key, featured on page 25 of MM46 and the second is the Mini Bug, featured on page 58 of MM50.

Tinsley Key MM78 p24

A similar key appearted in MM37 p21, which was marked "H. TINSLEY & Co. LONDON SE25, TYPE 1202 No. 29357.

Replica Marconi Key

The replica Marconi key used at the Lizard station and featured in MM76 p19 appears to be the same as the key used by Marconi in his experiments at the Haven Hotel, Poole. (see also MM75 p8 & p9.

Signal Electric Key MM77 p22

The Type can be determined by the contact size. QST, September, 1940 p92 lists the following:

TYPE	CONTACTS	CODE WORD	LIST PRICE
R-62	3/16"	SENCU	$3.50
R-63	¼"	SENCV	$3.60
R-64	3/8"	SEMCW	$3.85

The net weight and shipping weight of each model is listed as ¾ lb and 2 lb respectively

John Elwood, WW7P
Phoenix, Arizona

ReadersAds

Readers advertisements are free to MM subscribers. The number of insertions should be specified, otherwise it will be assumed that it is required in the next issue only. Non-subscribers are welcome to advertise in the Classified Ads section. Please contact MM for styles available and rates.

Ads can include one photo free of charge

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THE MM Q & Z CODEBOOK, a comprehensive 82-page list of the Q-codes and Z-codes, including a one-page list of the original Q-codes of 1912. Available from Dick Kraayveld PA3ALM, Merellaan 209, 3145 EH Maassluis, Holland. Price £5 UK, or US$10.00 outside UK, including postage in both cases. Payment accepted in cash only.

ReadersAds

EXCHANGE & WANTED

WANTED: TELEGRAPHY. I am looking for somewhat special apparatus: Double – and Single Needle, Wheatstone, Morse etc. Buy or swap. I can swap, amongst others, for early electricity (e.g. tubes from Crookes, Geissler, Rntgen; Ruhmkorff coils; Wimshurst; Tesla;..), radio (e.g. Philips bakelites, heavy! transmitter tubes), some early Marconi items, some telephones and of course telegraphy (a lot). Who else collects telegraphy? Contact: Fons Vanden Berghen (author of "Classics of Communication"), Lenniksesteenweg 462/22, B-1500 HALLE, Belgium. Tel: + 3 2 / 2 / 3 5 6 - 0 5 - 5 6 . fons.vandenberghen@pandora.be (NEW EMAIL address).

I AM A KEY COLLECTOR with over 300 different keys from 20 countries and have 50 keys available for swapping. Write to Henri Heraud, F6AUO, 9 Avenue de Bellevue, 91130 RIS ORANGIS, FRANCE.

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 of photocopies. I am a hobbyist in Cryptography and am facinated 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

WANTED: Marconi 365A or B key with roller bearings. Will pay going price and it will end up as property of Radio Officers Association as an addition to the equipment held. Contact David Barlow, G3PLE, Pine, Churchtown, Cury, Nr Helston, Cornwall, TR12 7BW, UK. Tel: +44 (0) 1326 240738, e-mail: dbarlow@lizardwireless.org

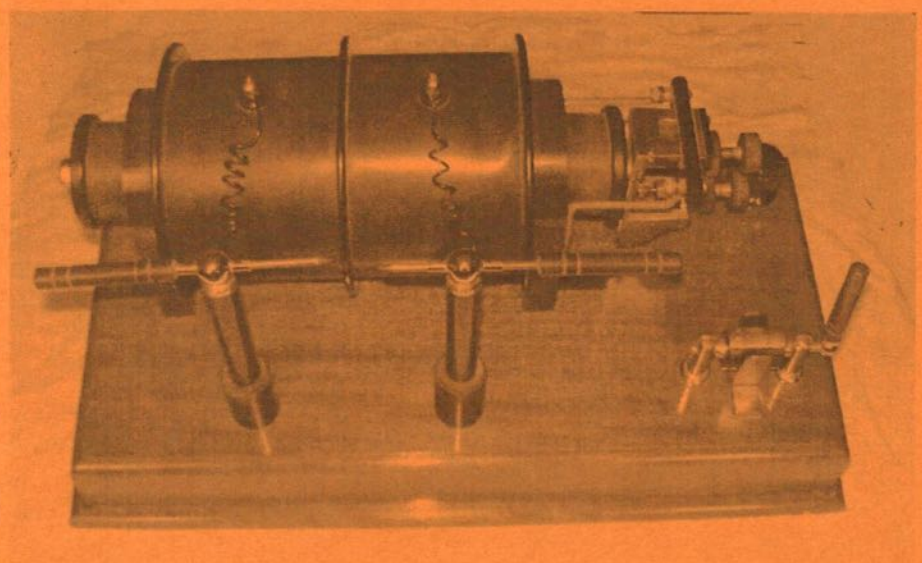
WANTED: CANDLER'S Auxilliary Course. Contact G.Lizee, VE2ZK, 666 Lamarre, La Prairie, QC, Canada J5R 1M6.

