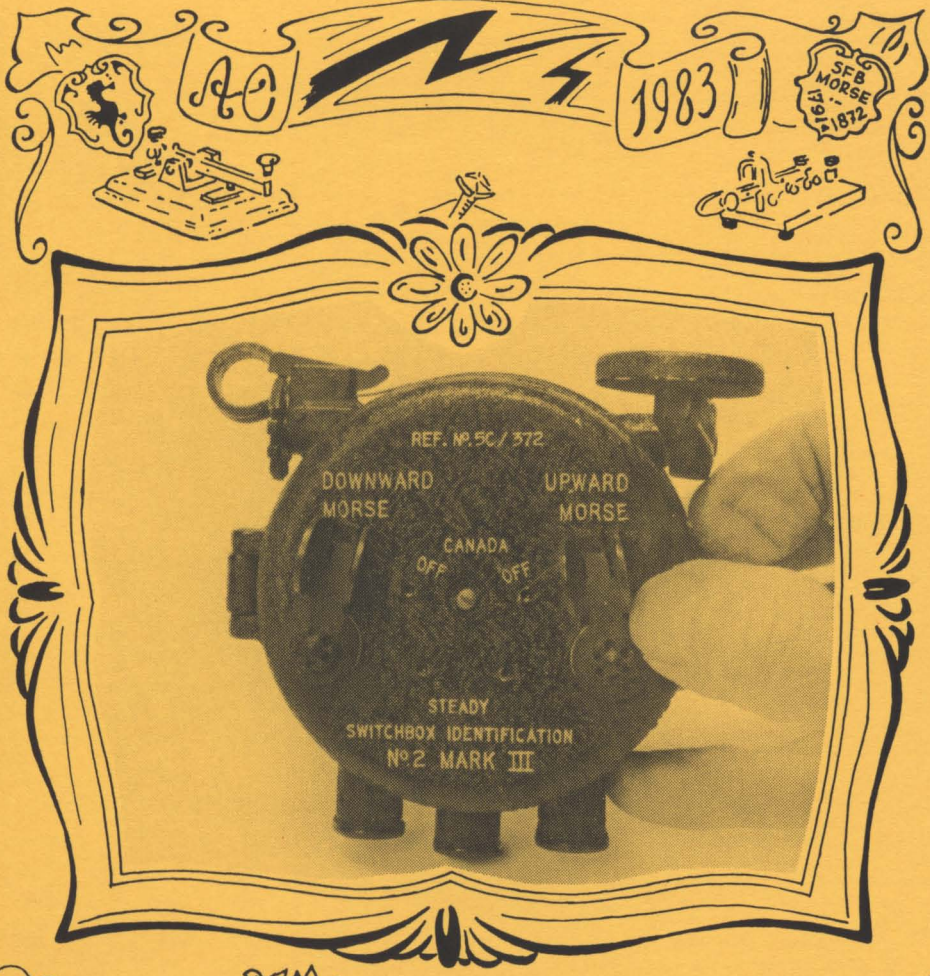

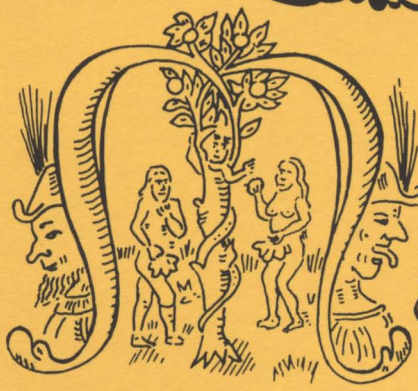

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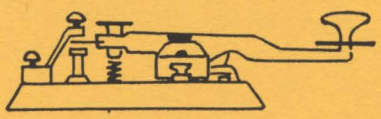

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COVER: Collectors' piece - WW2 RAF light-signalling key. See page 39 for more details. PHOTO: Murray Willer, VE3FRX.

The First Radio-Telegraph Transmission

by ROWLAND F. POCOCK

****

Marconi is generally credited with the invention of radio, but evidence suggests that Sir Oliver Lodge transmitted genuine radio signals almost a year earlier, although he did not appreciate the significance of his achievement at the time and failed to follow it up.

****

It is generally acknowledged that Sir Oliver Lodge (1851-1940) made a major contribution to the evolution of the scientific apparatus which was later developed into the earliest radio transmitters and receivers. Most historians also quote his memorial lecture for Hertz, delivered at the Royal Institution on the 1 June 1894, and his subsequent book based on this lecture[1], as the most important factors in publicising the scientific basis of the means of generating and detecting Hertzian waves.

This article makes two further claims for Lodge: it shows that he was the first experimenter to demonstrate publicly the transmission of Morse signals by Hertzian waves and their reception on telegraphic equipment, and that this demonstration to the British Association was the direct cause of the subsequent invention of three systems of radio telegraphy.

Preece's Prediction

There were many predictions of radio telegraphy in the 1890's, but that made by W H Preece (1834-1913, later Sir William Preece, CB, FRS), at the Oxford Meeting of the British Association on the 13 August 1894, was particularly significant. Preece was known as the inventor of a promising system of wireless telegraphy based on electromagnetic induction, and his official position as engineer-in-chief of the General Post office gave him especial authority among telegraph engineers. Above all, his prophecy was made only the day before Lodge's demonstration, and prepared Lodge's audience to appreciate the full significance of his experiments.

Preece, speaking at a meeting of Section G (mechanical science) of the British Association, stated that:[2]

'The mechanism of the mode of signalling across space is not difficult to follow. Its analogue is a flash of light seen at a distance. Energy is expended, say in, in a lighthouse. The energy assumes the luminous form exciting the ether to undulate with a frequency of many

millions per second, which, acting on the retina of the eye, produces the sensation called light. The burning of the oil lamp in the lighthouse is the primary source of energy; the rapid undulations of the ether propagated in straight lines at a velocity of 186000 mile/s are the radiation, transmitting this energy in a waveform to the distant ship; the eye is the apparatus which transforms the energy of the light waves into a form which excites consciousness in the brain. In our electrical experiments, the primary energy is in the current form; the comparatively few alternations per second excite waves in the ether of a few hundreds per second only. But these oscillations of the ether or electric waves are of the same character as those of light; they move with the same velocity, and when they fall on a sympathetic secondary conductor they excite in that conductor currents of electricity of the same frequency; and if a telephone be inserted in that circuit and applied to the ear sounds and musical notes are distinctly heard which, by pre-concerted measures, such as the use of the Morse code, can be utilised for the transmission of messages.'

It is rather interesting that this extremely accurate forecast of the properties of a radio telegraph was based on a misconception, as Preece believed that he was generating true Hertzian waves in the inductive circuits of his telegraph. However, this error was not important: engineers who understood the true nature of radio waves could appreciate their telegraphic potential from Preece's lecture.

Lodge's Demonstration

The principal event of the meeting on the 14 August 1894 was a joint session of the physiology and physical-science sections to hear and discuss a theory of the nature of vision based largely on Clerk Maxwell's electromagnetic theory. Prof Lodge (as he then was) assisted at this session by a series of demonstrations designed to explain the properties of electromagnetic radiation to biologists, who might not be expected to appreciate the latest physical research. Lodge's demonstrations were, however, deservedly popular, and many physicists and engineers also attended in order to see his experiments.

A contemporary report[3] says:

'Prof Oliver Lodge described some experiments to illustrate Clerk Maxwell's theory of light. He began by saying that his experiments referred to the waves generally known as Hertzian waves, though Maxwellian waves would be a more correct term. Various detectors of electric radiations were known, but the most sensitive was one which depended on the breaking down of the resistance of a bad electrical contact when electric surgings passed across it. Such a bad contact could be made by a row of iron borings in a tube, or by a steel spring with its end resting on a metal plate. These instruments he called 'coherers' ... Prof Lodge then described an electrical theory of vision ...

... Between the stimulus of lightness and darkness there would be persistence of vision. Prof Lodge showed an experiment to illustrate this, the coherer being restored by periodic tapping applied by a clockwork arrangement. For a continuous radiation, the coherer showed continuous indications which died away when the radiation ceased.'

Lodge himself has described[4] what these 'indications' were:

'These long and short signals obviously corresponded to the dashes and dots of the Morse code; and thus it was easy to demonstrate the signalling of some letters of the alphabet, so that they could be read by any telegraphist in the audience - some of whom may even now remember that they did so.'

The same source provides a description of the apparatus used for this Morse transmission. Lodge gives this description of his transmitter:

'The sending instrument was a Hertz vibrator actuated by an ordinary induction coil set in action by a Morse key. This apparatus was in another room, and was worked by an assistant.'

And he also states:

'The receiving apparatus was a filings tube in a copper hat, in circuit with a battery, actuating either a Morse recorder or a tape, or, for better demonstration to an audience, a Kelvin marine galvanometer, as first used for Atlantic telegraphy, before the siphon recorder replaced it. The instrument was lent to me by Dr Alexander Muirhead ... When the Morse key at the sending end was held down, the rapid trembler of the coil maintained the wave production, and the deflected spot of light at the receiving end remained in its deflected position so long as the key was down; but when the key was only momentarily depressed, a short series of waves was emitted, and the spot of light then suffered a momentary deflection.'

This is the earliest recorded instance of the transmission and reception of a Morse signal by radio waves, and is clearly of great historical importance. Unlike so many of the claims which have been advanced on behalf of obscure 'inventors' of radio telegraphy, this transmission was made at a public demonstration before a qualified audience who could assess its merit.

It is even more significant that Lodge chose a Kelvin galvanometer for his receiver and a standard Morse key to actuate his transmitter: the engineers in the audience will have noted that the signals were originated and finally displayed on standard telegraph apparatus, albeit obsolete apparatus. Lodge had not merely shown that radio telegraphy was possible, he had also shown that it was a practicable extension of the existing telegraph service.

Response

There is no doubt of the reception given to this demonstration, or

of the impression which it made. 'Nature' reported:[5]

'The audience, which filled every part of the large museum lecture room, repeatedly showed its warm appreciation of Prof Lodge's beautiful experiments.'

The distinguished scientists who saw the demonstration understood all its implications. Lodge later revealed:[4,6]

'Lord Rayleigh ... said, "If you follow that up, there is a life work in it", and he was quite right; but I didn't follow it up effectively ...

'I was too busy with teaching work to take up telegraphic or any other development ...'

Fortunately, others carried on the work that Lodge had temporarily abandoned. Marconi was attracted to the study of Hertzian waves by reading a magazine article when holidaying in Lombardy, according to family tradition related[7] by his daughter. Capt Henry Jackson, RN, later stated:[8]

'In September 1896 ... Mr Marconi informed me that he had been working at his system for at least two years, mostly at his home in Italy.'

Jackson's comment suggests that the article seen by Marconi was published at some time in the autumn of 1894. Until more information is available about the sources of Marconi's work, it is impossible to assert that Lodge was the originator of his work, but the coincidence of dates and the general lines of Marconi's research suggests that this article and later papers which Marconi discovered in the library of the University of Bologna were written with a knowledge of Lodge's work.

There is a more direct link with the work of the Russian physicist Alexandr Popov. Prof Susskind has shown[9] that Popov was aware of Marconi's experiments as early as September 1896, when these had been publicised only at the British Association. The BA records were therefore available to Popov; he must have known of Lodge's demonstration in 1894, and his work on atmospheric electricity early in 1895 acknowledges Lodge's book as one of his sources.

A third experimenter - Capt Henry Jackson, RN - demonstrated the transmission of Morse signals by radio in 1896. Jackson based his apparatus on the equipment used by Dr Bose of Calcutta for investigating refractive indices at radio wavelengths.[10] Bose himself derived his equipment from descriptions of Lodge's experiments. It is, however, possible that the direct source was the Royal Institution lecture and not that given to the British Association.

Invention of Radio

It is very tempting to suggest that the preceding evidence is enough to credit Lodge with the invention of radio. Certainly, if Lodge had been born a Russian he would now be known as the 'inventor of radio'

in the Soviet Union. He transmitted genuine radio signals with conventional telegraphic equipment on the 14 August 1894: Marconi certainly did not equal this achievement until June 1895,[9] while the earliest claims for Popov and Jackson are the 24 March 1896[9] and the 20 August 1896,[10] respectively.

However, the first demonstration is not usually accepted as sufficient in itself to demonstrate priority of invention in Great Britain unless it is accompanied by some evidence of subsequent development to a practical system of commercial value. Lodge did not fulfil this second requirement: we have already seen that, by his own admission, he did not appreciate the significance of what he had achieved, and he did not resume radio experiments until after hearing of Marconi's system in September 1896.

The Oxford demonstration therefore does not upset the pre-eminence usually according to Marconi, except that the alleged private transmissions witnessed by members of Marconi's family in the early summer of 1895[7] cannot be considered to be the first transmission of Morse signals by radio waves. It has been recognised generally that, although he was unaware of Lodge's work, the sources used by Marconi derived ultimately from Lodge, and this article does not therefore contradict the accepted opinion. It does, however, suggest that there is a much stronger and more direct link between Lodge's work and the ultimate use of Hertzian waves for telegraphy than is commonly appreciated.

[Thanks are due to the staffs of the Oxford City Libraries, the Nottingham City Library and the Guildhall Library, London, for their help and patience in tracing the various documents used in preparing this article. Reference 8 from Capt Jackson is taken from a letter now in the UK Public Record Office (ref.ADM 116/570) and is quoted here by permission of the Comptroller of HM Stationery Office. Particular help has been given by G E S Turner, University Museum, Oxford, who has assisted in establishing the general background and identifying the Museum theatre where Lodge gave his demonstration.]

