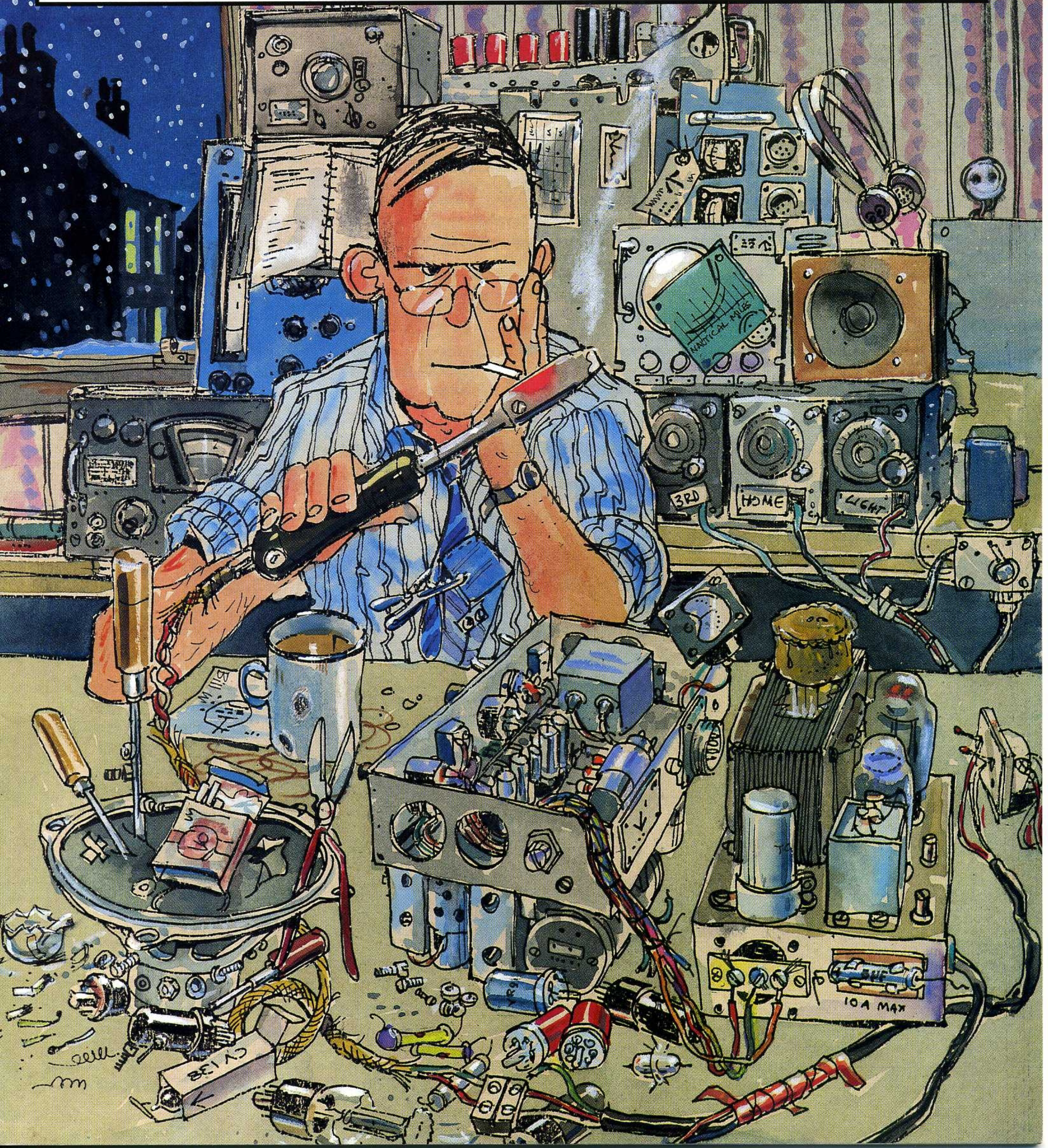
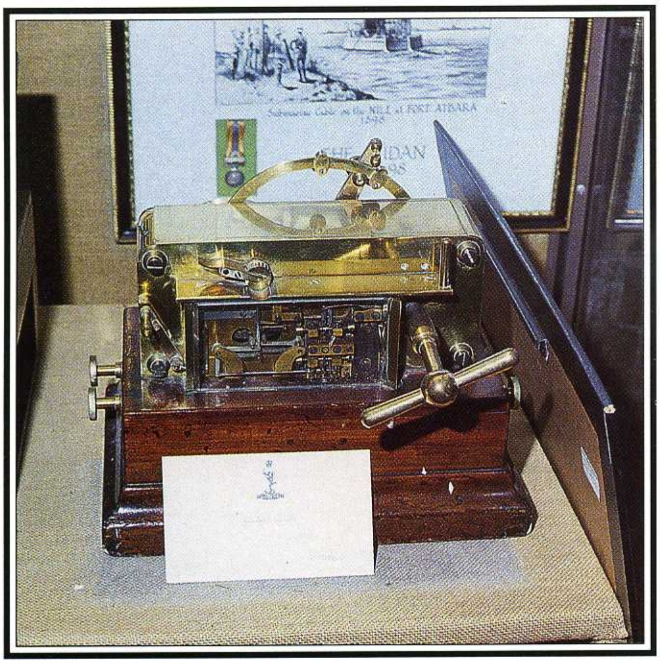
RADIO BYGONES

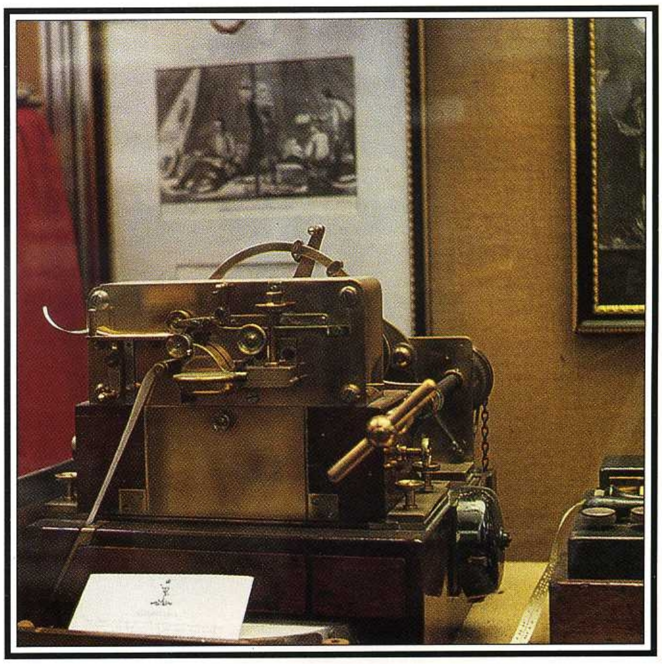
No. 3 – Christmas 1989

£2.20

ISSN 0956-974X



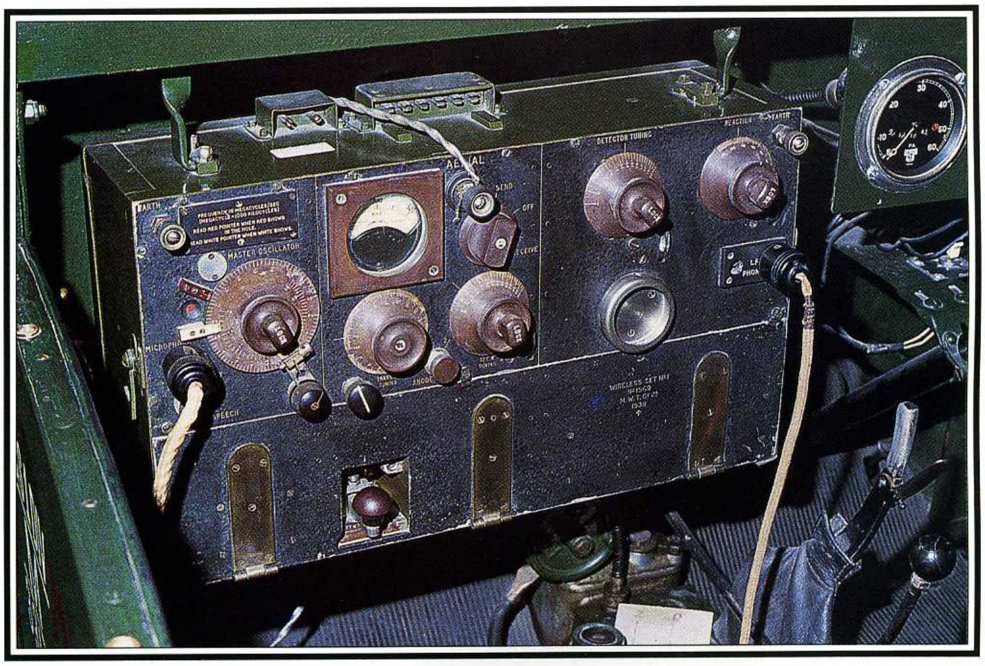




A Morse Tape Sender (left) and Morse Inker (right), from the Wheatstone automatic system, patented in 1863 and used by GPO and Royal Engineers Telegraph Battalions and Companies. Theoretically capable of 600 words per minute, but in practice achieving up to 400 wpm depending on line conditions

MUSEUM PIECES

This month featuring items from the Royal Signals Museum, Blandford Camp, Dorset



A No. 1 Set (1938) giving R/T and W/T facilities in the band 4.2 – 6.8Mc/s.This set is installed in a military version of an Austin 7, coupled to a top-loaded vertical antenna for mobile use

RADIO BYGONES

Christmas 1989
Issue No. 3

Published 12 December 1989
ISSN 0956-974X

Editor
Geoff Arnold
I.Eng FSERT G3GSR

Administration
Barbara Arnold

Editorial, Subscription and Advertisement Offices
Radio Bygones
8A Corfe View Road
Corfe Mullen
Wimborne
Dorset BH21 3LZ
England

Telephone:
Broadstone (0202) 658474

Printed by
The Friary Press Limited,
Dorchester, Dorset

The seasonal illustration on the front cover of this issue is by Bill Wilson

AS I LOOK BACK over the forty-five years or so since I first became interested in radio, many of the memories I have are naturally associated with radio in one way or another. Some of those memories are buried deep in my subconscious, requiring a 'trigger' of the sight of an item in a museum, or of something read in a book or article. Others are of events which were so moving that they are nearer the surface, so to speak, and are recalled quite spontaneously from time to time. Most, though not all, of those in this second category are associated with television rather than radio itself, evidence of what a powerful medium it is.

I was not a particularly early convert to the 'delights' of TV. My first experience of it didn't come until the early 1960s, when after a holiday visit to an aunt who had a set, my wife and I decided we would invest in one for ourselves. A second-hand 14in Bush (a TV63, I think it was) was duly purchased from the radio and TV shop round the corner for the princely sum of £25 cash.That Bush lasted us for about ten years. By then, the picture had got so faint from loss of emission in the CRT that you could hardly see it, even with the curtains drawn. We got good value for money from that set, though, for the only attention it required during the time that we had it was to replace a coupling capacitor in the audio amplifier, which caused intermittent loss of sound. That capacitor cost me 5 pence, as I recall!

My most vivid memory from those early TV days was sitting up one night, well into the small hours, to watch the first transatlantic link via *Telstar*. On the first pass of the satellite – nothing! Then it was decided by the engineers that there had been a misunderstanding between the two ends of the link about the polarisation of the signal, so a component was changed in the antenna feed system at the UK end, and during the second pass, the TV screen steadied and resolved itself into a recognisable picture. I had the feeling at the time that I was watching history being made.

Now that radio and TV have advanced so far, and satellite communications around the world become so commonplace, I think that perhaps I have become rather blasé about new technology. Nowadays, I find that it is the programmes rather than the technical achievements that, once in a while, burn themselves into my memory. Watching the scenes of jubilation as the border between East and West Berlin was thrown open on November 10, with families and friends meeting for the first time in years, was just such a moment. Though no-one can know what the future may bring in that part of Europe, what complications may ensue and whether hopes will be uplifted or dashed, here for a brief while, and via the medium of a TV satellite, we could all watch history in the making.