WANTED TO BUY: Back issues of MM nos. 6, 9 to 22 inclusive. Also 1960s NATO Navy key (5805-99-580-8558). Please contact Stephen Parry, G4LJZ, E-mail: stephen@keying.co.uk

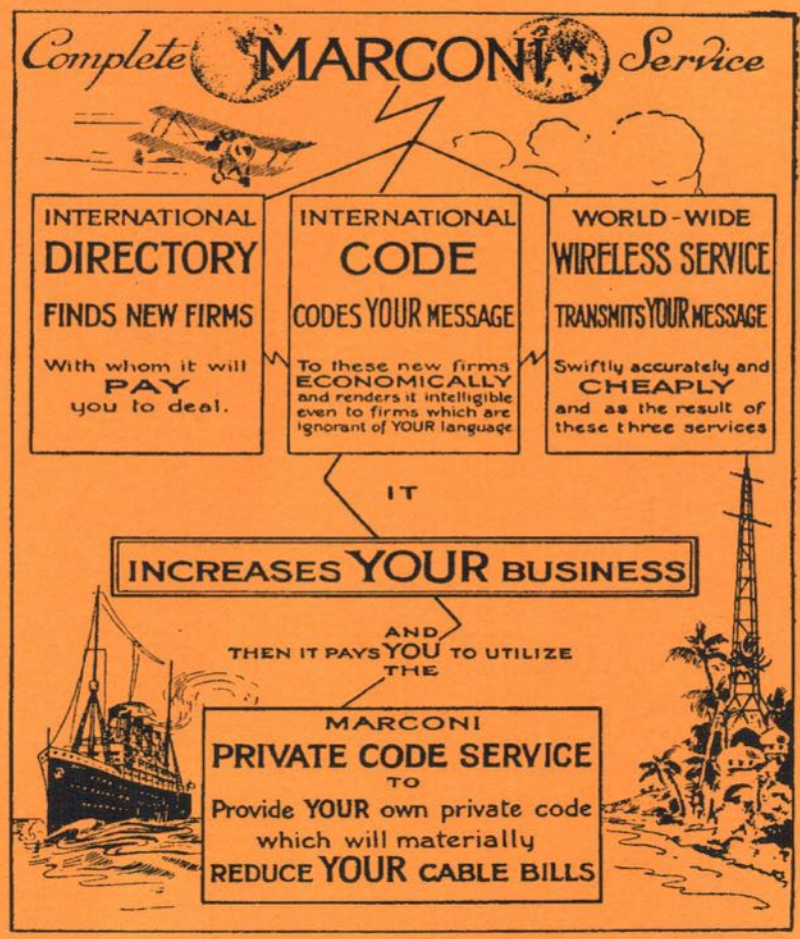
WANTED TO BUY: Old large commercial Morse key such as H. White 1918, or GPO double-current type keys, with or without the metal/metal-glass cover. Would consider exchanging my old Air Ministry Morse Key Type B1, Ref: 10F/7839 in as new condition. Letters to: D. Johnson W5FZ, 15514 Ensenada Drive, Houston, TX 77083-5008, Texas, USA. Or Email: fullerphone@yahoo.com

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.

The Telegraph Hotel, Great Orme's Head, Llandudno, North Wales late-19th century/early 20th century. It looks as though it was built around one of the early 19th century Murray semaphore towers, a chain of which linked Anglesey to Liverpool to report shipping heading for the port.



From an auction catalogue (to be held on 19th May at Wetwood, Staffordshire) Listed as a Spark transmitter, thought to be c1914.



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Advertisement for the Marconi International Code Company Ltd., Yearbook of Wireless Telegraphy and Telephony 1922.