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(This article was originally published in "Electronics and Power", September 1969, by the Institution of Electrical Engineers, and is reproduced with kind permission.)

%%%

COW POWER

I got my callsign VQ4DV in 1952, and for over 20 years kept a daily cw sked with Hugo Gurney, VQ4SNA. He was my Godfather and helped me a great deal in getting my call. We both had no mains electricity so I copied his 32 volt DC lighting set. We ran our 6L6-807 rigs from ex-WD rotary converters, and my BC 348 receiver had a built-in 28 volt genemotor which worked even better on 32 volts!

Initially I used old car batteries, but in 1955 I put in a set of alkaline cells and these were charged by a 2-hp Lister engine which ran entirely on Biogas produced from our cows. This system was still in use when we had to sell the farm in 1983, and gave rise to the rather amusing QSL card that a friend did for me depicting my claim to have the only cow-powered transmitter in East Africa!

Alas Hugo became a silent key quite a few years ago, but I am glad to say that I am still able to keep my wrist supple with a daily sked with Mike Tremlett, 5Z4MT, on 80 metres.

Tim Hutchinson, 5Z4DV.

%%%

READERS' ADS

WANTED

Australian Jigger/Bug, Simplex auto or Auto Morse. Smiley White, POB 5150 Fredericksburg, Va 22403, USA. Tel: 703-373-0996.

GPO key, RAF type D key, Vibroplex or McElroy keys. Wyn Davies, Pen-y-Maes, Halcog, Brymbo, Wrexham, LL11 5DR. Tel: 0978 756330.

FOR SALE

All back issues of MM are still available, but if you are thinking of making up a full set please note that supplies of Nrs 5 and 7 are getting low. Price per copy - UK, £1.65; EUROPE or SURFACE worldwide, £1.75 (US$2.75); Less 10% if more than 4 issues ordered at same time.

(Readers ads are free of charge).

Just rambling....

My thanks to the many concerned readers who have written with suggestions or offers of help to keep MM going.

Unfortunately no-one has yet expressed an interest in actually taking over publication so there is still uncertainty about the future of the magazine. I hope to have more definite information next time.

At the IARU Region 1 High Speed Telegraphy Championships in Hannover on 10-11 November there were entries from seven countries with speeds of up to 300 per minute for letters and 520 for numbers! Overall team winners were the Russians (who use a special form of shorthand) with the Czechs and Bulgarians as runners-up. I hope to include more details in the next issue of MM.

Walter Bunzel, DK9EA, who sent this information, reports that INTERRADIO '89, held at the same time, was a great success and that following the sensational opening-up of the "Wall" between East and West some East German amateurs "came to the fair and went home in the evening".

The 200th anniversary of the birth of Samuel F.B. Morse occurs on Saturday 27th April, 1991. For readers of MM this is surely an anniversary worthy of celebration! Such an occasion requires advance planning, however, whether by individuals, clubs, national or international societies with any form of interest in Morse operating.

If you think your own club or society should be involved, why not ask them to start planning something now to take place on Morse's birthday, or even throughout the anniversary year, to publicise the attractions of Morse operating and to celebrate this special occasion!

Another suggestion is that postal administrations might issue special commemorative stamps. Apart from the great contribution Prof. Morse's invention made to the development of world communications generally, his system was the backbone of postal telecommunications in most countries for many years.

Why not write to your country's postal administration now to suggest a commemorative stamp (or stamps!) to celebrate the anniversary? The more people who write, the more the authorities will take the suggestion seriously! Let me know how you get on... 73, Tony.

Fake telegram

by Jan Noordegraaf

Billy, the messenger boy, was a Casanova. You could see that immediately, because of his moustache, curly hair and dandy manners. Furthermore, he never left any doubt in his stories about his exploits in Loveland.

One morning he sneaked into the radio room, and most likely over-courageous because of his latest successes, silently peered over the shoulders of the radio-officer, who was in the process of receiving a telegram. The Sparks did not seem to notice his presence, pressed the headphones deeper on his head, bent a bit more forward, and wrote down the morse signals one by one. Dots and dashes became letters, and letters became words.

Billy read "Billy van Dam - steward on board SS Juno ..." Damn! That was a coincidence! A telegram for him! Just stay there and watch! Then silently leave the room, and stay like a king in his cabin until the telegram arrived. "Am expecting your baby," Billy read. "Love - Ann." While the Sparks put down his ballpoint, and seized the morse key to confirm receipt of the telegram, Billy fled from the room like a dog with its tail between its legs, totally confused and trying to get away from that unexpected news.

In the meantime the radio-officer threw the head phones on the working table, slowly walked to the door, peered into the gangway, and saw nobody. He grabbed the telegram form and went to the captain, where he explained the entire happening. Grinning, the captain called the mate, and the mate called the second and the second called the chief engineer and the chief called the second so that before long everyone on board understood, that Billy was not to become a father, except Billy himself.

Two hours later, Billy timidly knocked on the door of the radio room and the Sparks said: "Come in! Oh, it's you, Billy; what can I do for you? You are looking very

pale; what is the matter with you?"

The Casanova stammered: "Now, be sensible, Sparks ... Where is my telegram?"

"Telegram, Billy? What telegram do you mean? Say, you do not come into this room uninvited, do you? That's forbidden, you know! Telegrams are classified material ..."

"So ... you did not receive a telegram for me? ... You were faking it, Sparks."

"I do not know what you are talking about, Billy ... Did you expect ... a telegram ... or something else, perhaps?"

"Please, give me a form ...," Billy said with a sigh of relief. "I want to send a telegram myself."

Some minutes later Sparks morsed apparently unmoved: "Ann B, Amsteldijk 54, Amsterdam - I love you! Billy!"

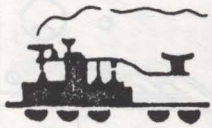
****

NEARLY PERFECT!

Heard on 2 metres. "By my calculator, that piece of Morse was sent at 11.91734 words per minute so it was pretty close to the test speed."

("Groundwave", Wimbledon & District ARS, December 1987.)

G.W.R. Morse



by RAY PASCOE, G3IOI

I started work on leaving school in 1944 as a "Learner" Telegraph Clerk at Truro Station on the old Great Western Railway. I remember being given a copy of the Telegraph Appendix. I was shown a dummy sounder circuit at one end of the office and was told to get on with teaching myself as there was a war on. Eight hours practice a day and my mother said I was saying dots and dashes in my sleep! It wasn't long before I was let loose on a live circuit.

I went into the Royal Signals in 1948 who promptly grabbed me as an Instructor OWL (Operator, Wireless and Line), and I spent the next two years at Catterick.

Promoted on the railway in 1952, I moved to Cardiff whose telegraph office was extremely busy with a mixture of Sounder, Single Needle, and Teleprinter circuits. It sounded like a factory with all the clatter. The Morse circuits were so busy that it was the practice to send tele-

Ray Pascoe, aged about 18 years, at the Truro end of the Truro-Plymouth sounder circuit.

grams in batches of six, then to receive six, and so on all day long. The waiting pile never seemed to get smaller.

I got promotion to Chief Telegraph Clerk at Hereford in 1962, but by that time plans were afoot to rationalise the Telegraph Network and in 1964 I had the unpleasant experience of watching Hereford office being dismantled. Morse sounder and single-needle instruments were in use on the Western Region up until that time, and I think the North Eastern Region had some Morse circuits for a short while after this.

After the closure of my office at Hereford I spent a year at Taunton (Teleprinter Office) and then moved to Bristol Telegraph. It was all teleprinters from then on and I think it was 1967 or 68 that information started to pass using computer switching.

I later became heavily involved in the creation of a National Teleprinter Network based on a computer in London. That computer is now interfaced with other Railway computer systems and the Post Office telex system, with the result that the same terminal can be used for a variety of purposes.

I've gone on a bit, but I thought that the evolution from the use of Morse to what is happening now would be of interest.

##

MORSE - THE HARD WAY!

A minor crisis occurred during the Amateur Radio ZC4VHF/5B4 DXpedition in Cyprus in 1987. During quiet periods, the 2-metre and 6-metre transmitters operated in an automatic CQ-calling beacon mode using a memory keyer. Shortly after I took over watch with a second operator, the keyer inexplicably erased its memory.

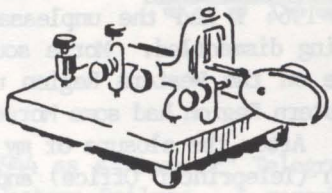
Unfortunately, the previous operator had taken away the squeeze paddles used to load the machine. Faced with the possibility of manually keying the transmitters continuously during the 12 hour watch, an alternative solution was sought, inspired by the old proverb "necessity is the mother of invention"!

The dustbin yielded one lollipop stick, a foil wrapper from a chocolate bar, 2 nails and a small block of wood. Using a brick as a hammer, the nails were driven into the wooden block. The foil was used to cover the lollipop stick for use as a paddle, and after attaching wires to the nails we attempted to re-load the memory.

It took about 20 frustrating attempts with this "Heath Robinson" affair to load, error free, "CQ CQ CQ de ZC4VHF/5B4 ZC4VHF/5B4 ZC4VHF/5B4" repeated 3 times "AR K". The results paid off as we sat back relaxing for the remaining 11 hours.

Dave Rycroft, G4OKO ex ZC4DR.

KEY COLLECTING



A PERSONAL VIEWPOINT

by Colin Waters, G3TSS.

There is little doubt the collecting of Morse keys can become, for some, a passion that may quickly exceed or even suppress all other aspects of radio the individual has until then been interested in. I freely admit that at times I myself have easily fallen into this category.

Such collectors, when asked why they started collecting, will offer many reasons. No doubt for some the desire may be simply to amass a large quantity of keying devices. For some the thrill may be owning keys that date back to a bygone age. For others, myself included, the excitement will come from studying the ways different manufacturers had of achieving their ideas of ultimate performance.

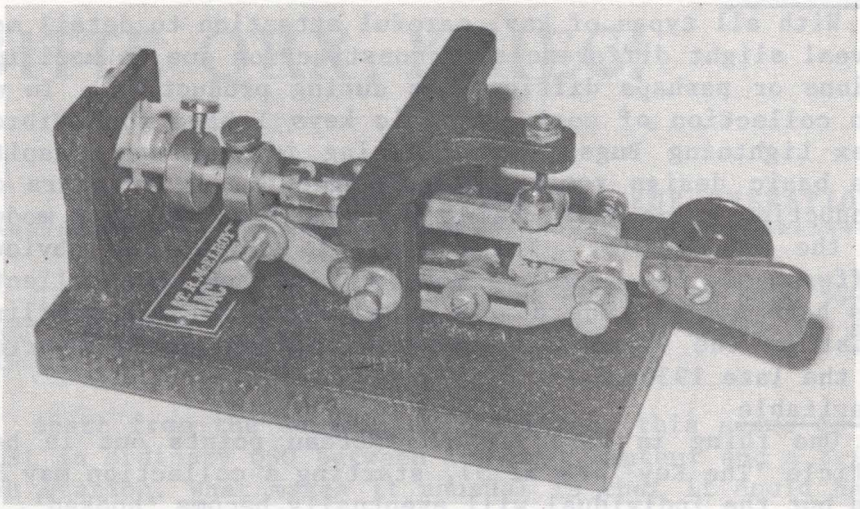
Rich history

How I envy those collectors on the far side of the Atlantic, their history seems so rich with stories of the telegraph, names like Western Union, Atlantic & Pacific, the Pennsylvania Railroad, Vibroplex, Bunnell, Johnson and McElroy, the list seems endless. Though my collection is, in comparison with those of John Elwood, Lou Moreau and several others, extremely modest, I can offer the would-be collector some observations.

Specialise

If the individual initially thinks he can collect one of every key made, I wish him luck, he has a long search ahead of him. My advice is to specialise. Here in the U.K. we have a good number of keys manufactured for use by the military. Each of the armed services keys would produce a worthy starting point for any collection.

Mac key (T.R. McElroy) S. No. 6842, mid-30's. Black crackle base and tin-plated fittings. G3TSS collection.



The superbly constructed and balanced naval keys. The small army keys, designed where mobility was a major factor. The air force keys including the excellent Type D, the aircrew W/OP's Type F, not forgetting the lightweight American keys fitted to the Fortresses, Liberators and Catalinas supplied under the wartime lend lease agreements. Then there are the much sought after GPO keys.

Where to find them?

So where will the collector obtain these keys? Local radio rallies, junk markets and secondhand stalls, all are capable of turning up an unusual example. From past experience, visits to antique shops produce little. Most shop owners' attitudes confirmed my suspicions that few knew what a Morse telegraph key was, let alone what to charge you when they did.

The antique shops specialising in scientific instruments, sextants, microscopes and barometers seemed the best informed. Personally speaking, scanning the 'for sale' columns in magazines, periodicals and even newspapers, or indeed advertising in their 'wanted' columns, have produced the greatest success.