Geoff Arnold

In This Issue

News & Events

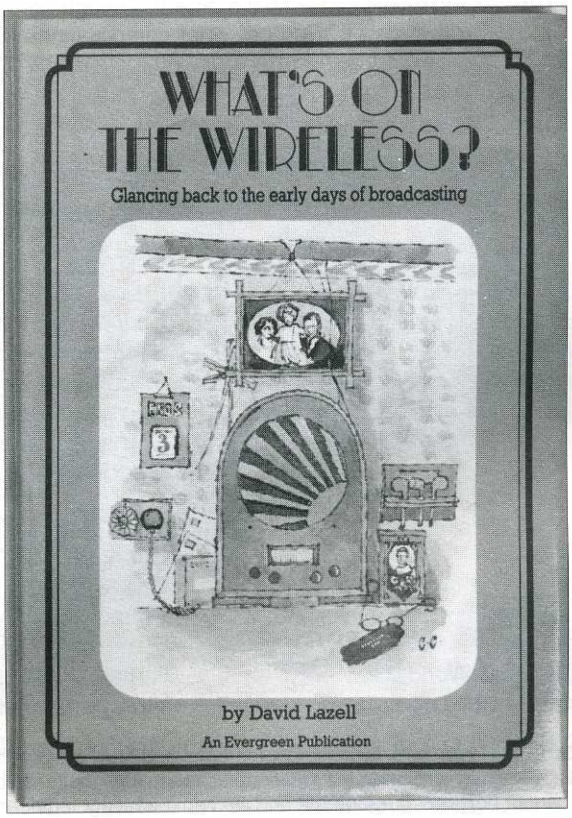
One Hundred Years of Radio Waves

As mentioned by Ken Smith in his article in the last issue of *Radio Bygones*, an important centennial, that of the confirmation of the existence of radio waves by Heinrich Hertz in 1888, slipped by with remarkably little notice in Britain. The work of Hertz, for its intelligent design and decisive findings, is a model of how theory-led experimentation in the exact sciences should go. What other important contributions to science might Hertz have made had he lived longer than 36 years?

Retired radio and electronics engineer F. C. Judd, also well known as a technical writer and radio amateur (G2BCX), commemorated the centennial in 1988 with published articles about the life and work of Hertz. He also constructed a working replica of apparatus used by Hertz in the famous experiments of 1888, which he recently demonstrated to staff and students at the School of Physics, University of East Anglia, Norwich. Mr Judd, whose home is at Cantley in Norfolk, has donated this apparatus to the University for the benefit of students in physics.

The photograph shows F. C. Judd (right) with Professor of Physics John Davies and the replica of Heinrich Hertz's 1888 experimental wireless transmitter.

New Book



Those of you who are interested in the programme personalities of the bygone days of radio broadcasting should be captivated by this newly published book entitled *What's on the Wireless*.

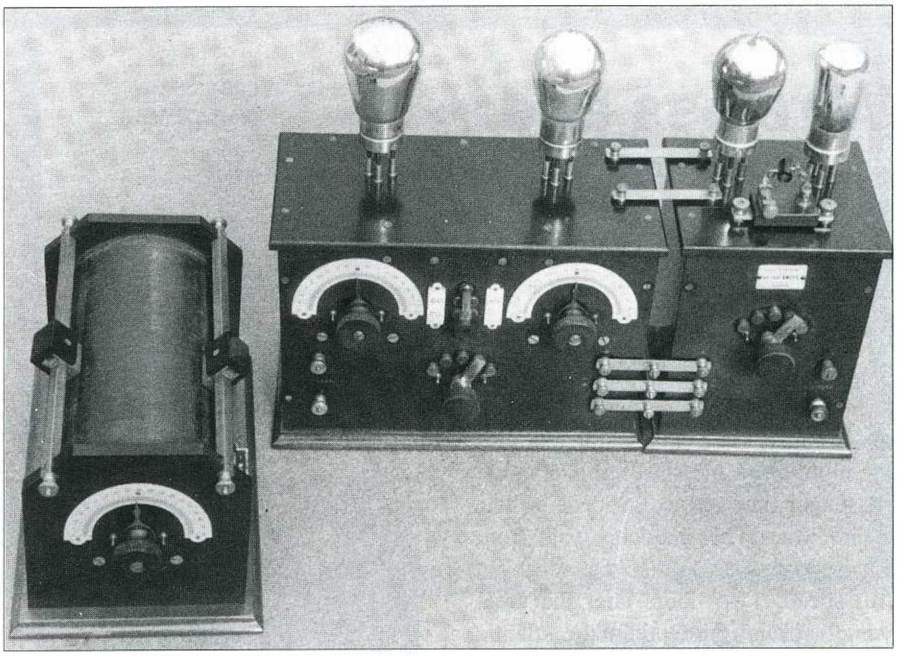
Written by David Lazell, who pens a regular column entitled 'On the Air' in *Evergreen* magazine, and lavishly illustrated, *What's on the Wireless*, sub-titled 'Glancing back to the early days of broadcasting', is the sort of book which can bring a lump to your throat and a tear to your eye within the first few pages.

Those of us of more mature years will readily recall names like Arthur Askey, Tony Hancock and Tommy Handley, programmes like *Dick Barton, Special Agent!* and *The Goon Show*, but this book really jogs the memory about personalities such as Elsie and Doris Waters (*Gert and Daisy*), The Western Brothers, Robb Wilton, Richard Goolden, Gillie Potter and his tales of goings-on in Hogsnorton, Mabel Constanduros and the Buggins family. And those catch-phrases – 'Mind my bike!' and 'Can I do you now, sir?'

What's on the Wireless is published in hardback, 168pp, size 8-1/2 x 6in. It is available by post from **Evergreen Books, PO Box 52, Cheltenham, Glos. GL50 1YQ. The price is £7.95 (including postage and packing) to UK addresses, or £9.00 overseas.**

Access/Visa orders can be placed by telephone on 0242 515156.

Can You Help? – 1



The photograph on the right shows a French set which I own, but have little information on. Has anyone any info?

The set has two RF stages, a crystal detector and two LF stages. The valves in the set when acquired were BTH B3 types. The set covers LW and MW (labelled in French: GO meaning 'grandes ondes' and PO meaning 'petites ondes'). Apart from the nameplate of a local Dublin shop, there is a nameplate stating: 'Societe Anonyme des Anc. Etab'ts ANCEL, 91 Boulevard Pereire, Paris'. I've never heard of a make called Ancel, and I hope someone has some information on this.

Dave Hooper, 2 Cypress Lawn, Templeogue, Dublin 6, Eire.

Can You Help? – 2

I have an 8-valve Marconiphone amplifier made in 1926. It is Model P6 and information about the original valve line-up is required. All the usual sources of information have been approached, with no success.

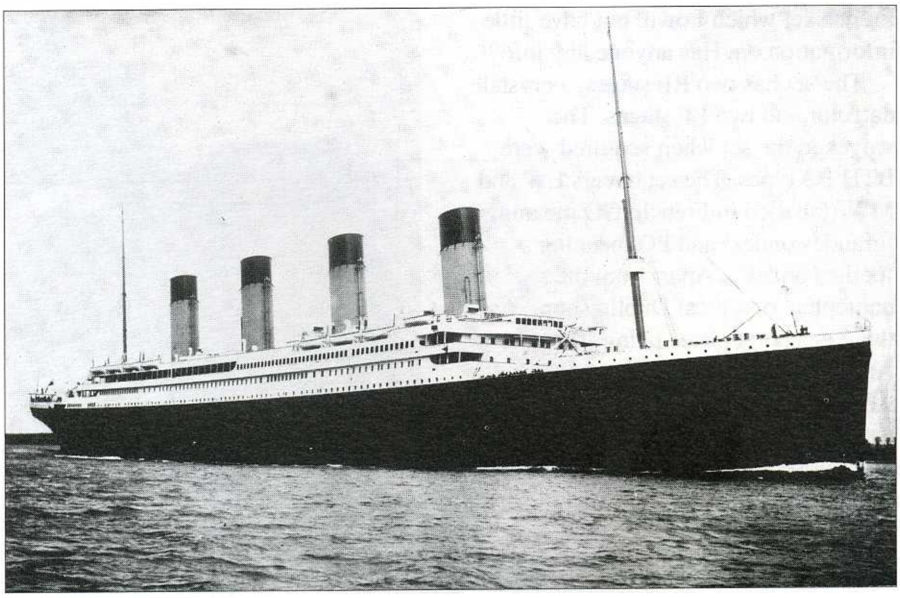
There is a small photo of the unit in a 1926 *Wireless World*, with a caption saying that 'the amplifier is capable of driving three super loudspeakers'. It is possible that it was made for public address work, or supplied to larger radio dealers for demonstrating loudspeakers.

It is a good quality instrument, housed in the usual hard-wood cabinet typical of the period, with a terminal panel on the rear taking a pick-up, radio and microphone inputs, and needing 2 and 6V LT, and 360V HT. It looks as though grid bias was supplied by a battery inside the amplifier.

Philip Taylor, 14 Willow Walk, Canewdon, Rochford, Essex SS4 3QH.

Wireless and the ss *Titanic*

by A. Lester-Rands



'God Himself could not sink her' was what everyone said of the new White Star Line ship *Titanic*, but at 11.40pm on 14 April 1912, in a calm sea with the night clear and starlit, this gigantic passenger liner struck an iceberg. The *Titanic* was on her maiden voyage from Liverpool to New York and travelling at full speed. Two hours later the great vessel sank into the depths of the Atlantic Ocean taking with her more than 1500 souls. 'No other disaster during the present century created a story so fascinating and yet so horrifying.'[1]

The First Warnings

Between the 12th and 14th of April 1912, a number of wireless messages containing warnings about icebergs had been received by numerous ships in the western area of the Atlantic around latitude 50°N. A copy of such a message, dated 13 April and received by the ss *Californian*, is shown in **Fig. 1**. Messages of this nature were undoubtedly received by the ss *Titanic* during that period.

Some time before midnight on the 14th, the Marconi wireless operator on duty in the wireless office of the *Titanic* did receive a message stating that there were icebergs in the area in which the ship was sailing. However, it was generally agreed by the officers on watch that the ship was too far south for icebergs to be in the immediate vicinity. The *Titanic* continued on course at full speed.

Onset of Disaster

Then there was a sudden drop in temperature, which everyone noticed and experienced sailors know is a sign that icebergs may be about. The Captain of the *Titanic*, E. J. Smith, ordered seamen aloft to the 'crows nest' to keep a sharp lookout for them. About half an hour before midnight, most of the passengers had gone to bed but a few remained in the luxurious lounges playing cards or chatting over coffee. A short time later, at 11.40pm, the ship heaved as though in a rough sea and some passengers felt a distinct jolt. No one was worried, even when the engines suddenly stopped, although it was thought most odd that this huge liner should then come to a standstill on a freezing cold night, well over a thousand miles from its destination, New York, and nearly 500 miles almost due south of St Johns, Newfoundland.

The Iceberg

First seen by the lookout men up in the crows nest, a warning to the bridge left no time for avoiding action to be taken. The *Titanic* struck the iceberg – the 'jolt' felt by some of the passengers. At first only a few members of the crew were aware that part of the hull of this enormous ship had been ripped open. Water began pouring in, flooding six of the otherwise watertight forward compartments on the starboard side. When informed as to the cause and extent of the damage, the Captain ordered the ship to be stopped immediately.

After a short time the engines started again, the ship began to move and those passengers still about returned to card playing and coffee with no idea that anything serious had occurred. Then the ship stopped again. Some passengers came on deck to find out what was happening and even when the order was given for everyone to report on deck with their lifebelts, no one was really alarmed. Standing on a seemingly firm deck, 75 feet above a sea as smooth as glass, most thought it was an exercise.