But obtaining a rare or unusual key may in some cases prove the easier part of the story. Tracing the manufacturer and dating its production may provide a more diffic-

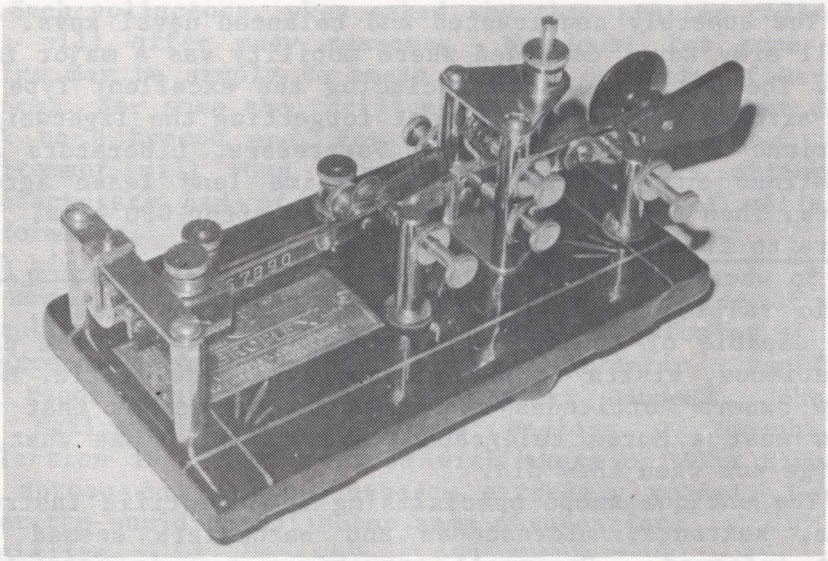
ult task. Few things are more frustrating for the collector than having a key and being unable to trace any information regarding it.

Differences

With all types of key, careful attention to detail may reveal slight differences in construction due to modifications or perhaps difficulties during production. In my own collection of semi-automatic keys I have four Vibroplex Lightning Bugs, all differing in some way despite the basic design remaining unchanged during 60 years of production since first being introduced as the No 6 model in the mid 1920's. There are, of course, the obvious differences, but some are more subtle; how many collectors have noticed the change in direction of the knurling twist on the Vibroplex adjustment screws which occurred in the late 1930's?

Inevitable

One thing is sure, as Lou Moreau points out in her article 'The Key' (MM Nr 5), starting a collection may be fun but the individual will eventually become 'hooked'.



Vibroplex Lightning Bug (No. 6) S. No.106077
1930's style black base with with gold carriage trim.
Discontinued early 1980's. G3TSS collection.

****

SEE OTHER INTERESTING COLLECTORS' ITEMS IN "SHOWCASE", ELSEWHERE IN THIS ISSUE.

MICHAEL OCKENDEN, G3MHF.

BITTE QRX, KRIEG!

WARTIME AMATEUR OPERATIONS

****

G7FH DE D3FBA - GM OM ES TNX FER REPRT - UR SIGS 569 - NAME WALDEMAR ES QTH NR BERLIN - TX 15 WATTS ES ANT DIPOLE - NW QRU ES 73 -

Apart from the unfamiliar callsigns, this seems to be just an ordinary QSO between a German amateur and a British station. What makes it unusual is that it could have taken place in 1945, before the end of the war, between two amateurs both officially licensed by their respective authorities. Thousands were being burnt alive in Dresden, V1's were falling on London, and yet two radio amateurs were able to wish each other 73! This QSO was typical of many similar contacts between German radio amateurs with wartime licences (Kriegsfunksendegenehmigungen - KFSG) and eight British stations with callsigns in the series G7FA-G7FH.

At the outbreak of war, G stations went off the air and all transmitters were impounded by the Post office. The same action was taken in Germany on 1 September but three operators were allowed to keep their equipment. The most well known of these was D4BIU whose contacts with American stations caused a great deal of interest throughout the world. The object of the exercise was propaganda. The authorities wanted to persuade outsiders that life in Germany was continuing normally despite the minor inconvenience of a war! Gradually more licences were issued until there were some 150 stations on the air, most of them on the 80 and 40 metre bands.

It does seem strange that radio amateurs should be permitted to operate transmitters from their homes in a country where people were not even allowed to listen to foreign broadcasts.

This, and the fact that from May 1940 the president of the National Society, the DASD, was an SS General, gave rise to the suspicion that anyone with a KFSG must be a confirmed Party member. However, this was not all the case. The licenses were issued during the war by the German Army High Command (OKW) entirely without regard to the recipient's political leanings. Some of the licence holders must have been members of the NSDAP or similar organisations; others may have held full-time jobs in the Abwehr communications intelligence service. All had to be trusted, but no more so than any other soldier or civilian engaged in sensitive work.

Neither in their political allegiances nor in their professional capacities can any common ground be established. They were not involved in any kind of monitoring duties similar to those performed by British amateurs in the wartime RSS organisation. Although the motive for putting them on the air - "propaganda by their very presence" - is hardly compatible with the true spirit of Amateur Radio, there was nothing at all sinister about the operators or the QSO's which passed between them.

Since 1932, a traffic-handling network of radio amateurs had been operating in Germany. The "Offizielle Betriebsdienst" as this network was called was really the origin of the wartime licences. Regular schedules were maintained and transmitting amateurs and SWL's alike were encouraged to take part in these exercises which were organised by the DASD. This disciplined activity was clearly excellent training for operators and it did much to keep the hobby alive at a time when the internationally-minded amateur fraternity was regarded with suspicion by the Nazis, who attempted to control its activities, first through the Party-sponsored "Verband Deutsche Funker" (League of German Radio Operators) and later by penetration of the DASD.

Contacts with American stations continued until 1940 when the W's were forbidden to work stations operating from the war zone. Operation by JA's ceased with their entry into the war in December 1941 and this put paid to plans for a contest involving German and Japanese amateurs. In 1942, licences were issued to a few operators in Hungary and Czechoslovakia. To stimulate activity on 10 metres, some fifty other German operators were given licences for exclusive operation on this band.

Although some experimental telephony transmissions were made, CW was used for the vast majority of all contacts. The QSL bureau functioned throughout the war and a communications receiver with plug-in coils similar to the HRO was available through the DASD.

With military approval, beacon stations D4WYF 2/3/4/5 operated during the war on the 80, 40, 20 and 10 metre bands; the 80 and 10 metre beacons were located at the Ludwigsfelde military base near Berlin where the Germans monitored foreign broadcasts. This unit - the German equivalent of Caversham - was known as the "Giftkuche" or "poison kitchen" and passed foreign propaganda to the High Command. The operators included several amateurs who all held special permits signed by Keitel himself authorising them to listen to foreign news broadcasts. Allied intelligence concerning the work of the Ludwigsfelde base must have been rather vague for an air raid during the night of 1 and 2 January 1944 closed the station down for several weeks and thereby prevented our propaganda from getting through.

A number of licensed German amateurs also operated from outside the Reich. Stations were on the air with D calls from France, Greece, North Africa, Norway and even from Spain. Contacts were made with stations at home and a certain amount of third party traffic was passed. D4XYN (DL1IX today) operated from the German embassy in Madrid. One day he intercepted a message from a Swiss cargo ship. (Yes, the HB's did and still do have a small merchant navy!) en route from South America to Genoa. The ship's main WT installation had been damaged in a storm but the radio officer came up on the 40 metre band with a small CO-PA transmitter. D4XYN tried to help by relaying messages to Berne but it was a full three days before they replied for fear that Swiss neutrality would be prejudiced.

Early in 1945, a number of British stations with G7 calls appeared on the bands. The feeling in Germany was that these stations were located on the east coast of England. At first it was thought that they were pirates and so QSO's were prolonged in order that they could perhaps be identified. The contacts were conducted in a polite and correct manner and a log of all traffic was passed to the authorities in Berlin. It is strange to think that some of these wartime QSO's between the German

amateurs and the G7's were probably between old friends from the pre-war days.

On 24 June 1945 about 30 HB7 stations operated a communications exercise on the 80 and 40 metre bands and once again there were contacts with G7 stations. No official explanation concerning the activities of the G7's has ever been given by British sources. They must have had some intelligence function but it is not clear whether this was to find out about the German stations or to provide a link for anyone in Germany (POW's perhaps, or agents emerging from hiding places) who had radio equipment and needed to contact England. Another possibility is that they were set up to help locate pirate operations from Britain. Certainly other stations were heard by German amateurs: these were using G4 and the G9 industrial callsigns and may well have been pirates. A lone operator during a boring night watch at a signals station somewhere in Europe, a powerful transmitter at his fingertips ... the temptation must have been great!

After the War, the bands gradually returned to normal: Swiss amateurs operated officially from 26 November 1945 and the British followed in December with permission to use the 6 and 10 metre bands. Operation for G stations on the other bands resumed in July 1946, and the first official DL's came on the air in 1949.

References:

(1) "Geschichte des Amateurfunks" by W F Korner (DL1CU), published by Koerner'sche Druckerie.

(2) "Faszination der kurzen Wellen" by Dr R Stuber (HB9T), published by USKA.

(This article is reproduced by kind permission of Short Wave Magazine).

MM FOOTNOTE

The April 1940 issue of "QST", journal of the American Radio Relay League, carried the following -

"... information received from Chris Schmelzer, D4BIU. 'There seems to be widespread misunderstanding concerning the activities of German amateur stations today. According to a statement made by our government, all sport activities etc will be continued during the war to as large an extent as possible. Due to this amateur stations D4ACF, D4ADF, D4BIU, D4BUF, D4RGF, D4TRV, D4WYF, D4HCF, and D4DKN have been re-licensed recently and more licen-

ses will follow shortly. The stations are supposed to carry on strictly in the usual manner. Please notify all interested.'"

ARRL had issued a neutrality code for amateurs at the outbreak of war in Europe, suggesting that they should not work any stations from countries engaged in hostilities. Because of the activities of the German stations, however, all foreign contacts were banned by the FCC on June 4 1940. Among other regulations which followed, all amateurs were required to provide proof of US citizenship, including date of birth, basis of citizenship, military record, and nationality of close relatives. Faced with such questions, this resulted in some 100 amateurs quietly relinquishing their licences.

References
(3) QST, April 1940, July 1940.
(4) "50 years of ARRL", pub. by ARRL, 1965.

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MORE USES OF AMERICAN MORSE

I enjoyed the filler on page 14 of MM12 regarding AR and SK, as used in radio, being borrowed from American Morse. Another unrecognized but ubiquitous use of American Morse, at least among English-speaking operators, is abbreviating "and" by using "e s".

This is nothing but the American Morse ampersand, didididit. As with other space-letters, the space between the first two dits is truncated to avoid forming the discrete letters "e" and "s". International code operators, being unfamiliar with characters having internal spaces, send and hear it as "e s".

CW traffic handlers in the U.S. have long used an American Morse comma (di-dah-di-dah) in radiogram addresses instead of the much clumsier International comma.

Further, its not uncommon to hear an amateur send "O.K." as "dit-dit dah-di-dah", using the American Morse "O" rather than the International's three dashes. Most probably regard this as something akin to a regional accent, not realizing its origin.

Bill Dunbar, AD9E.

DITS AND DAHS

by MAJOR BOB SMITH, THE ROYAL REGIMENT OF WALES

I have experienced few failures in my life, one of them was trying to teach National Servicemen in The South Wales Borderers how to use the Morse Code.

I was the Regimental Signals Officer of the 1st Battalion from 1949 to 1951 in The Sudan and Eritrea and, in those days the wireless sets we had to operate were unpredictable and establishing communication with them was a rather hit or miss affair. Even if the sets themselves were in working order and the large cumbersome batteries held their charge the arid nature of the country inhibited radio waves from straying far from the aerial.

I was always on the lookout for some way of improving our communications and I even tried using pigeons to overcome the inadequacies of my wireless sets. The Signals Training Pamphlet stated that messages transmitted on Carrier Wave using Morse Code would travel further than normal voice communication. Number 19 and Number 22 sets had a facility for using Morse but even though my Signal Sergeant and I spent hours trying to train our signallers to transmit messages in a series of dots and dashes we never achieved any real success.

At the end of my three year tour of duty with The 1st Battalion The South Wales Borderers I joined The 3rd Battalion The King's African Rifles in Kenya. Quite early in the morning after my arrival the evening before I was ushered into the office of the Commanding Officer who was Lt Colonel Jack Crewe-Read of The 24th Regiment. He showed great interest when I told him that I had been the Signals Officer of my last unit and he asked me if I would like to become the Regimental Signals Officer of 3 KAR. I responded warmly to his suggestion and there and then was confirmed in the appointment. The Adjutant was told to call the Warrant Officer Platoon Commander of the Signals Platoon to the C.O.'s office.

P.S.M. Kathuka came from the Kamba Tribe. He had been in the KAR since the end of the War, spoke very good English and was, by African standards of those days well educated. The C.O. introduced me to him ashis new boss, which could not have pleased him very much as he had been running the "show" by himself for a long time.

Kathuka and I walked across the playing fields to where the Signals Cadre were undergoing instruction in one of the huts. Even when we were

200 yards from the hut I could hear quite a lot of noise coming from inside, but when Kathuka opened the door of the nearest hut I thought that some kind of Black Magic Ritual was taking place.

"What is going on?" I said. "Every morning we do this," said Kathuka. "Do what?" I replied. "Morse and PT," was the answer. Kathuka went on to explain that the first forty minute period each day was a Morse Code instruction period coupled with some fairly strenuous exercise.

The Askaris were coming to the end of one session and were bathed in perspiration. They had a few minutes rest before the Instructor rapped on the table with his stick and said, "Watu wote tayari?" (Everybody ready?) "Tayari effendi" (Ready Sir) came the reply.