Wireless Distress Calls

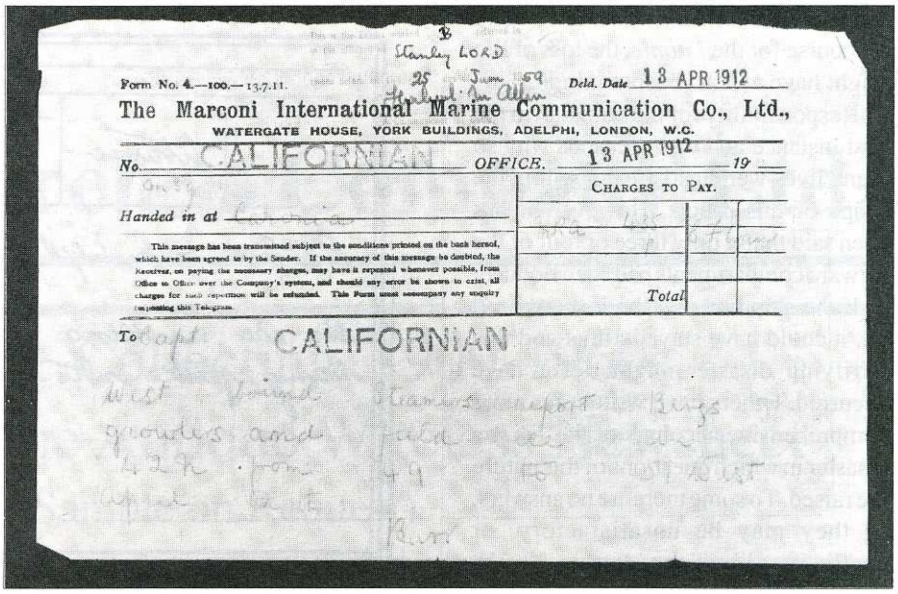
The first wireless distress calls, 'CQD' and the new version 'SOS', went out from the *Titanic* only five minutes after she struck the iceberg. A copy of one of those messages, shown in **Fig. 2**, is alleged to have been received by the ss *Birma* at 11.50pm. The *Birma* was at no great distance from the *Titanic* but it appears that the message was ignored. Perhaps some operator was carrying out an extremely foolish joke. One would hardly expect a message of that nature to have been sent by the 'unsinkable *Titanic*'.

Whilst there were a number of other ships in the area, not all may have been equipped with wireless or did not maintain a 24-hour continuous listening watch. It was not compulsory to keep such a watch at that time. For example, ss *Californian*, only a few miles from the *Titanic* was equipped with wireless but the operator was 'off duty'.

It was a Cunard liner, the ss *Carpathia* who replied but she was 58 miles away. Nevertheless, her captain ordered full speed and set course for the position given by the *Titanic*: latitude 41° 46'N and longitude 50° 15'W.

The Ship They Could See

The *Titanic* wireless operator continued with repetitions of the distress call, hoping that some nearer ship such as the *Californian*, said to be within visible range, would respond. Meantime, engine-room staff had released steam from the main boilers to prevent the possibility of a colossal explosion if the ship should sink. Then a member of the crew suggested letting off distress rockets. Surely these would be seen by someone on the *Californian*. They were, but it was thought that the *Titanic* was having a firework display for the benefit of the passengers! Those passengers already on deck realised the real significance of rockets fired at sea. The *Titanic* was signalling for assistance.


Form No. 4.—100.—13.7.11.

Deld. Date 13 APR 1912

The Marconi International Marine Communication Co., Ltd.,

WATERGATE HOUSE, YORK BUILDINGS, ADELPHI, LONDON, W.C.

No. CALIFORNIAN OFFICE. 13 APR 1912 19

Charges to Pay.

Handed in at

Total

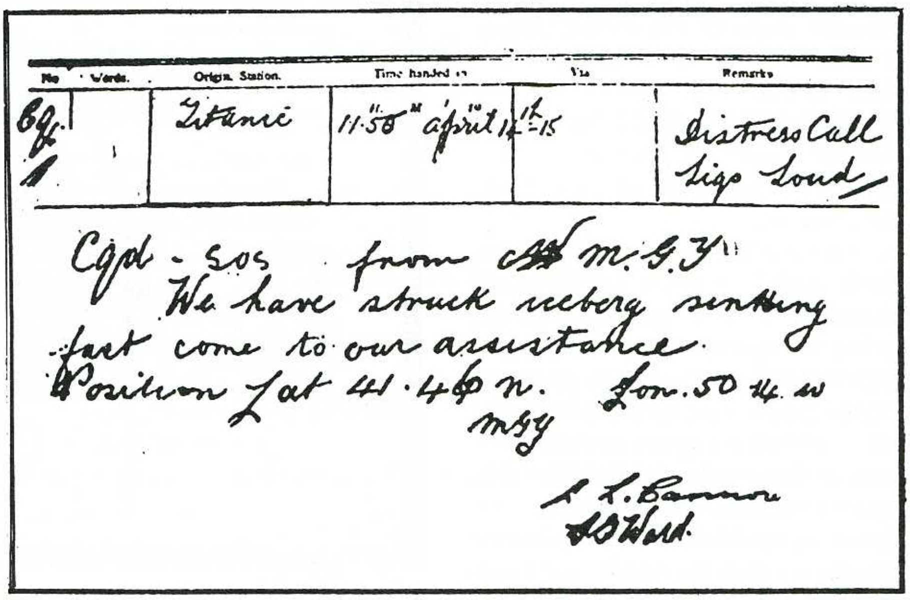
To Capt CALIFORNIAN

West bound steamers report bergs growlers and field ice 42N from 49 ... April ... Barr

Fig. 1 - Marconi message to the ss Californian, *dated 13 April 1912. It reads: 'West bound steamers report bergs growlers and field ice in 42N from 49 to 50 west. April 12th. Barr.'*

Hands to Lifeboats

By now the great ship was stationary and the time about 12.30am. The crew were ordered to release the lifeboats and shouts of 'women and children first' were being heard. Some of the first boats away were half empty because many of the women thought they would be safer on 'the unsinkable ship' whilst others, well aware of the situation, refused to leave their husbands. Captain Smith was now faced with an extremely difficult decision. He knew by this time that the ship would sink within a few hours at most. He gave the order that as many possible, men, women and children, should take to the lifeboats. The bow of the ship was partly submerged and the stern high. Some had jumped straight into the sea and although a few were picked up by the boats, others perished in the freezing water. One of the last wireless distress calls from the *Titanic* (callsign MGY) is reproduced, from the original, in **Fig. 3**. This was received by the *Carpathia* already on her way to effect rescue.



No.	Words	Origin Station	Time handed in	Via	Remarks
Bq. 1	1	Titanic	11.50 april 14–15		Distress Call Sigs Loud

CQD - SOS from MGY We have struck iceberg sinking fast come to our assistance. Position Lat 41.46 n. Lon. 50 14. w MGY

Fig. 2 - Message from the Titanic *received by the ss* Carpathia. *Timed 1150, April 14 – 15. It reads: 'CQD – SOS from MGY. We have struck iceberg – sinking fast – come to our assistance – position Lat 41.46N Lon 50.14W. MGY.'*

The *Titanic* Sinks

There are many dramatic yet sad stories relating to the disaster, and which are dealt with in detail in accounts by other writers. The ship's band who played to the very end in an attempt to calm the passengers; the engineers who remained below keeping the ship's lights going; the Captain, his First Officer and nearly all members of the crew. They and the passengers left on board, went down with the *Titanic* at about 2.20am when she sank very quickly, bow first and stern high, into the cold waters of the Atlantic. That night 1522 people lost their lives. of the total 2227 passengers and crew, 705 escaped in lifeboats and rafts. A copy of a message from the *Carpathia* to the *Californian*, sent on April 16 (shown in **Fig. 4**) relates to those who escaped in lifeboats.

The Wireless Operators

There were two operators present in the wireless room of the *Titanic* when the disaster occurred. The senior, John George ('Jack') Phillips, was about to go off duty but remained and began to send the distress calls as directed by the Captain. As already mentioned, the ss *Carpathia* not only replied but took immediate action. Phillips continued operating whilst his colleague, Harold Bride, conveyed information to the Captain. Then the wireless equipment began to fail and eventually the Captain gave the order to 'abandon ship'. Phillips was drowned but his colleague Harold Bride survived.

Could All Have Been Saved?

A question that has no doubt been asked many times, equally as often as: 'Who was to blame for the disaster in the first place?' If all the ships in the area, some so very close, had responded to the wireless distress calls and immediately set course for the *Titanic*, the loss of life might have at least been minimal.

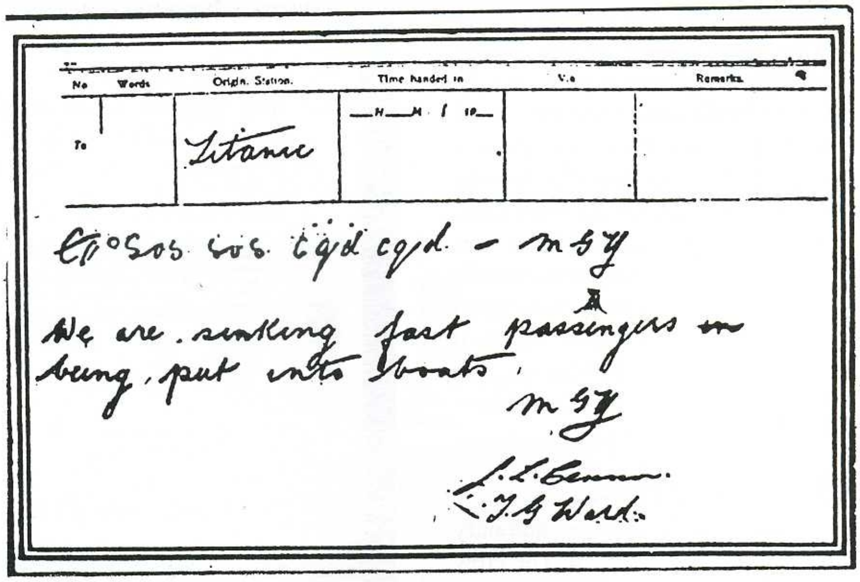
Responsibility for the collision in the first instance and other reasons why so many lives were lost, are not within the scope of this article. However, it has been said that if only three or four of the forward compartments had been flooded, or if the ship had met the iceberg head on, it could have stayed afloat and this terrifying disaster might never have occurred. Others have written far more comprehensive accounts of the *Titanic* disaster in which questions of this nature are raised. To some there are no answers, or they may be unsatisfactory, or conflicting, like the statements in the 'STOP-PRESS NEWS' column of a London newspaper dated 16 April 1912. Three of those, from the original print, were as follows:

1. 'TITANIC SINKS. New York, Monday, April 15. The Titanic sank at 2.20 (am) this morning. No lives were lost. – Reuter'.
2. 'MANY LIVES LOST. New York, Monday, April 15. The White Star officials now admit that many lives were lost. – Reuter'.
3. 'OFFICIAL STATEMENT. New York, April 15. 8.20pm. The following statement has been given out by the White Star Officials: "Captain Haddock, of the Olympic, sends a wireless message that the Titanic sank at 2.20am, Monday, after *all* (Author's italics) the passengers and crew had been lowered into lifeboats and transferred to the ss Virginian. The steamer Carpathia, with several hundred passengers from the Titanic, is now on her way to New York." – Reuter'.

Only one of the four statements in that Stop Press column was reasonably correct.

Wireless communication, even in those days, was in itself quite reliable. More competent use and a compulsory 24-hour listening watch for emergency calls, would almost certainly have accounted for a much lower loss of life, or even the saving of all those aboard the *Titanic*. Published news, much sent and received by wireless, could have been better checked by the publishers.

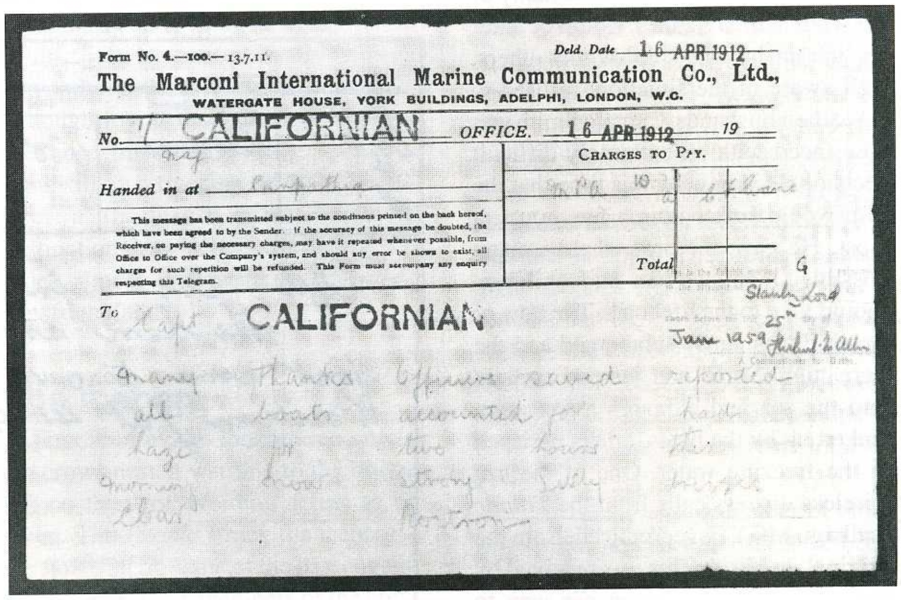
But then wireless was a new technology, its full potential yet to be exploited. However, an International Convention for Safety at Sea was called in London in 1913. They agreed a document stipulating lifeboat drills to be held every voyage and lifeboat space


No | Words | Origin. Station. | Time handed in | Via | Remarks

To Titanic

CT SOS SOS CQD CQD – MGY
We are sinking fast passengers being put into boats. MGY

Fig. 3 - Last message from the Titanic (untimed). It reads: 'CT SOS SOS CQD CQD – MGY We are sinking fast passengers being put into boats. MGY.'


Form No. 4.—100.—13.7.11. Deld. Date 16 APR 1912

The Marconi International Marine Communication Co., Ltd.,
WATERGATE HOUSE, YORK BUILDINGS, ADELPHI, LONDON, W.C.

No. CALIFORNIAN OFFICE. 16 APR 1912 19

CHARGES TO PAY.

Handed in at Carpathia

This message has been transmitted subject to the conditions printed on the back hereof, which have been agreed to by the Sender. If the accuracy of this message be doubted, the Receiver, on paying the necessary charges, may have it repeated whenever possible, from Office to Office over the Company's system, and should any error be shown to exist, all charges for such repetition will be refunded. This Form must accompany any enquiry respecting this Telegram.

Total

To Capt CALIFORNIAN

Many thanks officers saved reported all boats accounted for had haze for two hours this morning now strong SWly breezes clear Rostron

Fig. 4 - Marconi message to ss Californian from ss Carpathia. 16 April 1912. It reads: 'Capt Californian. Many thanks – officers saved reported all boats accounted for – had haze for two hours this morning – now strong SWly breezes – clear.'

to be provided for everyone embarked. Ships had to maintain a 24-hour wireless watch. In that same year an International Ice Patrol, run by the United States Coast Guard, was set up to warn ships of icebergs in North Atlantic shipping lanes.

Further Reading

[1] Michael Davie, *The Titanic – the full story of the tragedy*, Bodley Head (Press) Ltd., London 1986. A highly detailed account of the disaster itself and a comprehensive analysis of events and personal participation in the unfinished maiden voyage of a magnificent British-built passenger ship.

RB

Acknowledgment

Thanks are due to the National Museums and Galleries on Merseyside for the photograph of the ss *Titanic* and the reproductions of the original wireless messages, etc. These museums, including the Merseyside Maritime Museum which has a Titanic Display, are open to the public daily. Full details of what each of the five museums is devoted to are available by calling or writing to the National Museums and Galleries on Merseyside, PO Box 33, Dale Street, Liverpool L69 3LA, telephone 051-207 0001.

Albert Pearce and the Wireless

A short biography of an early wireless enthusiast

by F. C. Judd G2BCX

World War I was over and by 1920 many were taking up 'wireless', indeed some who had been experimenting with spark transmitters and coherer detector receivers before the war were now avidly pursuing the possibilities of a new development, the valve. By now, however, the Postmaster General (PMG) had stepped in and those who had chosen to continue with experiments, or indulge in the entertainment that wireless was soon to offer, had to obtain a Post Office licence.

For one young man, Albert Pearce, of Walthamstow in East London, wireless was a subject highly suited to his fertile mind, inventive prowess and dexterity with tools and a soldering iron. It must be remembered that in those days very few wireless components were available 'off the shelf'. One simply purchased brass nuts and bolts, terminals, square-section tinned copper wire, sheets of ebonite for panels, reels of thin enamelled wire for winding coils, stamped-out plates for making variable tuning capacitors, valve holders and valves and the requisite accumulators and batteries for LT and HT respectively. If all this was beyond the limit of one's pocket, there was always the 'crystal set' which involved much less expenditure. The licence to operate what the PMG referred to as 'your wireless receiving apparatus', regardless of its complexity, cost 10/- (ten shillings, or 50p in today's money) per year.

His First Wireless

For Albert Pearce, better known to the family as Bert, it all began with a 1-valve set and an aerial which, according to the PMG licence and under the Wireless Telegraphy Act of 1904: 'shall not exceed 100 feet in height, with a total length, including the leading in wire, of either 100 feet (single wire) or 70 feet (double wire with spreaders). Valves shall not be used without the special authority of the Postmaster General'. The rest of the terms of the licence are quaint to say the least. For instance, clause (6): 'The apparatus shall be open to inspection at all reasonable times by properly authorised officers of the Post Office.' Remember this was only for receiving!

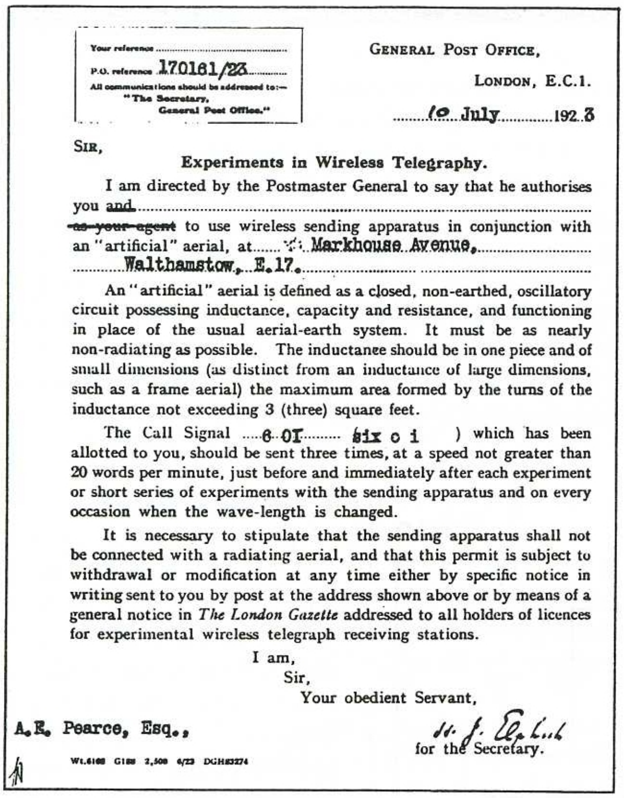
According to Bert's meticulously kept log book, his licence was issued and the receiving station set up on Monday, 13 September 1920. He had of course obtained special permission to use valves for he describes his receiver as a '1-valve set covering wavelengths from 400 to 23 450 metres' (750 – 12.8kHz). On the first page is a now rather faded photograph of the set and the circuit employed. The log book not only makes interesting reading but is a 'wireless history' in itself, with records of actual messages from telegraphy stations, including times and callsigns, etc., and details of the first 'broadcast' programmes from stations like 2MT, the Marconi station at Writtle in Essex, and later from 2LO in London. On various pages are diagrams of circuits used, illustrations of sets constructed, and notes concerned with the activity of the newly formed Walthamstow Amateur Radio Club, of which Bert became a member.

Experiments

Side notes in Bert's log book show that apart from experiments with different receiver circuits, he was also aware of the importance of the aerial. For example, one note reads: 'Aerial re-erected, 1430 GMT, with one end higher by 6 feet. Spark stations louder. FVD spark 600m Dunkirque Castle Line.' After a few years as a 'wireless listener' (no SWLs in those days) Bert quite naturally became interested in transmitting.

Accordingly he applied for and obtained a PMG licence to operate with an artificial aerial (AA). His callsign was 6OI. In the official but impressive wording, the licence states for example: 'The call signal 6OI (six o i) which has been allotted to you, should be sent three times, at a speed not greater than 20 words per minute, just before and immediately after each experiment, etc., etc.' As no Morse test was required to

Fig. 1 - The station of Albert Pearce 6OI. Left: Transmitting equipment and home constructed loudspeaker. Centre: Receiver 1, Morse key, etc. Right: 3-valve receiver and battery box



Your reference ....

P.O. reference 170161/23

All communications should be addressed to:— "The Secretary, General Post Office."

GENERAL POST OFFICE,
LONDON, E.C.1.
10 July 1923

SIR,

Experiments in Wireless Telegraphy.

I am directed by the Postmaster General to say that he authorises you ~~and~~ ~~as your agent~~ to use wireless sending apparatus in conjunction with an "artificial" aerial, at ... Markhouse Avenue, Walthamstow, E.17.

An "artificial" aerial is defined as a closed, non-earthed, oscillatory circuit possessing inductance, capacity and resistance, and functioning in place of the usual aerial-earth system. It must be as nearly non-radiating as possible. The inductance should be in one piece and of small dimensions (as distinct from an inductance of large dimensions, such as a frame aerial) the maximum area formed by the turns of the inductance not exceeding 3 (three) square feet.

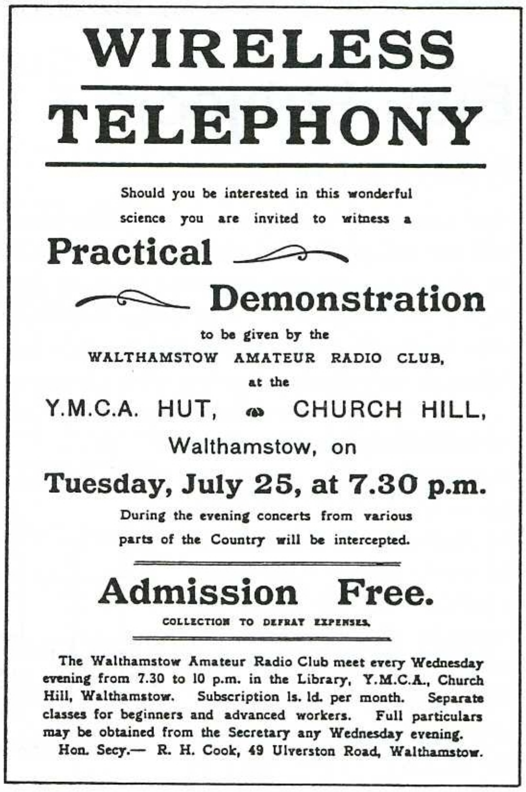
The Call Signal ... 6 OI ... six o i) which has been allotted to you, should be sent three times, at a speed not greater than 20 words per minute, just before and immediately after each experiment or short series of experiments with the sending apparatus and on every occasion when the wave-length is changed.

It is necessary to stipulate that the sending apparatus shall not be connected with a radiating aerial, and that this permit is subject to withdrawal or modification at any time either by specific notice in writing sent to you by post at the address shown above or by means of a general notice in *The London Gazette* addressed to all holders of licences for experimental wireless telegraph receiving stations.

I am,
Sir,
Your obedient Servant,

for the Secretary.

A.E. Pearce, Esq.,



WIRELESS TELEPHONY

Should you be interested in this wonderful science you are invited to witness a

Practical Demonstration

to be given by the
WALTHAMSTOW AMATEUR RADIO CLUB,
at the
Y.M.C.A. HUT, CHURCH HILL,
Walthamstow, on

Tuesday, July 25, at 7.30 p.m.

During the evening concerts from various parts of the Country will be intercepted.

Admission Free.

COLLECTION TO DEFRAY EXPENSES.

The Walthamstow Amateur Radio Club meet every Wednesday evening from 7.30 to 10 p.m. in the Library, Y.M.C.A., Church Hill, Walthamstow. Subscription 1s. 1d. per month. Separate classes for beginners and advanced workers. Full particulars may be obtained from the Secretary any Wednesday evening.
Hon. Secy.— R. H. Cook, 49 Ulverston Road, Walthamstow.