"Sekia" (Listen), said the Instructor with his stick raised as if he was a Choirmaster. "ABLE" (the first letter of the old phonetic alphabet) came from the Instructor. Back came the reply from the Askaris "DIT DAH" (the Morse Code symbol). "BAKER" was delivered from the front. "DAH DIT DIT DIT" came the chant, with Askaris already prancing on the spot in time with the dits and dahs. CHARLIE, DOG, EASY and FOX were signals for the Askaris to mount chairs and tables or to gyrate on any flat surface.

African rhythm is infectious and before long I found myself caught up in the sensation of movement and sound. Not all the letters of the alphabet followed each other in sequence. The Instructor produced, either by luck or by judgement, a series of letters that continually altered the flow and tempo of the chant.

Everyone thoroughly enjoyed themselves and what was more after only four weeks training these Askaris were managing to send and read about fifteen words a minute.

I was very impressed with such an unusual form of instruction and I wished that I had known about it earlier so that I could have produced a version of SOSPAN FACH (the great rugby song of Wales, Ed.) with lyrics by Mr Samuel Morse - and then I might have had more success with my Welsh signallers.

(Reprinted, with kind permission, from "The Men of Harlech", the journal of The Royal Regiment of Wales, Autumn 1987.)

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10 MHZ OK FOR ARRL AWARDS

The ARRL has changed its policy with respect to awards credits on the 10 MHz band. Effective immediately, ARRL accepts 10 MHz contacts for the following awards: WAS (basic, CW, RTTY, packet and QRP, but not for single or 5-band WAS); and DXCC (CW and digital QSOs for the mixed, CW and RTTY awards, but not for 5-band DXCC).

W5YI REPORT, November 1, 1989.

A FEW COMMENTS

by Don deNeuf, WA1SPM.

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Don deNeuf wrote this piece several years ago but some of his comments seem as valid today as when he wrote them.

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After half a century of telecommunications and amateur radio (6ACZ in 1920) I am inclined to think I am justified in making a few comments in general:

1) Keep your eyes on the bureaucrats and politicians who establish international communications rules and regulations. They often do strange things. For example, some years back, why did they change the international signal QRL (which meant "send test V's" and was well established for years) to a new meaning, "I'm busy"? Then they changed the punctuation signals. "MIM" used to signify an exclamation mark, which they dropped completely. (My old associates and I on ham operation find the exclamation mark very useful and we have reverted to the old American Morse signal for it - "OE").

2) The most wasteful CW code signal today in terms of time, effort, power, tube life, frequency useage and QRM is the last digit in the "RST" signal report code. In this day and age who ever reports anything less than "9" even if the guy's "note" is a bit rough or modulated by his power supply?

Why don't we adopt a new "RST" system which would be meaningful by providing information on the effects of fading and interference, for example? I'm not advocating the system used for years by commercial HF radio operations because it is too lengthy, but it was called the SINPO code, with numerical graduations 1 to 5, and embraced Signal Strength (S); Interference (I); Noise or Atmospherics (N); Propagation characteristics (fading etc) (P); and Overal readability (O).

3) Why is the non-commercial radioman called an "amateur"? And his activity on the air called an "amateur operation"?

There are hundreds of "hams" who hold valid commercial First Class FCC Radiotelephone and/or Radiotelegraph licenses, and who have spent a lifetime in commercial or "safety of life and property" radio operations, and some who have developed and/or invented very important technical improvements.

This question was recently put to me by a non-communicator Chinese friend who was visiting me, and who wanted to know what "amateur station and operator" meant.

I simply could not find a satisfactory answer to give him - and the more I tried, the more the designation seemed ludicrous, even to me. I offered one explanation - hams don't handle communications "for hire", and that they operate as a sort of "hobby".

"But", said my friend, "how can you and so many others be termed "amateurs"? My understanding is that the word refers to a person who does something more or less unskillfully. You are 'experts', 'professional' communications people! Why do they call you amateurs?"
(From the Heritage Villager)

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CANDLER ON SENDING

"Many teachers claim that a student should learn to receive 10-13 words per minute before he undertakes to practice sending. I have yet to hear an explanation of this theory.

My long experience in training many successful radio operators (including T. McElroy, 'fastest' telegraph operator of all time) has been that the student's progress will be more pronounced by doing balanced practice; that is, with as much, or more time devoted to sending as receiving.

Before you learn to receive you MUST learn to send. It stands to reason that when you have the correct images of signals in your mind you will be more likely to recognise them when you hear them."
Candler System Course, Lesson 2 (1931).
(From Groundwave, newsletter of the Wimbledon & District Amateur Radio Society, June 1987.)

Australian POST OFFICE TIME

by JOHN HOULDER

Before the days of the "speaking clock" or the time pips on the radio you could always adjust your timepiece from the local post office clock. Just before 1 pm each day, in Sydney for instance, a telegraphist would climb up to a platform above the top floor of the GPO building, to a window giving an unobstructed view of Sydney Observatory.

The Observatory gave its time signal by lifting a giant ball to the top of a vertical mast, and releasing it at exactly 1 pm. As the ball rose, the watching telegraphist tapped a Morse code every couple of seconds, ringing a bell in the Telegraph Operating Room below. The telegraphists there, in turn, stopped all other activities and slowly tapped their own keys to indicate to all post offices in New South Wales that the time signal was imminent.

When the bell fell, the observer tapped his key rapidly and the waiting operators repeated this signal down the lines enabling staff at the post offices to adjust their clocks plus or minus a few seconds, an accuracy quite adequate for most of the demands of everyday life.

A new building erected in 1928 obscured the view of the Observatory and the time signal was then sent to the GPO by wire, with the re-transmission to post offices remaining unchanged. The original purpose of the time bell was of course to provide time checks for shipping in Sydney Harbour.

Sydney GPO was perhaps unique with its early visual link with the Observatory. In the other states their Chief Telegraph Offices were probably all linked with their Observatories by wire from the beginning. I believe the practice of re-transmitting time checks to post offices, as described, was common in all states up until about 1959.

BUGS & SIDESWIPERS ON THE CLANDESTINE LINKS

by Pat Hawker, G3VA

The notes by ZS6AJY (MM, Nr 12) reminded me that I still have one of the Eddystone bug keys though seldom used these days being primarily a straight key addict. The Eddystone key was the one that I "wrote up" in an unsigned piece in the RSGB Bulletin (April, 1949, page 247). (See below. Ed.) This review answers some of the questions posed by ZS6AJY making it clear that the key was intended for the "amateur" rather than the professional market. But ZS6AJY also notes that bug keys were officially frowned upon by the British services before, during and after the second world war.

I recall that I was one of several operators in Special Communications who made some limited use of bug keys in 1943-45 in conjunction with the Intelligence and Resistance links with Europe. I also remember that another base operator (Johnny Rudge) often used a home-made sideswiper; and taking traffic from a clandestine station in Haute Savoie from a French operator who favoured these distinctive horrors.

My occasional use of a bug came about because the late John Bowers, ex-G4NY, had a McElroy de luxe key, bought I believe in 1939, and he began to use this on the nightly "broadcast" to the main Intelligence group in the Paris area - and at times loaned me his key for these transmissions.

Another bug key that found its way to this station and subsequently other Special Communications stations in north-west Europe was the one owned by Watson Peat, GM3AVA, built about 1942 by Ernie Houldsworth, G6NM at the Country Farmyard (Hanslope Park). Both the McElroy and the G6NM bugs went with us into Normandy. My photograph shows Watson Peat* with the G6NM bug at a station in Eindhoven in late 1944.

The typewriter was mine and though included in the photograph was for "show" as all of us copied the traffic by hand and not on what the Americans called a "mill". Receiver HRO, transmitter the Mark III (6V6-807) as widely used in Special Communications and built in considerable quantity at Whaddon, near Bletchley.

For agent use, Whaddon made considerable numbers of Mark VII transmitter-receivers (6SK7-6SK6 receiver, 6V6 crystal oscillator) fitted with a reasonably effective miniature "silent" key. The Germans also developed silent keys for the Abwehr agents and I believe silent keys were also a feature of German service equipment. (*Watson Peat, CBE, GM3AVA, recently retired as Scottish National Governor of the BBC.)

Review from RSGB Bulletin, April 1949, mentioned above.

THE EDDYSTONE SEMI-AUTOMATIC KEY

Not so long ago the semi-automatic - or "bug" - key was regarded in the United Kingdom with something akin to suspicion, both by amateurs and by commercial telegraph

ists. But during the war, operators at busy traffic-handling stations proved - often in the face of official disapproval - that where continuous hand-sending was necessary over long periods, this type of key permitted a higher average speed of transmission to be maintained almost without fatigue. On many a night shift the heavy thump of traditional brass-pounding gave way to the soft swish and clatter of the "bug". Contrary to the then popular belief, the standard of sending by an experienced operator was found to be as good, and as easy to copy, as with an orthodox key, providing that the ratio between the length of the automatic dots and the handformed dashes was correctly adjusted.

Until recently, mass-produced "bugs" - originally used on the US railway telegraph networks - were of exclusively foreign manufacture. In 1947, however, Stratton and Co Ltd, introduced the now well-known Eddystone model. No mere copy of overseas designs, this key was noteworthy for its high standard of mechanical finish, its new style of "paddle" or handle suitable for either right- or left-hand operation, and its heavy die-cast housing which totally encloses the movement, provides sufficient weight to prevent the rubber feet of the key from slipping on a smooth table, and adds considerably to the attractive streamlined appearance. The dot contact of this model is also sufficiently "heavy" to avoid the spluttering effect experienced with some "bug" keys. For the amateur who wishes to operate for long periods at a time, either in contests or during those pleasant ragchews which are such a feature of high-speed CW working, a semi-automatic key soon becomes an essential part of station equipment.

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BRAVE NEW WORLD

Overheard on the GB3TY Repeater.

Two stations, obviously not CW operators, discussing the advantages of having Morse code reading programs for their computers.

GØ... to G3... "I think there must be something wrong with my computer. Everytime I key into it most of it comes up as nonsense."

Colin Waters, G3TSS.

The RAF's Historic

T1154/R1155

PART 2 - Early history; Initial problems; Circuitry; Different versions; Additional facilities.

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This composite feature is based on articles/material, etc, sent to MM by John McDonnell G3DOP, Phil Racher G6MQJ, and Larry Robinson GØHIR, with additional advice and help from Gus Taylor G8PG.

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Early history

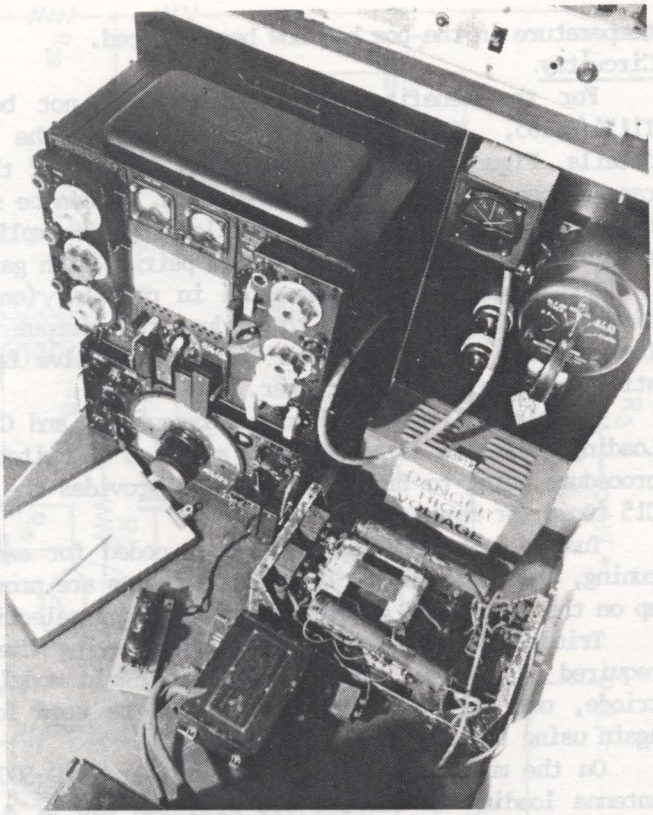
From his researches, PHIL RACHER has sent MM information on the early background and development of the 1154/1155. In 1936 the Canopus, a new flying boat on the Empire Service was fitted with the Marconi AD57A/58A, a short/medium wave transmitter/receiver with direction finding facilities. In 1937 the Caledonia, another new flying boat, had the AD67A/6872B, and development work was in hand on a new "all wave" transmitter/receiver.

In 1939 the RAF prepared a specification requiring a greater number of spot frequencies and a combined communication and direction finding receiver. The new transmitter (T1154) was developed by Marconi from the AD67 and AD77 and the receiver (R1155) from the AD8882. The design of the 1154 was effected by Mr G.P. Parker, while Mr C. Cockerell headed the design team for the 1155. By January 1940 prototypes had been flown and approved, and production began at the Air-Radio works at Hackbridge.

By June of the same year a large number had been fitted in Bomber Command aircraft by teams from Marconi. In 1942 RAF M.U.'s began to undertake this work. Because of demand, production was sub-contracted to E.K. Cole (who co-ordinated production); Mullard, Plessey, and EMI, although the Marconi Co. retained control of the technical aspects. In all, some 80,000 sets were produced during the war.

Initial problems

The first production contract for the R1155 specified an aluminium chassis and case but thereafter, in view of the shortage of aluminium, the Ministry of Aircraft Production ruled that cadmium plated mild steel 0.48" thick should be used. In July 1941, the Ministry informed the Marconi Co that Vernier tuning handles on some receivers were defective due to the Vernier sticking and operating the coarse mechanism. Marconi



Larry
Robinson's
1154M/1155A

were requested to investigate the matter urgently and to recommend such action as they considered necessary to deal with this problem. The original Vernier was replaced in later models with a much improved model having a very slow tuning rate.

In August Coastal Command reported that serious interference was being experienced on R1155 m.f. reception in Northern Ireland due to i.f. break-through from the Athlone transmissions on 565 Kc. On investigation the solution was found to be the use of additional i.f. trap circuits. (Gus Taylor mentions, however, that even with the trap, there were still problems on 500 Kc at times.)

In October, Coastal Command reported a further defect in the form of overheating and instability in the b.f.o. circuit, and the temperature was reduced by means of a 1¼" hole made in the b.f.o. box.

An associated problem was traced to the presence of sulphur due to deterioration of the particular grade of sorbo rubber used for the pad under the box lid. The sulphur caused random changes in the capacitance of the silvered mica condensers in the b.f.o. circuit, making them liable to continue exhibiting random changes even though the

temperature in the box had now been reduced.

Circuitry

For the benefit of readers who may not be familiar with the T1154/R1155, JOHN McDONNELL has provided the following technical details. Figure 1 shows a simplified circuit of the T1154 on its h.f. ranges when used for c.w. transmission. As can be seen from the diagram the transmitter is a Master Oscillator/Power Amplifier, (MO/PA) with a triode Hartley oscillator driving a pair of high gain r.f. pentodes.

These pentodes are connected in parallel (only one shown in the diagram) and are designed to produce full output with very low drive. The parallel connection means that if one valve fails, transmission is still possible on reduced power.

Capacitor C2 sets the output frequency, and C15 resonates the PA. Loading of the PA is achieved by a series of switchable taps on L4, the procedure being to find the tap which provides the correct loading with C15 tuned for maximum dip.

Tuning control knobs are colour coded for each wave-range to aid tuning, and a number of click-stop settings are provided. These were set up on the ground and allowed rapid frequency selection when airborne.

Triode V4 provides sidetone when keying the rig. If m.c.w. is required it can be used to suppressor grid modulate the PA. Another triode, not shown on the diagram, can be used for voice modulation, again using the suppressor grid method.

On the m.f. range of the transmitter (200-500 kHz) PA tuning and antenna loading is carried out with the aid of a tapped permeability tuned inductor instead of an LC combination like C15/L4.

Different versions

During WW2 at least 13 versions of the T1154 were produced, covering a variety of frequency ranges. Early models covered 200-500 kHz, 3.0-5.5 MHz and 5.5-10.0 MHz in three switchable ranges.

Coastal Command versions dropped the higher h.f. band and covered 1.5-3.0 MHz instead, and some models are believed to have had an extended h.f. range. (Information provided by PHIL RACHER confirms that the T1154C/F/H/K/M covered 2.35-16.7 MHz in three switched ranges, plus 200-500 kHz.) The basic circuit, however, was the same in all versions.

Receiver

The communication circuits of the R1155 are shown in simplified form in fig. 2. As can be seen, it is a 6 valve superhet with an r.f. stage and a b.f.o. The two i.f. stages use top-capacity coupled i.f. transformers to give a 3 kHz bandwidth. Most models covered 75-1500 kHz and 3.0-18.0 MHz, but the Coastal Command version omitted the 75-200 kHz range and was fitted instead with either a 1.5-3.0 MHz or a 2.45-4.5 MHz range. In all, there were ten versions of this receiver produced, the R1155, R1155A/B/C/D/E/F/L/M/N.

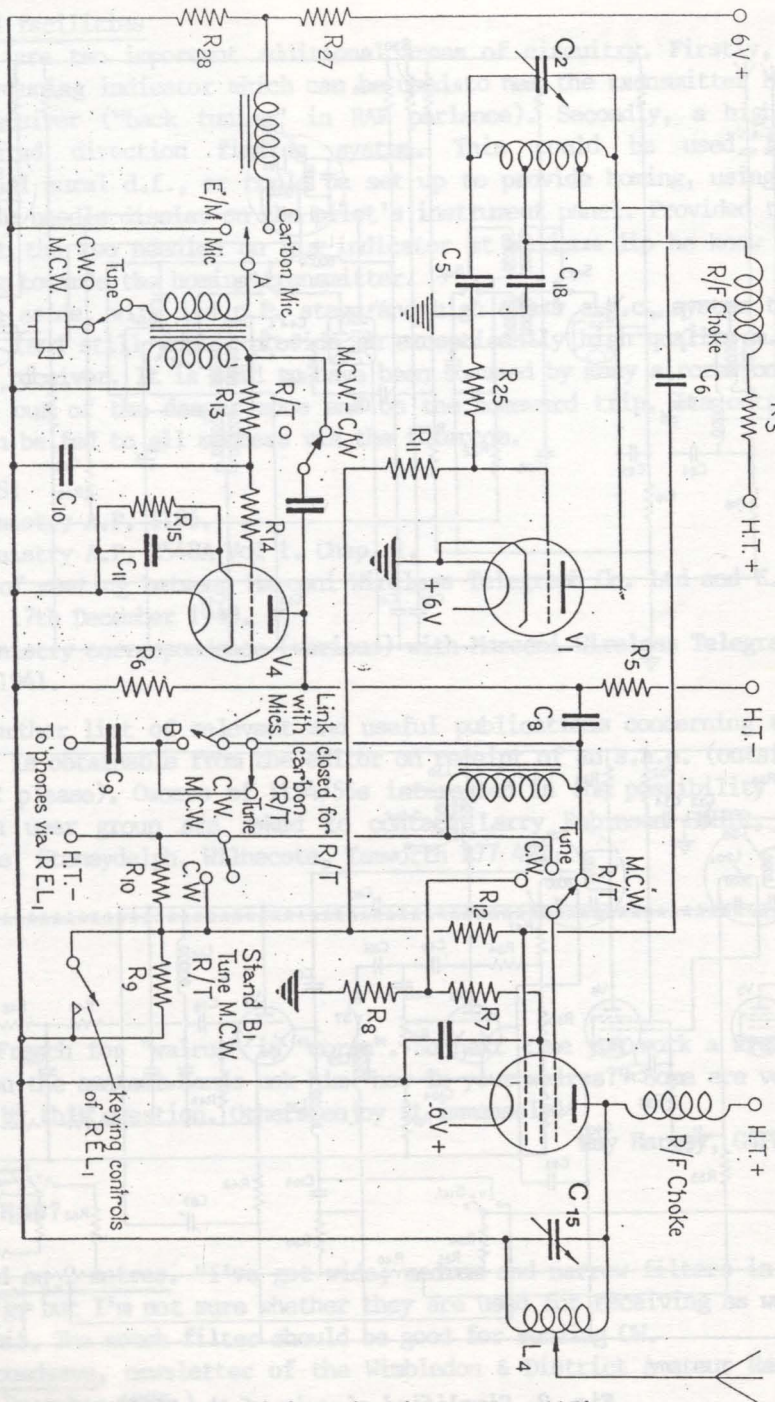


Fig. 1. Simplified circuit of the T1154.

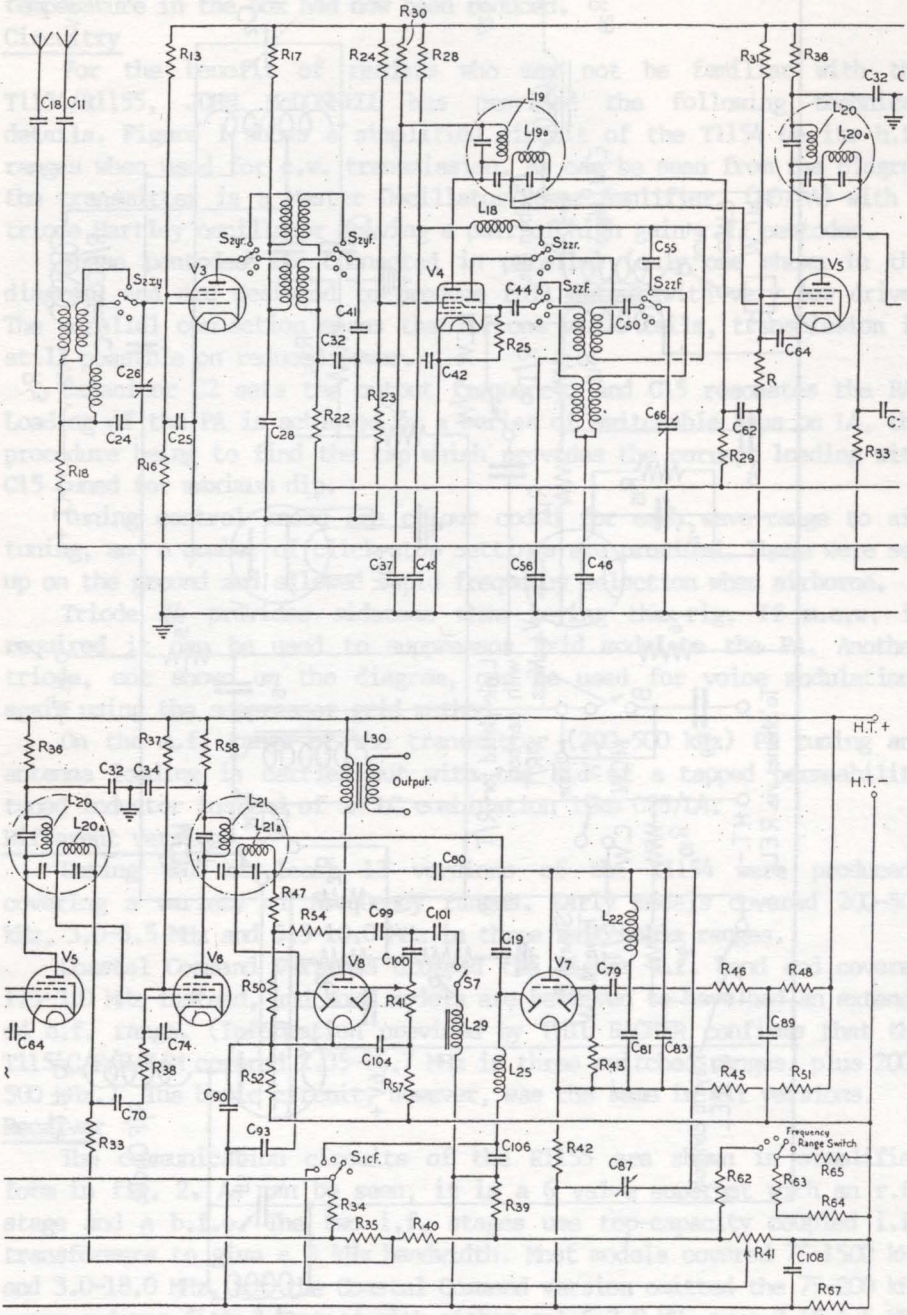


Fig. 2. Simplified circuit of the R1155.

Additional facilities

There are two important additional areas of circuitry. Firstly, a magic eye tuning indicator which can be used to net the transmitter MO. to the receiver ("back tuning" in RAF parlance). Secondly, a highly sophisticated direction finding system. This could be used for conventional aural d.f., or could be set up to provide homing, using a visual twin needle display on the pilot's instrument panel. Provided the pilot kept the two needles on his indicator at maximum dip he knew he was flying towards the homing transmitter.

As an aside, with its r.f. stage and high class a.g.c. system the R1155 did (and still would) provide an exceptionally high quality m.f. broadcast receiver. It is said to have been so used by many aircrew once they were out of the danger zone and on the homeward trip. Its output could then be fed to all members via the intercom.

REFERENCES:
1. Air Ministry A.P. 1186.
2. Air Ministry A.P. 2548A Vol 1. Chap. 1.
4. Notes of meeting between Marconi Wireless Telegraph Co. Ltd and E.K. Cole Ltd, 17th December 1940.
3. Air Ministry correspondence (various) with Marconi Wireless Telegraph Co. Ltd, 1941.

Note A further list of relevant and useful publications concerning the 1154/1155 is obtainable from the editor on receipt of an s.a.e. (outside UK, 1xIRC please). Owners of 1154/55s interested in the possibility of forming a user group are asked to contact Larry Robinson GØHTR, 82 Grassholme, Stoneydelph, Wilnecote, Tamworth B77 4BZ

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HI!

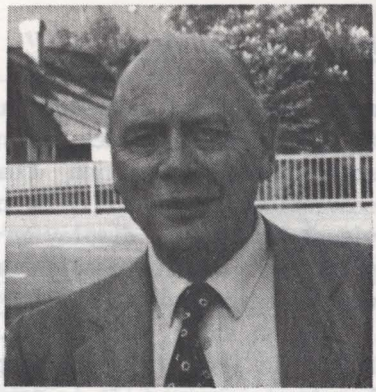
The French for "walrus" is "morse". So next time you work a French station on the amateur bands ask him "how is your walrus?" Some are very confused by this question. Others enjoy it immensely!

Ray Harvey, G4PKY.

NEW METHOD?

Heard on 2 metres. "I've got wide, medium and narrow filters in my new HF rig, but I'm not sure whether they are used for receiving as well as transmit. The notch filter should be good for sending CW.
(From Groundwave, newsletter of the Wimbledon & District Amateur Radio Society, December 1987.)

Phillips Code Reborn



by KAYE WEEDON

Sooner or later the venerable PHILLIPS code had to be revived. The following appeared in a 'New Products' notice in "Newsweek", May 9, 1988.