Fig. 2 (left) - Copy of 6OI's 'Artificial Aerial' transmitting licence. Fig. 3 (right) - Handbill announcing a demonstration of wireless by the Walthamstow Amateur Radio Club in 1922. Note the membership fee of 1/1d per month!

obtain the AA licence, the PMG no doubt assumed that the licence holder knew the Morse code anyway. The licence firmly states: 'It is necessary to stipulate that the sending apparatus shall not be connected with a radiating aerial.' Was the PMG under the impression that one could obtain aerials that 'radiated' by themselves? And how about this: 'The inductance (for the artificial aerial) should be in one piece and of small dimensions, as distinct from an inductance of large dimensions, etc.' Well they did add 'such as a frame aerial'. No point in tempting providence. Unfortunately, there are no records of the circuits that Bert used for his experimental wireless telegraphy, but old photographs show that he built a considerable amount of equipment.

The Pearce Family

The whole family, Bert's mother and father, his two sisters and young brother John, became involved with the wireless in one way or another. His father helped with putting up new aerials which were changed very frequently in the course of the experimentation, whilst Bert constructed receiving sets for the family who listened to the broadcast programmes of news and music.

Dad in particular became addicted to what was then called 'the wireless craze', and 'tickling the crystal' had become an art in itself. Woe betide anyone who rustled papers or spoke in anything but a whisper whilst dad was listening, or coaxing the set to receive some exotic station like Radio Paris.

Then there were the frequent 'bangs on the floor' from Bert's wireless room upstairs when something very special was being received. A signal for all to come up and listen; or else keep quiet. A 'wireless family' one might say, with the 'goings on' eloquently expressed in mother's wireless poetry.

For Bert however, the wireless hobby was soon to be abandoned for a family life of his own. He had found a wife but his skills as a machine tool maker quickly led to a somewhat less demanding hobby, model making. Although he never achieved the status of becoming a fully licensed radio amateur, he was a proficient Morse operator, so what could better the remembrance of an early wireless enthusiast except by saying that Bert became a 'silent key' in 1966.

Wireless Poetry

One of several little poems written at the age of 69 by Mrs Elizabeth Pearce, mother of Bert Pearce 6OI, his two elder sisters and younger brother John:

Wireless, wonderful wireless
broadcast far and wide,
a blessing to the sailors
on the stormy tide.

Wonderful strains of music,
to cheer the lonely heart,
comfort to the weary,
when friends are far apart.

Christmas time is with us
and by many an aerial wire,
loved ones are united
gathered round a glowing fire.

The wonders of the wireless,
in the book at which we gaze,
tell of pleasure and enjoyment
to be found in the wireless craze.

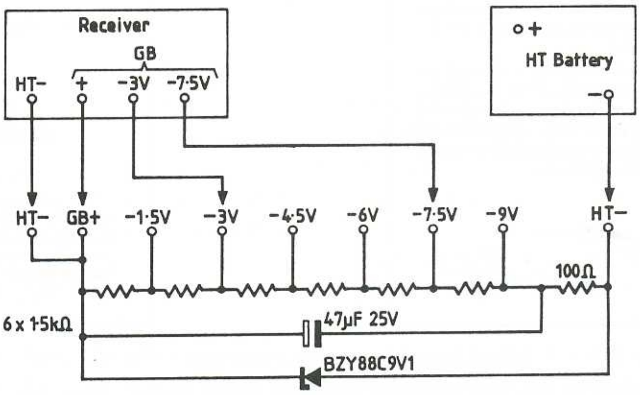
Acknowledgements

As the writer of this biography and also a radio amateur since 1934, I am indebted to John Pearce (my next-door neighbour and friend) for permission to quote from his brother Bert's log book, for the photograph (6OI) and other documents mentioned or reproduced in part or in whole. **RB**

Bias Subjects

by John I. Brown

Most valves require a negative bias on the control grid, and way back in the days of battery valves, with a common 2 volt LT cell for all valves, a separate dry battery was used to provide bias. Such batteries had chemical proportions different from the HT cells, to give long shelf life, since no current was taken as the battery provided only a negative voltage to one or more valves. Users often forgot to test and replace old bias batteries, so that the reduction or absence of bias increased HT current consumption (and sometimes the plugs fell out, or were put in the wrong sockets with similar results), with the result that expensive HT batteries lasted only a few weeks or even days. This caused grief and 'words' with the HT battery supplier, so the makers sought ways of eliminating the bias battery.



Remedies

One method was to incorporate the bias cells in the HT battery so that a new bias supply came with each new HT battery. This made the choice of replacement limited to that specified by the set-maker, and plugs could still fall out or be put in wrong sockets. Starting just before World War II, and becoming general after 1945, set-makers used a resistor in series with the negative HT line to produce a voltage drop due to the total HT current. With decoupling to avoid feedback problems due to audio components in the HT current, correct negative bias was obtained, even giving automatic adjustment for the running down of HT with time. For those enthusiasts restoring old sets to working order, the 'Bias-Box' may save cash, while still filling the role of bias battery. The circuit shows a 9V1 Zener diode which is in series with the HT– lead, giving a constant voltage drop of 9.1 volts for HT current varying from 5 to 40 milliamps, the normal range for old sets. The low impedance of the Zener reduces audio feedback to low level, further reduced by the 47μF 25V electrolytic capacitor. The 100 ohm resistor reduces the bias to just 9.0 volts, and the chain of resistors, carrying 1mA of the total current, gives steps of 1.5V with an impedance low enough to avoid significant common coupling in sets with several valves.

Construction

The parts are soldered on to a piece of Veroboard (RS Stock No. 433-832) 3-3/4 x 2-1/16in with 0.15in pitch (24 strips x 13 holes) Sockets are made by close-winding 18 swg tinned copper wire round a 1/8in drill and then tinning to bind the turns together, with a 'tail' of wire to solder onto the Veroboard. The finished board is fitted into an audio cassette case, drilling and slotting the board to locate on the prongs which normally locate the cassette. Two small pads of hard foam rubber and a 95 x 10mm strip of Veroboard ensure a snug fit. The case is drilled so that the sockets just come through the case when shut. Use a small drill first, then open the holes with a 1/4in drill turned BY HAND on each side until the hole is just big enough to admit the sockets. A SHARP drill is recommended. Take care, the case is brittle! The two sockets HT– and GB+ provide for sets with separate leads (they are linked inside), and a short wire with a plug on each end joins the Bias-Box to the HT battery. The total HT voltage will be reduced by 9 volts, but this is usually unimportant since most users will also be using a mains power pack to supply HT (unless they are rich and have a supply of HT batteries!).

RB

Some Thoughts on Power Supplies

by Tony Hopwood

One of the biggest problems for today's vintage wireless enthusiast is powering the battery set. With dry HT batteries extinct, some sort of power pack has to be substituted.

There are two ways of providing LT and HT. The first is to drive the set entirely off LT, using an electronic invertor. Electronic invertors must be well screened, or they will provide wall-to-wall background mush. The second, and more orthodox method is to build a mains power pack.

Safety has to be an important feature – not only isolation from the mains, but also built-in tolerance to faults and shorts. Isolation is usually obtained from a double-wound mains transformer, with a typical HT secondary rated at 100 to 150 volts at 50 mA plus an appropriate LT winding. Purpose-built transformers are not cheap, and any found may be too big to make a power pack to fit existing battery compartments.

To save space, it is possible to eliminate the transformer **(provided your mains sockets are correctly wired)** using a series capacitor to isolate the mains. The series capacitor has many advantages in a compact power unit. It doesn't get hot, and better still is a constant current source, so a short circuit inside the set won't do much damage. The capacitor must be suitable for AC service and be rated at not less than 400 volts. To meet the modest HT needs of most vintage sets, use two half-wave mains diodes like the BY127 for HT+ and negative grid bias. A capacitor-fed set can use the mains neutral as earth provided it does not float about too much or add interference.

Although the capacitor isolates the mains, it still makes sense to fit a 60mA lamp bulb as a fuse, against the day when the capacitor fails at the end of its statistical 100 000 hour life!

For a nominal 100 volt stabilised supply as shown in Fig. 1, modern power factor correction capacitors used in fluorescent lamps or split-phase motors are very suitable, although internal discharge resistors sometimes fitted make them impossible to test for insulation. All elderly capacitors should be regarded with suspicion, and must show no trace of leakage at 500 volts. Any capacitors that pass the leakage test but show any self-generated voltage must also be discarded because this voltage is a sign of electrolytic degradation of the foil caused by impurities in the wax, and is an early warning of failure.

A 1µF capacitor will pass 80mA at 240 volts 50Hz, giving an AC resistance (impedance) of 3000 ohms, so any current and voltage combination may easily be calculated – but don't forget the voltage drop in the stabiliser. Capacitors can also conveniently replace line cords or baretters in other mains sets because 8µF will drop about 120 volts at 300mA without even getting warm!

Some sort of HT voltage regulator must be fitted, and a combination of silicon rectifier and high voltage Zener diodes or stabiliser tubes will provide safe HT for most multi-valve sets

Using capacitor feed, it is easy to obtain negative grid bias by using a single diode to channel negative half-cycles into a network of preset potentiometers with individual outputs carefully decoupled.

SAFETY WARNING

The technique described in this article involves a direct connection between the AC mains supply and the circuitry of a receiver which was designed for use from batteries, in days when safety rules were less stringent than they are today. **Use it only if you fully understand the risks involved.**

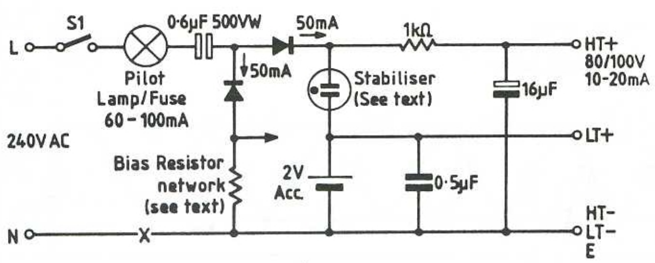
If the neutral conductor of your mains supply is not at or **very** near earth potential, it may not be practical to make use of this circuit.

Readers outside the UK should observe their own local electricity supply regulations and codes of practice.

LT

Low tension supplies are a bigger problem. It is possible to buy miniature stabilised supplies, but most of them do not go down below 2 volts, and they tend to be expensive. Transformer LT usually comes from a rectifier bridge feeding into a large electrolytic via a surge limiting resistor, but be careful – those thousands of smoothing microfarads store enough energy to 'splat' elderly filaments if the set is switched on without using the filament resistors. Even a 2 volt transformer winding will charge the smoothing electrolytics to nearly 3 volts no-load peak rectified DC.

Transformerless LT of any voltage can be easily and safely obtained from trickle charged sealed accumulators, arranged as part of the capacitor fed supply. Any midget sealed accumulator has an effective smoothing capacitance of farads as well as providing stabilised filament supply volts. Charging rate can be chosen by selecting the right stabiliser/capacitor combination, but bear in mind a typical sealed 2 volt 9.5 ampere/hour lead acid cell will only last about 4 hours on 3 bright emitters! With the fall in price of sealed nickel cadmium rechargeable cells, a pair of 'D' size cells makes a good alternative to one lead acid cell, and gives around 4Ah and 2.4 volts.



Automatic trickle charging is obtained if the LT battery is connected between the stabiliser and neutral, and a charging rate of 25mA will put back over 4Ah a week – enough for modest regular listening with DE valves. If a higher charging current is needed, the charging and HT stabiliser circuits can be separated.

A pilot light should be fitted if the power unit is to be left on trickle charge. Because the mains current is controlled, a low voltage 60mA lamp can double as an indicator and fuse. It may be necessary to shunt the battery with a capacitor to kill any rectifier and stabiliser noise.

Using capacitor feed and a 2 volt sealed cell, it is possible to build an extremely small power pack capable of supplying HT, LT and bias for most sets. **The only proviso is that it must only be used where the mains sockets are correctly wired, otherwise the earthy side of the set will become live with possibly fatal consequences.**

Stabiliser

To give a 'period' look to a capacitor-fed PSU, an early piptop beehive Osglim neon makes a reasonable stabiliser when the ballast resistor is removed. It is quite easy to remove the base and extract the ballast resistor by heating the cap with a flame to loosen the cement. Osglim beehive neons and similar night-lights have a 5 watt rating, and will safely handle a 25mA stabiliser current from a 0.6µF series capacitor. Best stability will be with the flat plate of the neon lamp illuminated. Once the cap is reconnected and replaced, the neon MUST be clearly marked as unsuitable for mains use! Tests with the unit illustrated showed it gave 10mA HT at 100 volts and 150 volts off load using an ancient Osglim and a nominal 0.5µF capacitor. The LT trickle charge rate was 20mA. A proper stabiliser tube like the VR105/30 would regulate better, but it wouldn't look as good! Valve stabilisers are cheaply available for all common HT voltages, and it is even possible to connect several in series to provide detector and output HT. A useful tube is the G55/1K (on a B7G base) or G120/1B (B4 base) rated at 55 volts 30mA – two in series make a 55/110V detector/output HT combination but don't forget to bridge the top tube with a 200kΩ resistor to make sure they both strike properly. For reliable service, the series capacitor feed and HT current drain should be within the stabiliser tube current ratings It is a matter of choice whether the LT cell(s) and bias adjustment pots are built into the PSU or fitted into the back of the set. If B7G based stabiliser tubes like the OB2 or 90C1 are used, the complete power supply need be no larger than an old B126 90 volt battery (Approximately 4 x 2 x 2in), assuming the LT cells are fitted externally. For post-war portables using very low filament current valves like the Mullard D96 25mA range run in series off 7.5 volts LT, it is possible to take advantage of the constant current feature of a capacitor-fed supply, and drive the filaments direct off the end of the stabiliser, with a smoothing capacitor fitted across the supply to cut rectifier and stabiliser noise. A final point is to remember that the HT+ will shoot up to over 240 volts if the stabiliser is removed or the LT circuit is open circuited, so make sure that you wire the cells upstream of any LT on/off switch.

RB

A Battery Eliminator for Valved Radios

by Rod Burman

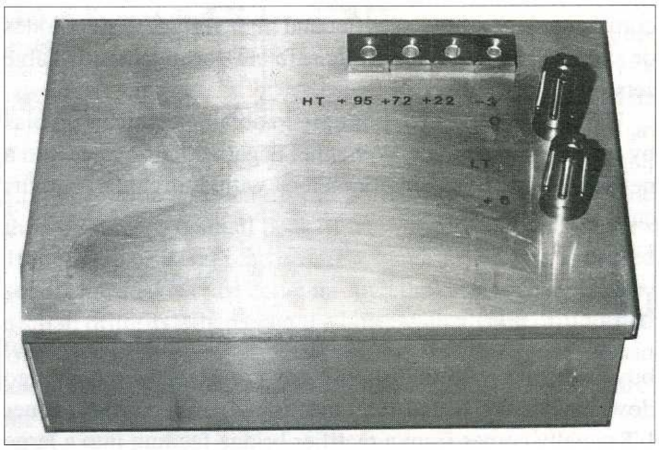
Having recently restored an Atwater Kent model 20C radio, the problem of a suitable power supply presented itself. With a total consumption in excess of 8 watts, batteries did not seem to be a very practical solution, so it was decided to build a mains eliminator instead.

The actual voltages and current required were as follows:

LT 5.5 to 6.0 volts at 1.25 amps
GB –3 to – 4.5 volts
HT1 22.5 volts at 3.0 milliamps
HT2 70 volts at 2.0 to 3.0 milliamps
HT3 90 to 100 volts at 5.0 milliamps.

Clearly a suitable transformer was not likely easily to be found and some thought was given to ways by which the desired voltages might be obtained using 'off the shelf' components.

The Cockcroft-Walton voltage multiplier provided a possible solution as to how the necessary HT voltages might be obtained from a standard low-voltage transformer.



A test showed that a multiplier using 10 diodes and 10 reasonably sized capacitors was capable of delivering 120 volts at 15mA using a transformer having a nominal output voltage

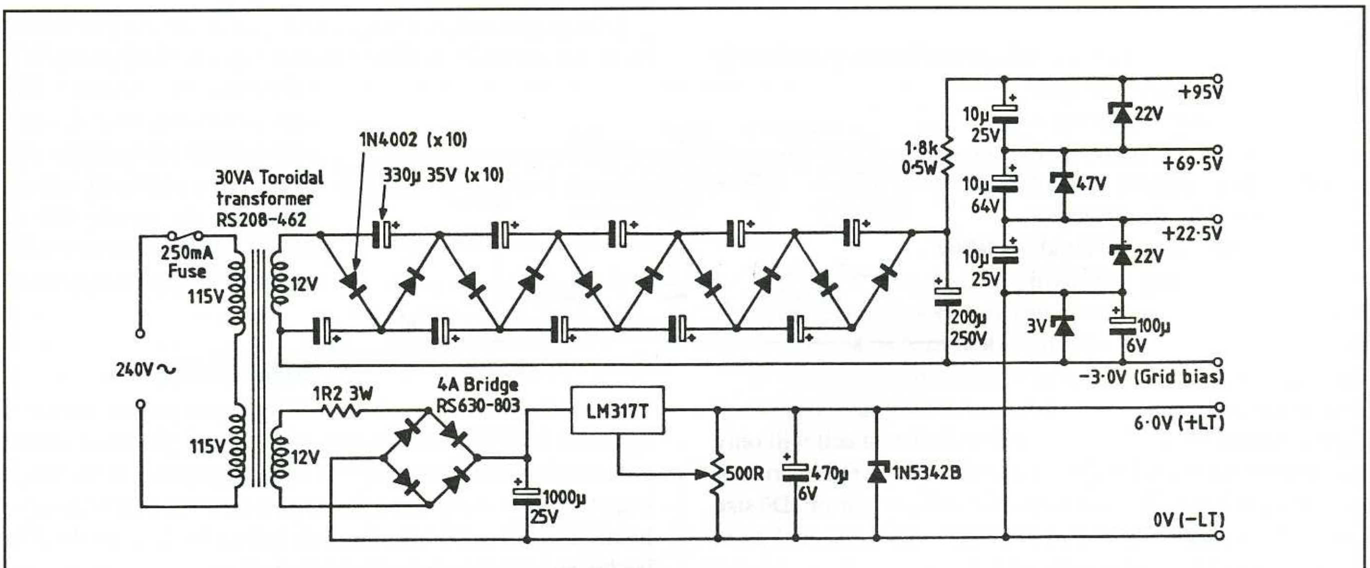


Fig. 1 - Complete circuit diagram of the battery eliminator

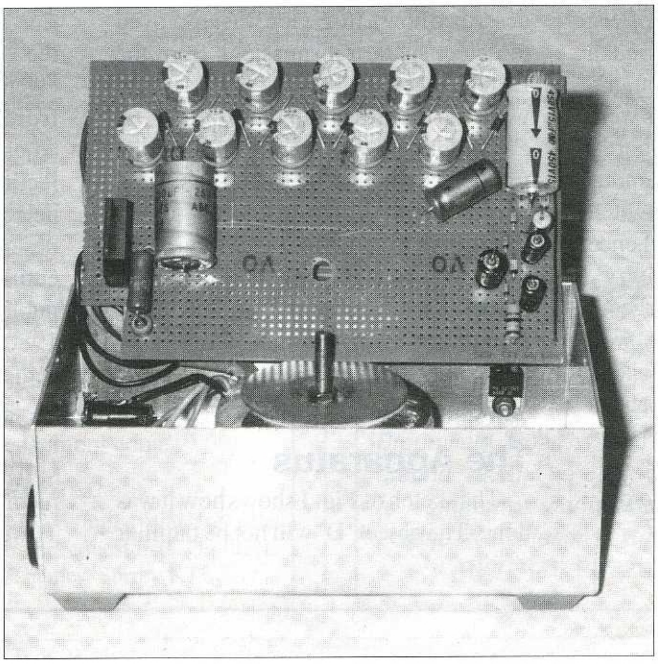
of 12 volts. A similar 12V winding was also capable of providing the LT requirement without the need for excessive heat dissipation. Using this information the circuit in **Fig. 1** was evolved, which provided all the outputs required to operate the model 20C radio.

Component Selection

The transformer is probably the most important component to be chosen. For this particular eliminator, reference was made to the RS Components (Electromail) catalogue and a dual 12V output 30VA toroidal transformer (RS No. 208-462) was selected. Although the load on the secondary supplying the LT voltage is slightly in excess of the full load rating for this transformer it was felt that as there was extremely light loading on the other secondary and the total load was well below the VA rating of the transformer, no problems would result, as has indeed proved to be the case.

Another benefit of selecting a toroidal transformer was that its small size allowed the complete unit to be built in a box measuring only 6 x 4 x 2in.

For other applications, in particular those where the set uses 2 volt battery valves, a transformer having say three 6.3V windings, one for LT and two in series for the HT would be ideal. In fact any low voltage transformer having two separate outputs, one not more than 12V and one not less than 12V will do the job.



An internal view of the author's prototype battery eliminator, with the circuit board removed from its mounting bolt

The Zener Chain

The diodes in the Zener chain are chosen to give the required voltages for the radio. The power rating of the highest voltage diode will be determined by the current down the chain, which should be at least 20 per cent more than the maximum current required by the receiver.

This current can be set by altering the value of the series resistor between the Zener chain and the output of the Cockcroft-Walton multiplier. In this case a value of 1.8kΩ was chosen to give a Zener chain current of 15mA and a maximum dissipation off load in the 47 volt Zener of less than 750mW, thereby allowing a BZX61 or BZX85 type to be used.

LT Supply Series Resistor and Regulator

An adjustable series regulator integrated circuit type LM317 was used to provide a variable low voltage output for the valve filaments from the rectified AC derived from the other winding of the transformer. The maximum dissipation allowed for the TO220 version (LM317T) is in the region of 15 watts even when used with an insulating washer, and this level is more than adequate for this application. The series resistor, 1.2 ohms in this case, is selected such that under full load and minimum mains voltage no ripple appears at the output of the LM317T, thereby indicating that the voltage across the regulator does not fall below its drop-out voltage of 2.8 volts. The 1.2Ω resistor dissipates approximately 3.0 watts. Finally a high-current 6.8 volt Zener diode is connected across the LT output so that in the event of a failure of the LM317T, the output voltage would be limited and the valve filaments protected against serious over-voltage.

Constructional Details

All the components except the LM317T and the transformer are assembled on a piece of 0.1in pitch stripboard, which lends itself quite well to the circuit configuration with a minimum of track cutting. The transformer is mounted inside the aluminium box by means of a single centre bolt, which also serves as one of the circuit board fixings. The LM317T is fixed to an outside wall of the box using an insulating pad and washers. The box acts as a perfectly adequate heatsink, even though it does get quite warm to the touch after some hours of operating. The outputs are brought out to wander plugs and terminals, and the complete unit may be housed in something more authentic looking if desired.

Conclusion

The above design, whilst specifically aimed at the Atwater Kent model 20C, is sufficiently flexible to enable mains powered battery eliminators to be designed for a wide variety of receivers whilst using readily available components. ***RB***

Physiological Radio Detectors

*by Geoffrey Walsh MD FRSE (GM4FH)**

The experience of an electric shock when a Leyden jar was discharged was one of the earlier ways of detecting an electric charge. In 1772 John Walsh described in the *Philosophical Transactions of the Royal Society* how he had passed a current from an electric fish through a chain of eight persons whose hands were linked through basins of water. Shortly after this Galvani undertook his famous experiments making frog muscle twitch in response to an electric current – hence the phrase 'galvanise into activity'. Galvani was an anatomist and surgeon. Much of this and much more is well known but what is not widely appreciated is that there have at times in the past been procedures for detecting radio waves physiologically.

**Reader, Department of Physiology, University of Edinburgh EH8 9AG*

In a recent article in the *Short Wave Magazine*, M. S. Crabtree G3OXC described how a frog's leg was employed to detect spark transmissions from the Eiffel Tower and the original scientific work is described in the *Journal de Physiologie et de Pathologie Generale* for 1912. It should be said at once that frog's nerve and muscle is pretty insensitive to radio frequency currents; little will change until burning takes place! The optimum frequency for stimulation of a frog's nerve is no higher than about 200 hertz (c/s).

The Apparatus

The sketch of **Fig. 1** shows how it was done. The object 'D' will not be familiar to most modern technologists. It is an 'electrolytic detector' and is described in detail on pages 315 and 316 of *Compt. Rendu 1905* Vol. 141. Briefly, a very fine wire of platinum dipped into acid, the other electrode being larger. The electrolytic cell was polarised by current from a battery, the voltage being adjusted by the potentiometer 'P', and rectification occurred. Other electrolytic detectors were in use at this time and are described in a book by V. J. Phillips entitled *Early Radio Wave Detectors*, published by Peter Peregrinus Ltd in 1980. It was apparently possible to decipher dots and dashes according to the evolution of bubbles.