> "....the Panasonic Industrial Co.... has developed a new software program for certain Panasonic electric typewriters that could increase the speed and accuracy of typists. The program, called FasType, automatically converts Gregg shorthand abbreviations.... into full typed text. If, for example, a secretary types the abbreviation 'asap' on the keyboard, the system will automatically type out the words "as soon as possible".... Panasonic claim the program increases office productivity in two ways: by reducing the number of keystrokes needed for data entry, and by eliminating some potential spelling errors.
>
> FasType.... has a 1,400-word standard glossary that includes days of the week, months, salutations, common nouns and standard business terms. A separate 'user glossary' allows operators to store abbreviations unique to their job...."

It is interesting to quote an example (ref.1) of the abbreviations used in the Phillips code era which lasted, in the U.S., c.1879 - 1919. The Phillips code was only used by commercial high-speed operators and almost entirely for press work. Speed of message handling was their bread and butter - unlike Europe where bonus pay was unknown, telegraphists were offered no incentives and, in the German Post Office, higher speed was seen as a possibility of reducing staff.

Phillips code enabled U.S. operators to send for hours at 45-50 wpm, at times even more, but it also transferred a burden to the receiving operator.

> Example: "Mems o cx Cgs rptg und cv cmns o eno cap wo krp xgn ifo thr adhts wi cmb aga ay emt to t crpns, bt cujx es dtmd efo qpt peo f sq stas wi efy dmz ay osn."

Which 'translates' as:

> "Members of Congress representing under cover combinations of enormous capital who corrupt legislation in favor of their

adherents will combine against any embarrassment to the corporations, but courageous and determined effort on the part of the people of the separate states will effectually demoralize any opposition."

In the Phillips code the computer was the human brain of the telegraph operator whose functions are described thus (refs.2, 3, 4):

> "'Working Phillips' involved very remarkable brain work. First, both operators had to know the Phillips code by heart. The sender would automatically encode his abbreviated message in Morse.... The receiving operator performed the almost incredible task of hearing the sounder in a noisy room, immediately decoding the message from 'Phillips' into the readable language of the original message which his pen recorded on paper. (Later written by typewriter).
>
> In press work, the use of the Phillips code.... materially lightened the burden of the telegraph operators, some of whom could now handle 50 to 55 w.p.m. for hours.... using their privately owned typewriters."

The burden is now taken over by the computer and its software but the 'operator', now the "FasType" secretary, has to master the Gregg shorthand abbreviations, duplicating the Morse operator's initial learning process of 109 years ago.

Where the old-time operators stored the abbreviations in their minds but could look them up in the Phillips code book, the modern secretary has them stored in the computer program for instant reference if the human memory is not adequate.

References

1. Weedon: "Sounder, skrivemaskin, bonus, Phillips-kode og 'Vibroplex', VOLUND 1985, Norsk Teknisk Museum, p.67
2. Weedon: ibid, p.72.
3. Weedon: "Faster Manual Morse", Morsum Magnificat Nr 11 Spring 1989, p45.
4 Murray, Donald: "The Typewriter and Piecework in Telegraphy". Post Office Electrical Engineer's Journal, Vol 1, 1908, pp 18-21.

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NOT HIS FAULT!

At 3 Radio School, RAF Compton Bassett, during my training as a Wireless Operator, I recall at the end of our course, in February 1954, one of the course members, from Liverpool, being told how lousy his sending was.

His reply was that he couldn't help his accent!

Stan Williams, G3LQI.

SHOWCASE

Collectors' items and "homebrew" specials.

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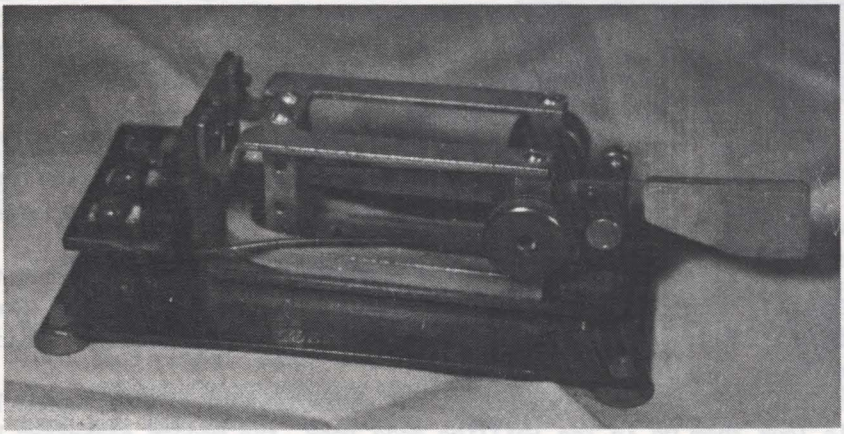
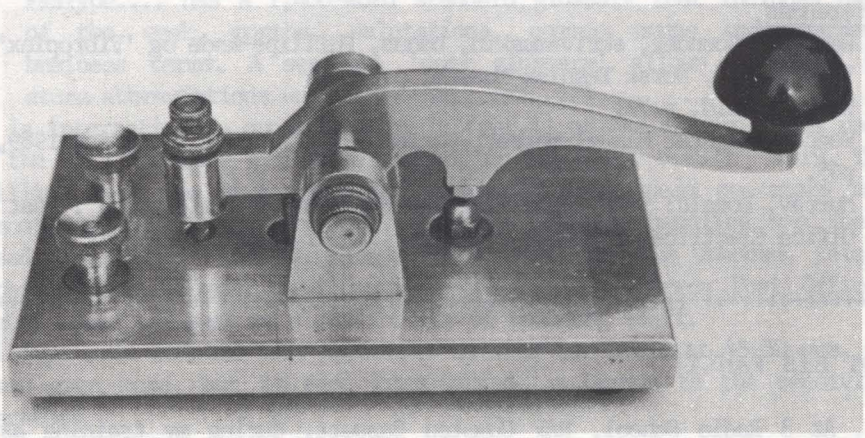


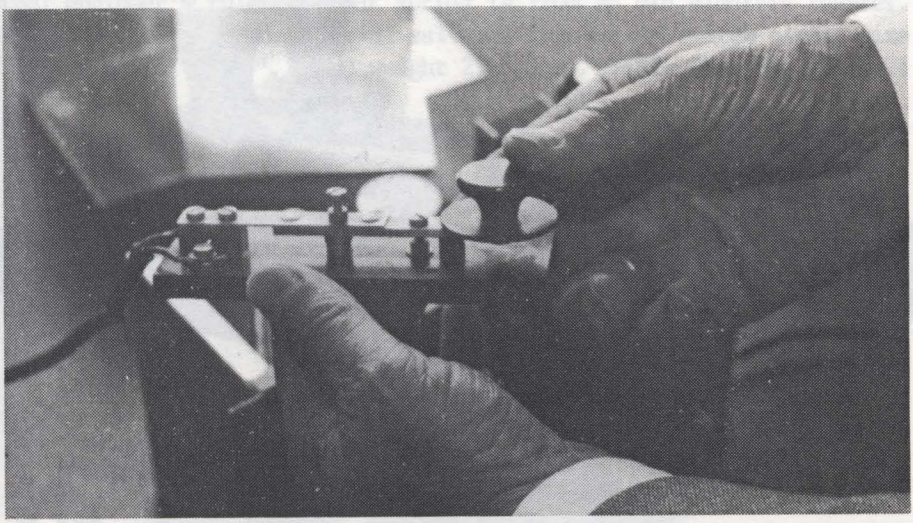
W8DNC home-made side-swiper. Nail file for arm. Polar relay case. Collection John Elwood, W7GAQ. Photo. N7CFO.

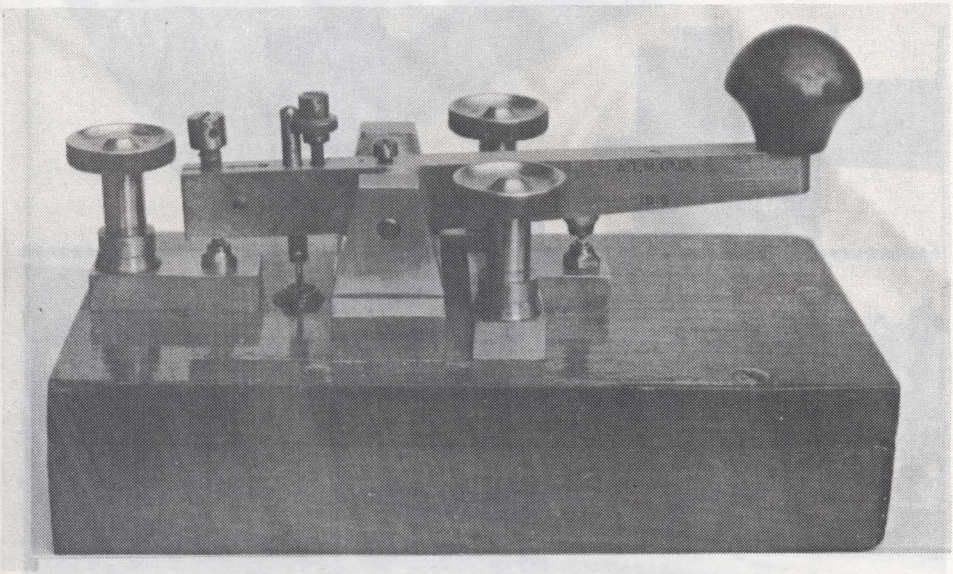


Replica camelback key inspired by a drawing on the QSL card of DL3SAF (DG1SK), and made by Alex Vilensky, 4X1MH. He says, "It is not an exact copy. I was limited by my skill and by the availability of materials and also I wanted it to perform as a modern key. The arm is almost balanced and there is a back tension adjustable coil spring."

Illegal key (about 1942) made by the Norwegian company Elektrisk Bureau, or more specifically by Finn Willoch who was employed there.

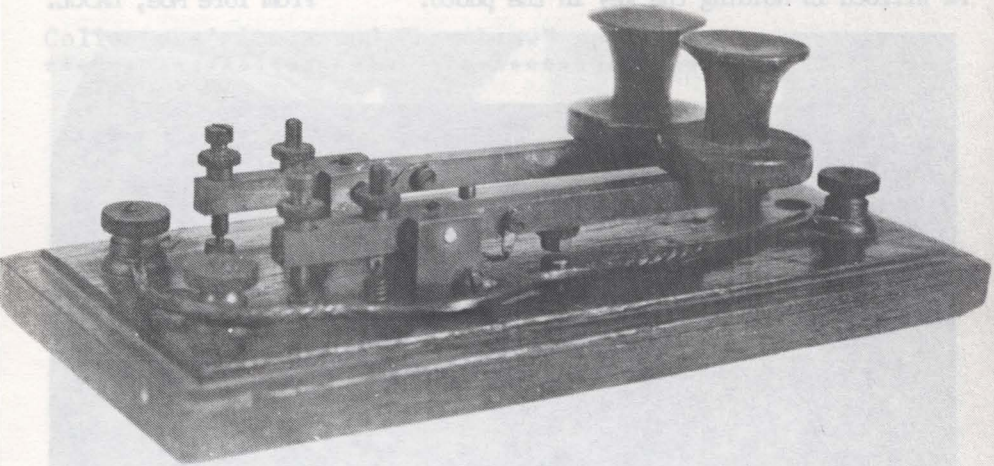
Mr Willoch, who was not an operator himself, took part in the production of the OLGA set (see MM10, p.28) and this key was used with OLGA. Mr Willoch is holding the key in the photo. From Tore Moe, LA5CL.

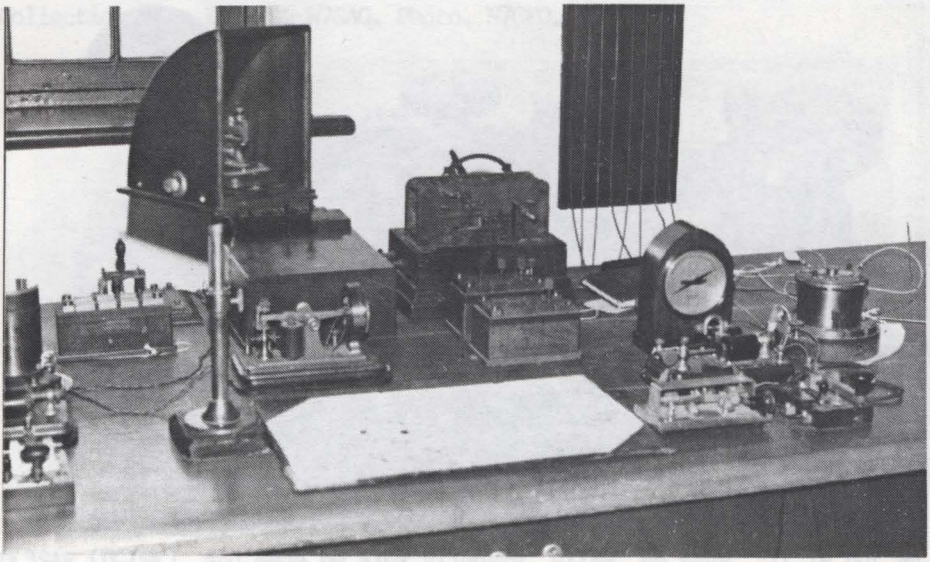




Key by A.T.M. Co. Ltd, Liverpool, 1916.
Used by the Palestinian Railway System. The knob is not original.
Collection of Alex Vilensky, 4X1MH.

Key for line telegraphy in Dutch East Indies.
Obtained by PAØCWS on the Isle of Celebes.