Lefeuvre, a physiologist at the University of Rheims successfully recorded the time signals from the Eiffel Tower at a distance of 200 miles (see

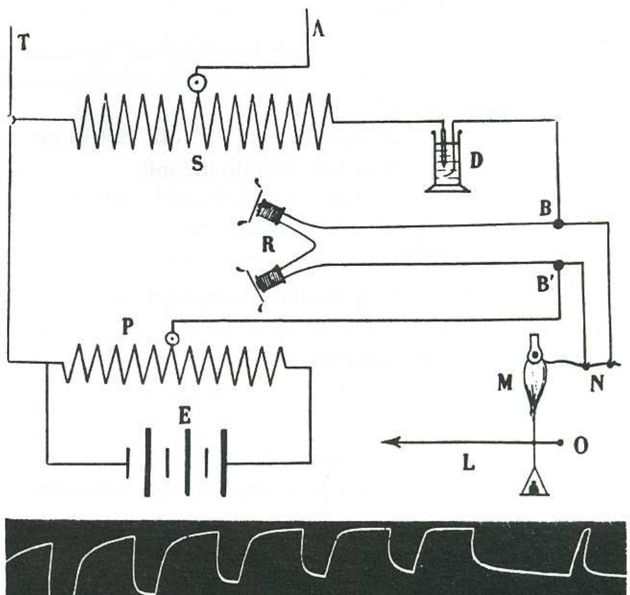


Fig. 1 - Lefeuvre's apparatus. 'A' is the aerial (antenna), 'B' and 'B'' the output to the frog and headphones, 'E' the battery, 'P' a potentiometer, 'S' an inductor, 'T' earth, 'N' the nerve and 'M' the muscle. 'O' was a pivot for 'L', a lever, probably made of straw and furnished with a tip for writing on smoked paper on a rotating drum ('Kymograph'). This method of recording muscular contractions had become widely used by this time and was instigated by a French physiologist Marey. A weight shown on a pan restored the length of the muscle after each contraction

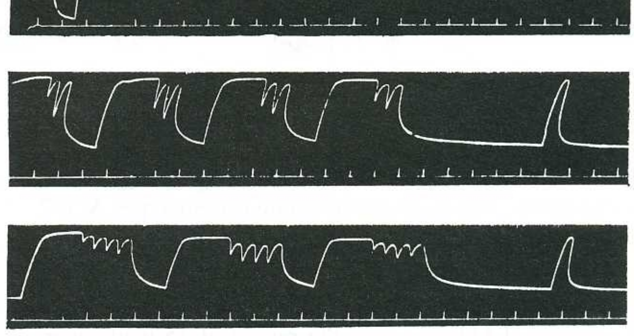


Fig. 2 - The type of graph recorded by Lefeuvre when receiving time signals transmitted by the Eiffel Tower transmitter. Top, a series of dashes followed by a dot for the 10.45am time signal. Middle, several dashes and two dots followed by a single dot for the 10.47am time signal. Lowest, three dashes and four dots, followed by one dot at 10.49am.

The original Eiffel Tower time signal transmitter (FL) is preserved at the Musée des Artes et Métiers in Paris

Fig. 2). This scientific account does however show that the system would only work when the high impedance headphones ('R' in Fig. 1) were connected across the nerve; it must be supposed that the excitation of the nerve depended on the self inductance of the headphones. Each spark from the transmitter will have set up a damped train of radio frequency waves. If these were still continuing at the time of the next spark the phase relationships will have been randomised and often there will have been an abrupt reversal of current. It seems that the consequent back-EMF provided the effective stimulus. The frequency of the spark train was 2000Hz, the wavelength of the transmission 2600 metres. This wavelength was determined by an inductance of 40 turns of brass pipe each turn being 3 feet in diameter. The aerial current was 80 amps.

Detection by Taste

Another, rather bizarre, form of physiological detector was described by Goldsmith and Dickson in 1921 (*Proceedings of the Institution of Radio Engineers*, Vol. 9.206-224). They used the sense of taste to detect Morse signals. A wire 150 feet high (!) and 180 feet long fed a triode detector and four stages of valve amplification. Current was supplied via electrodes to the tip of the tongue. The investigators' idea was that the reception of Morse signals by the use of headphones might be impossible 'in places where there is great interference due to exterior noises, as in the case of an operator on an airplane'. The authors suggested that there would thus be an advantage in employing the operator's sense of taste rather than hearing in receiving signals. As however, it was found that the maximum rate at which signals could be received was 5 words per minute, they eventually deemed the system impractical! The bandwidth was restricted, a jet airplane might have travelled about a mile before one word was received. **RB**

The author acknowledges the assistance of S. Crabtree and C. H. C. Matthews in tracing certain parts of the historical material.

Where is it?

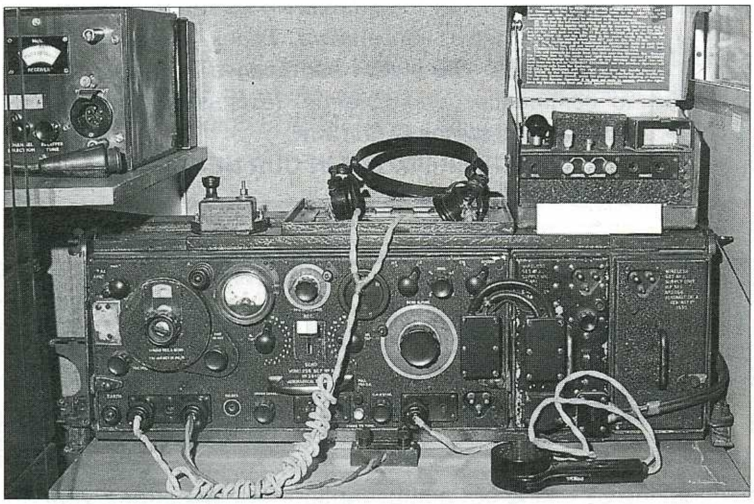
We seem to be totally baffling you with our picture puzzles. Not a single correct answer to No. 2, which was a photograph of the Marconi Research station off Broomfield Road, Chelmsford, Essex, probably taken around 1935. The station had opened in August 1903, to commence 'long-distance' tests with the famous Poldhu Point station in Cornwall.

ANOTHER PUZZLE IN OUR NEXT ISSUE

Royal Signals Museum
Blandford Camp, Dorset

A Single Needle Telegraph (1855) as used in the Crimean War

A Wireless Set Trench CW MKIII (WWI). The first all-valve transmitter, it used 'R' Type valves



A Wireless Set No. 11. This hand-built set replaced the No. 1 set in 1935. It had an output of up to 1.5W on R/T and 4.5W on CW in the band 4.2 – 7.5Mc/s.
It proved unsuitable for mass production to satisfy the quantities required for WWII, and was replaced by the 19 Set in 1940/41

The Royal Signals Museum first came into being in 1924, some four years after the formation of the Royal Corps of Signals itself, and was one of the earliest military museums. As is the case with many specialist museums, it had its origins as a private collection.

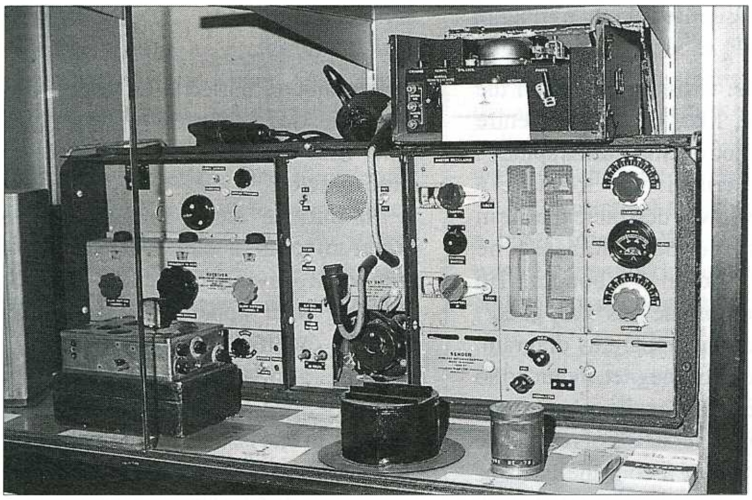
Further development of the museum began in the late 1930s, but this was soon halted by the onset of World War II. It was re-commenced at Catterick, in North Yorkshire, after the war, and after occupying a number of homes there, was moved to Blandford with the School of Signals in 1967. Since then the museum has continued to grow, gathering historical exhibits from numerous sources within the Corps.

The museum presently occupies an area of some 6000 square feet, but has far outgrown that space. Plans have been drawn up for it to move to a new building of around 25 000 square feet to be constructed on a 'green field' site, just outside the present camp entrance. The target date for the move is 1992, but it does depend on raising the £2.5 million required to finance the project.

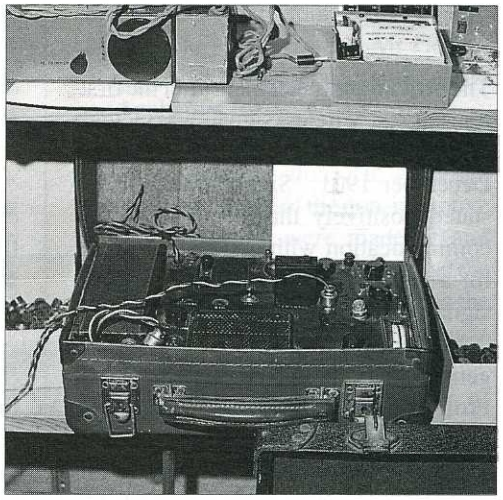
The museum contains items dealing with the history of army communication dating from the Crimean War to the Falklands Islands Campaign of 1982, as well as the history of the Royal Engineers (Signal Service) and the Royal Corps of Signals. There are many colourful uniforms and a large medal collection on display, as well as the only surviving example of the horse drawn cable laying wagon, also an 8th Army Armoured Command Vehicle in a desert setting. There are a number of military motor cycles as used by the Despatch Riders of the Corps, and an airborne communications jeep.

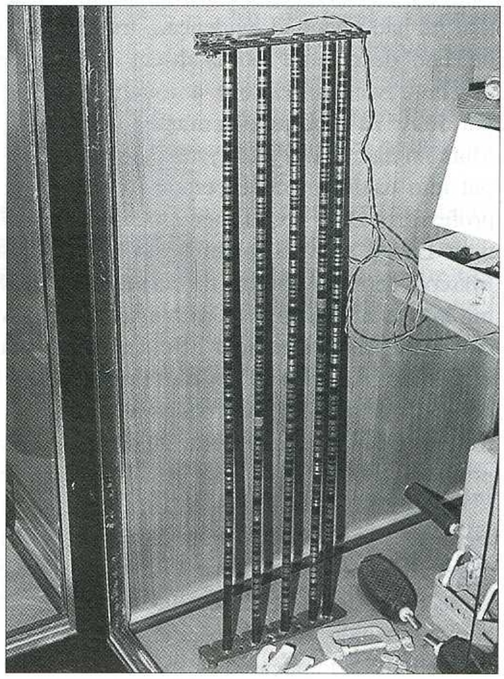
The display contains early telegraphic and radio equipment dating from the South African War, World War I, the campaigns of the North-West Frontier of India, and World War II. There are heliographs and signal flags, and telephone exchanges and handsets of all types and ages.

In the main, the radio equipment on display was that made for use by the British Army, but there are also many items from other countries which were taken into use by the Army. It ranges from hand-portable equipment, through



A No. 9 Set, developed in 1935 for use in tanks. The transmitter output power was 10W R/T, CW or MCW in the band 1.875 – 5Mc/s. It was replaced by the 19 Set





The 'Squirt' transmitter (above) and its coder (right). The coder consists of four rods over which insulating and conducting rings are slipped by the operator, in the appropriate pattern to make up a Morse code message. The transmitter keying probe is then run smartly down the rows of rings, sending the message in bursts or 'squirts' too short to allow an enemy radio direction-finding station to pinpoint the location of the set

man-packs and mobile rigs to base transmitters running a kilowatt or more. Older radio amateurs and short wave listeners (and some youngsters, too) will instantly recognise many of the types of receiver which came into their hands via the government surplus market. There is a very interesting and comprehensive display of clandestine radio equipment from WWII.