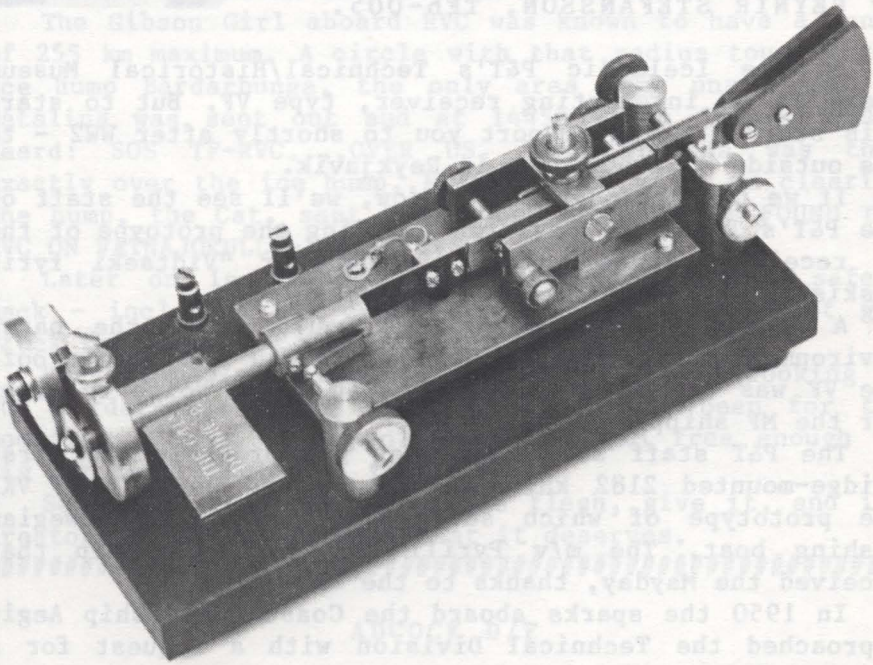




Original old-time equipment (except the Simplex bug/jigger) at Alice Springs Old Telegraph Station in Australia (see "Operation Alice", MM13). Photo from John Houlder.

The G4LSB "DONNIE-BUG". Don Harris, G4LSB, writes "Let his be a warning to all readers of MORSUM MAGNIFICAT! Beware of looking at too many pictures of bug keys in MM. In my case this resulted in a scrap-metal/junkbox nightmare!

The pendulum and paddle springs are cut from a very old 6" flexible steel engineer's rule. The dot spring is from an old electric toaster. Base is a slab of resin material salvaged from an old switch panel, size 7 1/2" x 3 5/8" x 5/8". Total weight 2lbs 8ozs. PHOTO: SWL, Ray Mitchell



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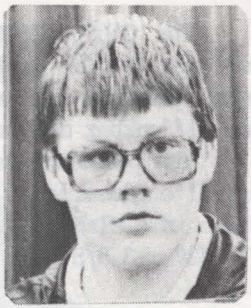
FRONT COVER PHOTO.

Intriguing item from the collection of Murray Willer.
WW2 RAF light-signalling key.

This flame-proof key was used in a number of British aircraft mounted at the side of the pilot or navigator's position. The switch on the face of the key, marked "UPWARD MORSE" and "DOWNWARD MORSE operated the lights on the top and bottom of the aircraft to signal aircraft in formation without using wireless.

Photo: Murray Willer. Description from "Foreign and Military Keys" by L.R. Moreau W3WRE and M. Willer VE3FRX, AWA Review Vol. 3. 1988.

VF to the rescue



by REYNIR STEFANSSON, TF6-005.

In the Icelandic P&T's Technical/Historical Museum there is an interesting receiver, type VF. But to start this story I must timeport you to shortly after WW2 - to the outside of a building in Reykjavik.

If we peek through the window, we'll see the staff of the P&T's Technical Division building the protoype of the VF receiver. These initials stand for "Vidtaeki fyrir Fiskiskip" (Receiver for Fishing Vessels).

A receiver was needed that would stand the harsh environment of a fishing vessel. Splash and sprayproof, the VF was the first such rig. It was a voice receiver for the MF shipping band.

The P&T staff also made what was probably the first bridge-mounted 2182 kHz receiver in the world, the VK, the prototype of which saved the crew of a Norwegian fishing boat. The m/v Pyrill was the only ship that received the Mayday, thanks to the VK.

In 1950 the sparks aboard the Coast Guard ship Aegir approached the Technical Division with a request for a battery driven rig for 500 kHz as other receivers were plagued with mains spikes and hash. The TD staff took a VF, added the CW band and a BFO and gave it to him.

Now we timeport to September 14, 1950. A Skymaster, TF-RVC or "Geysir" is en route for Iceland. The weather is bad and no radio contact is possible. At 2252z a message is sent to RVC: QFN 8000 FT ON REG QNH 2844 INS QAY VN TFRK OAC. No QSL is received. Again the message is sent, but in vain.

And again: Hold 8000 feet with altimeter setting 28.44 inches until further notice. Still no answer. It could just be a faulty transmitter, but no-one could be sure. TFA Gufunes was asked to transmit the message blind. So were Scotland, Ireland, Norway and Newfoundland, plus all planes over the North Atlantic.

Rescue units, ships and search planes, were called out. RUV went on the air again. But nobody saw anything and nobody heard anything. At 0530 it became clear - TF-RVC was missing.

Everybody listened - and listened - and listened a bit longer. At about 1130z on September 18, the RO aboard the Aegir finished a dispatch and switched on all his receivers. Shortly after he heard from one of them: SOS TF-RVC QTH NOT KNOWN ALL ALIVE TF- RVC.

The Gibson Girl aboard RVC was known to have a range of 255 km maximum. A circle with that radius touched the ice hump Bardarbunga, the only area left unsearched. A Catalina was sent out and at 1445z Radio Seydisfjordur heard: SOS TF-RVC....OVER US. The Catalina was then exactly over the ice hump. Finally, at 1643z, on clearing the hump, the Cat. sent the joyous news: WE'VE FOUND TF-RVC ON VATNAJOKULL - ALL ALIVE.

Later on land-rescue units brought everyone safely back - including the crew of a USAF ski-plane that got stuck trying to get the RVC crew off the glacier.

Very probably no-one would have thought of looking on the Bardarbunga until later if it hadn't been for the modified VF rig - the only receiver QRM free enough to dig out that first call from RVC.

So if you ever see it in the flesh, give it, and its creators, the full respect that it deserves.

##

ADCOCK D/F

I was taken back a few years by the cartoon on page 48 of MM12 which perfectly captures the old Adcock D/F huts. I spent some time in one, in 1946, in a field near Styal, Cheshire. We were in a barbed wire compound in the middle of a field. The farmer had a sense of humour, parking a large bull in it which used to chase the truck in which we travelled to and from the site.

The old receivers were incredibly sensitive. On foggy mornings (QBI) we would keep an ear open to hear someone tuning, and when heard would ring ATC to tell them the fog was clearing at Dublin Airport. What we could hear was the R.O. of the first flight out of Dublin testing his gear while the aircraft was still in the hangar.

Gus Taylor, G8PG.

FEEDBACK on

(1) "THE HELIOGRAPH" (MM12)

There has been a surprising response to Louis Meulstee's article on the Heliograph in MM12. Louis has now sent some further references plus a copy of a detailed (service) procedure for the setting up and alignment of the heliograph (1922). Copies of both are available from the editor on receipt of an s.a.e. (UK) or 1 x IRC (outside UK).

COMMENTS RECEIVED

Amazed In 1945 I was Signals Officer in the 3rd Battalion of my regiment embarked for Palestine. When I drew and signed for the Signal Platoon's equipment I was amazed to find three heliographs included.

None of us had ever really seen one close-up, or been trained to use them. They were brand new and we unpacked them from the maker's cases. I remember they were beautifully made in mahogany and solid brass and the precision engineering was a joy to behold.... I was always looking for a chance to use them on operations but we were too mobile and radio was the order of the day.

We did teach ourselves to use them in the bright sunshine of Palestine but I must confess to having a wireless link between the two positions as well - just in case! We never had enough time to set up the third helio which was intended, of course, to serve as a relay station. I may be wrong, but I seem to remember there were some oil lamps included in the heliograph kit as well, but memory has faded.

Dick Lancaster, G3CFG.

Hi-tech aid. My friend and colleague, Dave ZS6AZP, and I were very interested in the article on the Heliograph because we have two at work. We bought, from a government surplus shop, two 'Heliograph 5", Mark V', for use when doing path surveys for microwave line of sight links.

By 'flashing' the path one can often verify line of sight between two points that cannot be identified through binoculars. Of course the fact that we are both CW enthusiasts had something to do with our decision not to just buy ordinary mirrors!

Two years ago we tried to demonstrate the helios to Boy Scouts during JOTA. What a disaster! Even with handi-talkies at both ends we didn't succeed in passing a message by sunlight!

Now that we have learnt the correct way to align the mirrors, from MM, we will try again. There is rarely a problem with supplies of sunlight out here, but the sun moves quite quickly and frequent realignments are needed.

Peter Smith, ZS6FS, Clubview, South Africa.

(2) THE EDDYSTONE BUG KEY (MM12 & 13)

Used at Sea. I was more than interested to read the articles on the Eddystone bug key. I have a similar model, serial no. 6Z0277 which I purchased years ago and used at sea. The contacts have been re-plated at least six times and it is now painted black again (original colour) after many re-sprays. Although I possess a straight key and an electronic key I still prefer the old Eddystone. Gerry Kelly, G3CBF.

Collectors' item. I note with a smile that my Eddystone bug should now be relegated to Collectors' Corner! I got mine new, back in 1951 and it is still my Nr 2 key - a Vibroplex is in more regular use. I guess I'm getting old, or old-fashioned, or both! Mike Whitaker, G3IGW.

Spring change. I have two Eddystone Bug Keys, and with the changing of one spring for one of less tension they are as good as, if not better than, the Vibroplex. I certainly prefer the Eddystone.

Dawson Thompson, G3AHS.

Double memory. Two articles in MM13 brought back memories which might be of interest. I used the Eddystone bug key with the T1154/R1155 on Vickers Vikings and Avro Yorks. Also with other equipment on Dakotas, Bristol Britannias and DC6B's.

The Tx/Rx relay in the T1154, having a very large gap, was much too slow to be used with the bug key and had to be biased towards the transmit side, making the gap smaller. This was done with a piece of cardboard and an elastic band. The receive contact no longer being made was bypassed by a wire.

My key is marked '369P' on the inside of the cover and cast on the base, not connecting strip, are the markings 'S689' and 'Rd No 853967'.

I worked for 33 years with Hunting-Clan, British United Airways and British Caledonian Airways, first as a Radio Officer and later as a pilot (first officer). I am now retired, have passed the RAE but still have to sit my Morse test. A. Millership, G1XDF.

In Israel. In 1963 on the termination of my engineering studies I visited the transmitting end of the Israel Radio-Telegraph and Telephone Services near Tel Aviv. As a young engineer and a ham I was very excited when we entered the main hall where the "High Power" 500 watts transmitters were in action. I was attracted by a strange device on a table which looked like a turtle. The operator explained that it was an English bug and invited me to try it. Later I saw a dozen of them around. I thought it would be great to have an Eddystone bug in my station!

About six years later when visiting a junk shop in Haifa I was surprised to see a few Eddystone bugs on the shelf with other surplus items. I bought one and started to use it in my station. Since then it is the only one used while the Vibroplex, Vibroplex de Luxe and the old Martin bugs remain on the show shelf. Alex Vilensky, 4X1MH.

(3) THE LINE TO IRELAND (MM13)

Change of use In 1944-45, I was involved in work on the old submarine cables between Portpatrick and Northern Ireland, then owned by the Post Office. As far as I remember, there were at that time three of the 19th century cables still serviceable. One may have been the original cable described by Alan Williams and two were of similar construction but later date, I think from the 1870's. The cables had been repaired on numerous occasions over the years and several new shore lengths provided. I remember the station log books contained graphic reports of some of the difficulties encountered in this work by the cable ships.

In 1944 the cables had not been used for their original purpose for some time but we were able to utilise them to carry broadcasting programmes to Northern Ireland for the BBC and the American Forces Network. The wires were used in pairs, with balancing networks to minimise crosstalk. Equalizing networks were designed to achieve a flat response from 50 Hz to about 7000 Hz, followed by amplifiers to compensate for the losses in cable and networks. This equipment was installed in the cable huts on the Northern Ireland coast. The circuits were extended at each end to the main centres on modern telephone cables.

The submarine cables terminated in the huts at Port Kale and Knock Bay in Scotland and on the Irish side at Donaghadee and Whitehead (on the opposite side of the Belfast Lough). I am not aware that at the time any serviceable cable remained via Mora Bay. I was amused by Alan's comment that visits to the sites of the Scottish huts "require stout boots". Although my own work was at the Irish end where the cable huts were easily accessible by road, I well remember that my colleagues on the Scottish side were none too keen to visit Port Kale, and especially Knock Bay, when laden with tools and heavy test gear.

The circuits we provided on the old telegraph cables remained in ocasional use for a number of years - well into the 1950's I think. Although the circuits were not of the highest quality, suffering from some noise interference, it is remarkable that the cables were able to give useful service so different from their original purpose so long after they were first laid.

Robert Charlton, G3CPC.

(4) THE DOUBLE SPEED KEY (MM12)

Easing the pain. The so-called telegraphers' paralysis is technically known as the "carpal tunnel syndrome" which seems to be afflicting some people who work with computers today (and is probably considered to be a new medical discovery!). It goes way back in the history of the telegraph. (Later, of course, the wireless people called it "glass arm".

Its all the same thing.) After the Civil War the telegraph companies here were getting larger and larger loads of work but it was not until 1886 that the first patents began to appear for instruments that might be used to alleviate or at least ease the pain.

The first evidence I have been able to find is a patent granted to a pair of telegraphers, Maloney and Johnson, in 1886, for a "Convertable Key", a straight lever instrument that had a screw on the lever so it could be turned on the side and operated horizontally if necessary. There was only one contact but they made provision for it to be mounted on either the right or the left to suit the operator.

Two years later the Bunnell Company picked up the idea and were advertising their Double Speed Key, the one we all call the "sideswiper" today. That started a trend and everybody tried to get in on the act. The best known was the Twentieth Century Key popularly called the "Pump Handle" by the very irreverent telegraphers. This invention by Skirrow and Shirley was sold by the Foote-Pierson Company about 1900 and was rather favoured by operators of the B&O Railroad.

There were others as well, including home-brew styles using hacksaw blades. Many used a corset stay instead but how they put contacts on the whalebone I have no idea. But the favoured instrument was the Bunnell model. It was never used by the "Kings of the Wire" who had good arms and no problems. In fact it was meant only for those who were so afflicted but would rather telegraph than eat.

By 1904 the incomparable Vibroplex was on the market and the horizontal action key was in full use, easily handling ten to eighteen thousand words in a single trick. The "Cootie Key", incidentally, is the invention of Bob Karlowa, 9XR, about 1920. It was just a sideswiper for wireless (spark) and was followed by dozens of others (including Sears Roebuck Co.), all with large contacts for wireless operation.

I use a Bunnell Sideswiper for Field day and other contest operation, and the strange sound is a siren call to log Old Timers who just love listening to the sound of this type of key. But it has to be operated properly, not like a bug, which it was never meant to be.

Louise Ramsey Moreau, W3WRE.

(5) "AUSTRALIAN JIGGERS" (MM11)

What's in a name? In the interesting article on Australian Jiggers by John Houlder, some readers may not have noted the connection in the slang terms used for the semi-automatic speed keys described. In some areas of the world the term jigger is the name given to a type of flea or bug, the female of which burrows under human flesh to lay its eggs. One wonders why they didn't call the semi-automatic a chigoe instead!

Colin Waters, G3TSS.

Tuning Your Vibroplex

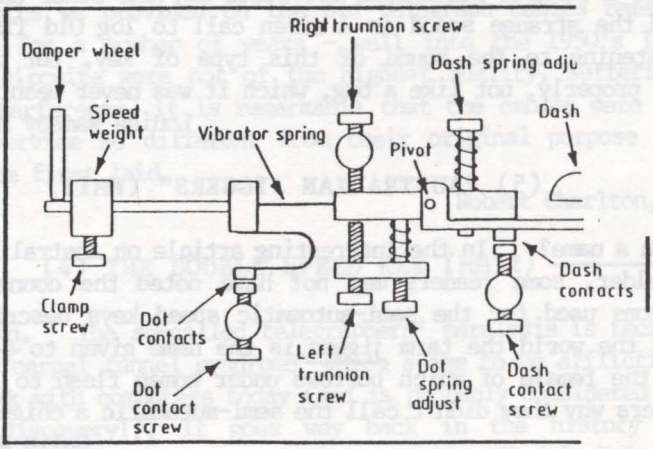
By Jens H. Nohns, OZ1CAR.

1. Set Speed weight at end of swinging arm without it touching the damper wheel. Unscrew both trunnion screws.
2. Screw in right trunnion screw until the swinging arm is just free of the damper wheel. Then unscrew slightly until the arm rests lightly against the damper wheel.
3. Screw in the left trunnion screw until there is a gap of 0.4 mm between the end of the screw and the swinging arm. (A "feeler" gauge would be helpful.)
4. Connect the key to a tone-generator (or your TX without VOX). Make dots, adjusting the dot contact screw until the dots sound regular and more than 30 dots are made before the arm stops at rest on the contact screw.

Or, better still, connect the key to an ohmmeter, and adjust the meter for full scale deflection (100%) when making a dash. Then move the speed weight to your own "working speed" and make dots.

Adjust the dot contact screw until the meter shows 40-45% of full scale deflection. You now have suitable spacing between your dots. Check again that the swinging arm is just touching the damper wheel.

5. Adjust the dash/dot spring adjusters for most comfortable operation. Do not have these too tight.
6. Adjust the dash contact gap to make dashes of the correct length. Many Vibroplex operators make their dashes too short. Too wide a gap makes it difficult to avoid excessive spaces between dashes.



REFLECTIONS from Uncle Bas - 9

Sixth Sense

Sailors can't go home at night so, in a way, they provide a 24-hour service to their employer, although at sea there is something akin to an 8-hour shift. As most people on board work in such shifts, free-time can be at night as well as in the daytime. Accordingly, the greater part of the crew are sleeping at any given time, day or night, the exception, of course, being the Captain who does no guard-duties. Mysteriously, he always appears when something's wrong.

He seems to be able to smell trouble, especially situations when the crew would prefer him not to be there! Most Captains seem to have this sort of sixth sense. That's the reason they're Captains! Then there are the civilian personnel - cooks, stewards, and mess-servants. They don't work irregular hours either. Last, but not least, there's the wireless operator. He has a kind of knowledge which even most Captains don't understand, being related in some way to GMT. As is well-known, his duties are decided by an international organisation in Switzerland.

It's all very serious and totally incomprehensible to outsiders. One day Sparks would be in his cabin. The same time next day the cabin would be closed. The Captain, having more concern for the requirements of mercantile law than the rules of Switzerland would then demand an hour-long explanation for the absence. Now and then there truly was some distortion of working times but only another telegrapher could check this ... However, 99 out of 100 ships have only one Sparks, and that is how it should be! One obviously cannot have a weekend ashore, but there is time to relax on a Sunday, with an extra drink in the afternoon, instead of going to bed. Trying to catch fish from a moving ship is usually unsuccessful, but it is a welcome distraction from normal routine.

Come and look

I once sailed in a 5,000 tons Norwegian freighter of unknown age. Its home port was Oslo, but it had never been there. According to rumour, it was wrecked by bombing in the last war, had been left on the sea-bed and was lifted after the war with the help of Marshall-Plan funds. Originally equipped with a coal-fired triple expansion engine, it had been painted nicely and now had an oil-fired engine. The bunks had new mattresses; the radio cabin a BC348 receiver and a TDE transmitter;

the chronometer was wound up, and the SS Candide (LELM) headed for the open sea. All this happened before I took responsibility for the "Safety of Life at Sea". It never occurred to me that there might still be radio-equipment on board that had been brought up during the salvage operations.

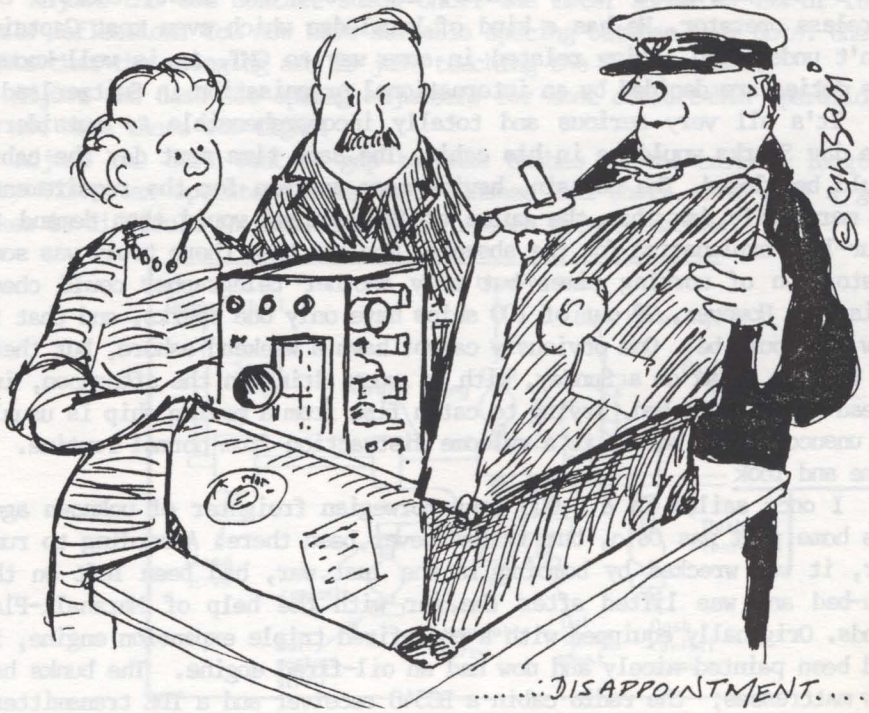
Relaxing one Sunday afternoon, as heretofore described, we were sailing through the Caribbean. The weather was fine and the sea like a mirror. The coxswain suddenly appeared and asked me to come and look at something aft. Out of sheer boredom, he had opened up a small room containing various radio apparatus. To my great astonishment, I saw a "Scot" receiver and an "Ocean-Span" transmitter, albeit totally covered with rust and dirt. He proposed to dump the lot overboard. He did not want to do it himself, however, which was why I had been summoned.

As a radio-ham from my 7th birthday I got a joyous feeling seeing all this old gear. I got everything on deck and during the rest of the voyage spent a lot of time working on it.

Disappointment ...

When I came home after a few years, my parents were full of hopeful expectation seeing me arrive carrying two very heavy suitcases.

Happiness for my return was great; disappointment about the contents of the suitcases was even greater ... Bastian van Es.



No. 75 of a Series

"ACCURATE CW, PAST AND PRESENT"

WHEN we pull the main switch after a brief or prolonged session of activity in one of our favorite pastimes, Amateur Radio CW operating, what will the person on the other end of the circuit be thinking?

QUITE certainly we must be hoping his or her thoughts will resemble something like this: "Aside from proving to be an interesting conversationalist, John or Jane sends BEAUTIFUL CODE. What a pleasure to have been on the receiving end. I am going to try a little harder to improve the quality of my sending."

SURROUNDED by an aura of amazing progress, man should not live in the past. Improved methods must be realized through constant scientific research and logical thinking. If he occasionally reviews history, it may serve as a searching examination of past achievements and heritages to ascertain whether past accomplishments are being sustained or improved upon.

THE radio telegrapher of by-gone years established many enviable records both in speed and accuracy, demonstrating incomparable operating ability. Speed records were NOT attained through sending and receiving imperfectly formed morse code. Enormous volumes of traffic were efficiently handled. In many instances an operator was "lifted" from the circuit if he found it necessary to "break" an operable circuit more than twice per hour to request a "fill."

WITH vastly improved equipment and methods available, should the CW operator of the space age, in honesty and pride, fail to meet accomplishments of the dim past?

TRUE, the majority of present day operators are not using CW in the commercial sense, but they do use it in overly crowded bands where noise and fading are all too prevalent.

UNDOUBTEDLY, modern methods of exchanging intelligence through the medium of manual or automated CW, under uncontrollably adverse conditions, demand the consistent practise of improved sending habits.

LET'S make certain our hope becomes reality; designating ACCURACY FOREMOST.

SPEED must, and will, follow ACCURACY. This statement has thoroughly been proven many times during the past 30 or more years.

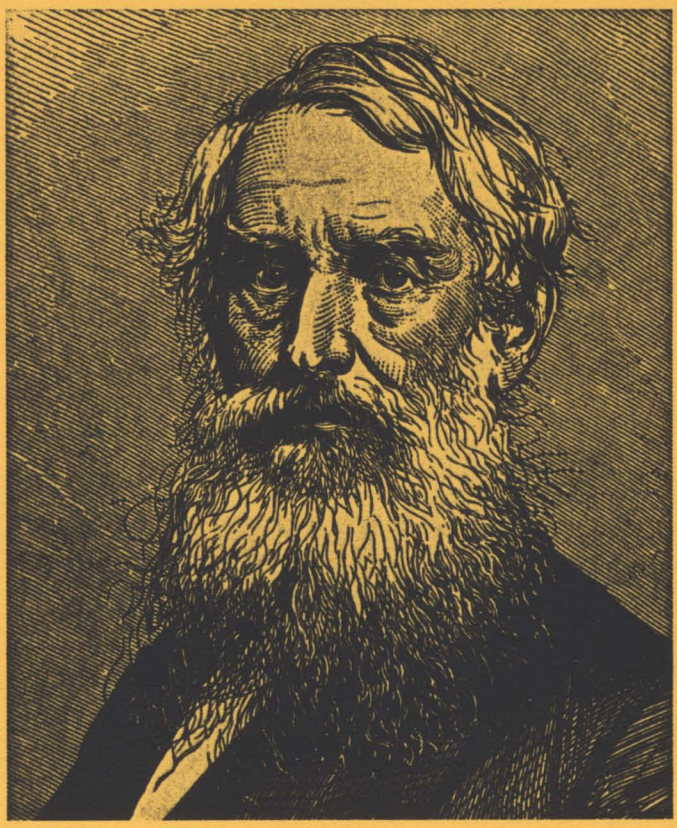
SHALL we of the space age be complacently content with accomplishing less than our Fraternal CW Brothers before us?

—JOHN B. NELSON, W6EAR
(Guest Editor)

Bill Halligan Jr. W J. Halligan W9AC

for hallicrafters

1961 ADVERT



Samuel Finley Breese Morse