The museum's Deputy Director and Curator are most happy to assist visitors who are carrying out research into army communications of years gone by. Photocopies of circuit diagrams, etc., of army radio equipment can also be obtained, provided the documents involved are more than 30 years old. Enquiries should be addressed to the Deputy Director, Royal Signals Museum, Blandford Camp, Blandford, Dorset DT11 8RH, stating the diagrams required, and asking for a quotation. As a guide, the current charge is 20p per A4 sheet. The museum is not at present able to provide copies of photographs of equipment. ***RB***

Our acknowledgments to the Trustees of The Royal Signals Museum for permission to reproduce the photographs of exhibits featured in this article and on our covers this month

The Royal Signals Museum is open to the public between the hours of 1000 and 1700, Monday to Friday, throughout the year. The museum is also open from 1000 to 1600 hours on Saturdays and Sundays from June to September. Admission is free

The entrance to Blandford Camp is off the B3082 Wimborne to Blandford road, between the Blandford By-pass and the town centre. The camp and the museum are clearly sign-posted from the by-pass. As the museum is situated within the perimeter of a military establishment, the usual security considerations and requirements apply.

The Vintage Years of Amateur Wireless
Part 2
by Stan Crabtree

The official announcement after the first transatlantic wireless signals was factual. A press statement appeared on 20th December 1901: 'Signor Marconi has stated positively that he had been in communication with the English coast for a few minutes – only pre-arranged signals from Poldhu being conveyed'.

Although Marconi's word was generally accepted there were sceptics. Professor Oliver Lodge in *The Times* of December 27 felt it would be 'rash to express an opinion either way as to the probability of the correctness of Mr Marconi's evidently general impression that he had obtained evidence... trusts he is not deceived. Proof is absent'.

There was inevitably a touch of jealousy in Lodge's remarks. For Marconi had slowly and systematically put into useful practice certain of the professor's early experiments. At this time Lodge seemed to refuse to take Marconi seriously, at one time describing him as a 'young man with a secret box and a sense of humour'. But Lodge and Preece, the then GPO Chief Engineer had not seen any Marconi stations for two years and were unaware of his progress.

The small band of wireless enthusiasts were encouraged by the dramatic press statement and many newcomers became interested in the new means of communication. Interest centred on an article that had appeared in the *Model Engineer* earlier in the year written by G. F. Tanner of Old Charlton, Kent, who had given an excellent summing up of the principles and described the equipment he had in use. A concise description of the operation was given with clear diagrams. The basics of tuning was explained thus: 'Transmitter and receiver must be in sympathy with one another... by the insertion of resistance and capacitance'. A novel type of aerial top loading was recommended which must have appeared almost medieval:

'The collectors (antennas) for the receiving apparatus consist of two rolls of copper, exactly the same size, mounted on a high pole. Crosses are cut on the copper sheet... like an 'X', the centre ends being turned out like curled spikes'.

Tanner described how to make a coherer but as it was desirable the air in the tube should be exhausted he suggested it should be bought. He recommended Bottone's as 'very good'.

In the receiving apparatus diagram, 'E' is a small electromagnet, included so that its armature can tap the coherer tube at every signal. 'R' consists of resistance wire in the form of a coil, the turns of which are wound as shown. Although amateur built, the arrangement showed conception and cannot have trailed far behind professional designs at this time.

Carbon Granules

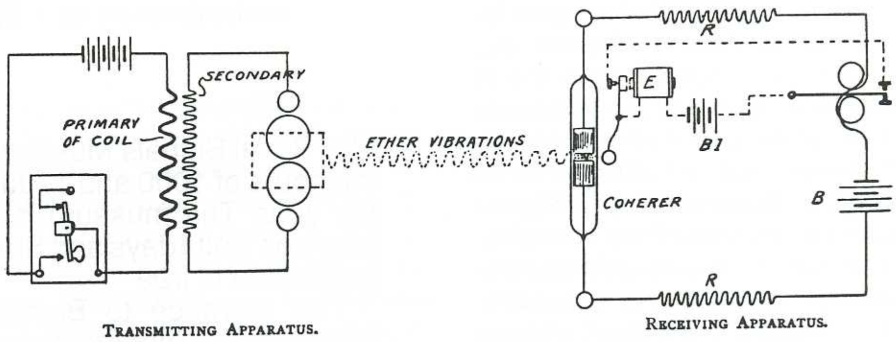
The July 1902 issue of the *English Mechanic and World of Science* featured an article by A. Frederick Collins describing 'A Simple and Efficient Wireless Telegraph Receiver'. An innovation was that instead of the usual silver and nickel particles in the coherer, carbon granules as used in the telephone transmitter were employed. The unit was self-restoring – no tapping was needed to decohere and it was not necessary for the tube to be exhausted. The suggested aerial length was 30 feet and an earth consisting of a copper or zinc plate 12 inches square, buried 2 feet deep was recommended. A warning was given that the receiver was prone to atmospherics.

Mr Bottone was continuing to give expert advice to all readers of the *English Mechanic* having difficulty in constructing their apparatus. As well as being a qualified electrical engineer, Bottone appears to have been an acknowledged expert in many other spheres. In one issue, he gave an answer to a query on the wiring up of electric motors which was immediately followed by information on how to make and bottle tomato sauce.

In August 1902 a request appeared in the *English Mechanic* under the rather humble pseudonym of 'a drapers assistant': What distance could a 7/8in spark coil attain and were large balls necessary? Also, why was the spark usually described as 'in air'.

Mr Bottone thought a mile should be possible and advised that the larger the balls the longer the wave. He added his now customary advice of always keeping the balls highly polished. Finally, he advised that as the air pressure diminished the length of the spark increased.

A rather ambitious correspondent in October 1902's *English Mechanic* wrote: 'I want to signal to a friend by



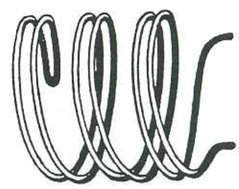


Diagram of W/T apparatus appearing in the May 1901 edition of The Model Engineer *by Mr G. F. Tanner. The method of winding a non-inductive resistor for 'R' is shown in the sketch on the right*

Morse code who lives 50 miles away and he wants to signal back. Will a 2in spark be sufficient?' The signature was AMA and he, or she, confided they were making all the apparatus themselves.

The answer from Bottone was NO – a minimum 10in spark coil would be required. In addition he felt an aerial of at least 100ft would be needed. He ended by saying he preferred a 3 ball transmitter. In November AMA came back with requests for the sizes of the condenser plates.

Writing in the *Model Engineer* early in 1903, 'WCR' (Bradford), complained of trouble with decohering. He stated: 'The spark produced by the make and break of the induction coil excites the coherer and keeps it in operation even though the bell hammer is striking it all the time.'

Replying, the editor felt he had a self induction problem and recommended the construction and use of non-inductive resistors. The habits of a committed model maker could not be suppressed and he ended with the advice 'Baste the whole thing in hot paraffin wax'.

'LCP', (Beeston), came up with the usual frequently asked questions. What length of spark to reach 1 mile, what size of coil to produce this and the cost? He also wanted to know the size and cost of the brass spheres and wondered where they could be obtained.

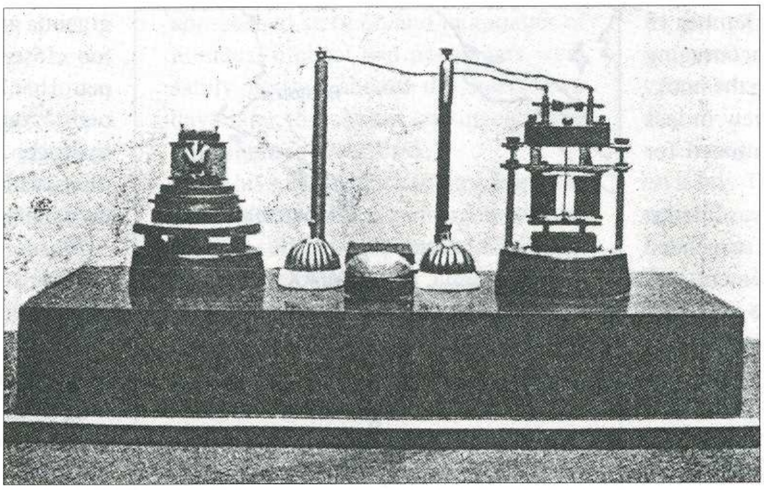
Brass Bedsteads

One earlier reply to this question had been that the balls from any brass bedstead could be used, but possibly the writer had not taken this seriously. This time the response was more specific. The balls could be obtained from several metal appliance makers.

The basic design described by Mr Tanner earlier seems to have continued to be used by amateurs in these early years. Indeed there were few variations possible. Stability in the receiver was improved by inserting chokes on the output circuits of the coherer, thereby preventing RF from leaking through to the other components.

Even at this time there appears to have been no general acceptance in amateur circles of the definition of inductance and its relevance in wireless matters. The understanding must have been there, for transformers and induction coils had been in use for many years. Using this knowledge, a simple statement as to the value in henrys (or a note of the turns and diameter) of an inductive device could have greatly simplified the explanation of constructional features. As it was, the amount of inductance required was rather vaguely given by suggesting the weight of the wire needed.

An example of this comes to light in a letter from 'RWF' (Sleaford) who wrote: 'I am thinking of making a spark coil but am not quite sure of the amount of wire needed. I have some by me so I want to use it up. Would 6lbs of No. 36 SCC copper wire for the secondary and 1-1/2lbs of No. 14 DCC copper wire for the primary be in suitable proportion for giving a 6in spark?' For some reason he was averse to soldering as he queried the feasibility of making connections by 'twisting the wires together or binding them with fine wire'.



Mr G. H. Cook's wireless telegraphy receiver

The editor felt the quoted amounts of wire would be insufficient. He recommended 6-1/4lbs for the secondary (a further 1/4lb) and 2lbs of No. 12swg for the primary. He was quite emphatic about the connections. A SOLID metal to metal joint was essential; merely twisting them together was not good enough.

In the August 1903 edition of the *Model Engineer*, 'ERP' (Tunbridge Wells) requested the diagram of a 'small wireless installation together with the construction of the transmitting and receiving apparatus'. He wanted to know what distance a 'good fat inch spark' would work up to and where he could purchase a coherer for working a distance of about a mile.

Some diagrams were reproduced for him in the letters column and the editor warned if he were using the same aerial, some arrangement must be made for changing it over from spark gap to coherer. He recommended Mr Cox of Cursitor Street EC who could supply good coherers for 7s. 6d. (37p).

In the following issue, 'ERP' bounced back with more questions. He wanted to know the resistance of the non-inductive shunts, what they were made of and what form they took. He also queried the absence of any capacity used across the make and break contacts of the induction coil.

Again, the value of inductance would have helped. Instead, the editor in his reply advised 'ERP' to 'try different lengths of No. 40 eureka German silver or platinoid wire, silk covered'. He ended by suggesting the enquirer 'get an ounce or two and experiment'.

Correspondents continued to ask the same old questions. In the *English Mechanic and World of Science*, items that had previously appeared under the heading wireless telegraphy were now titled 'Marconigraphy'. In the *Model Engineer* the editor was getting a little impatient with the continuing 'what size coil' etc. He referred correspondents to *Wireless Telegraphy* by Sewall at 10s. 6d. (52p) and even Sir Oliver Lodge's renowned *Signalling through Space without Wires* at 5s. 0d. (25p).

The trend at this time appeared to be concentrated on reception only. For any amateur living near the coast there was the possibility of monitoring the increasing number of Marconi coast stations. In 1901 these consisted of Withernsea, near the Humber, Caister on Sea in Norfolk, Alum Bay in the Isle of Wight and Holyhead. In Ireland, Crookhaven and Rosslare were in operation. In the south-west, the big attraction was of course the high power station Poldhu (MPD) in Cornwall,

continued on page 21

Airship

by Stan Crabtree

The first attempt to cross the Atlantic by air was made by the airship *America* in October 1910. The ill-fated voyage ended in disaster and only the use of wireless telegraphy succeeded in saving the lives of those on board.

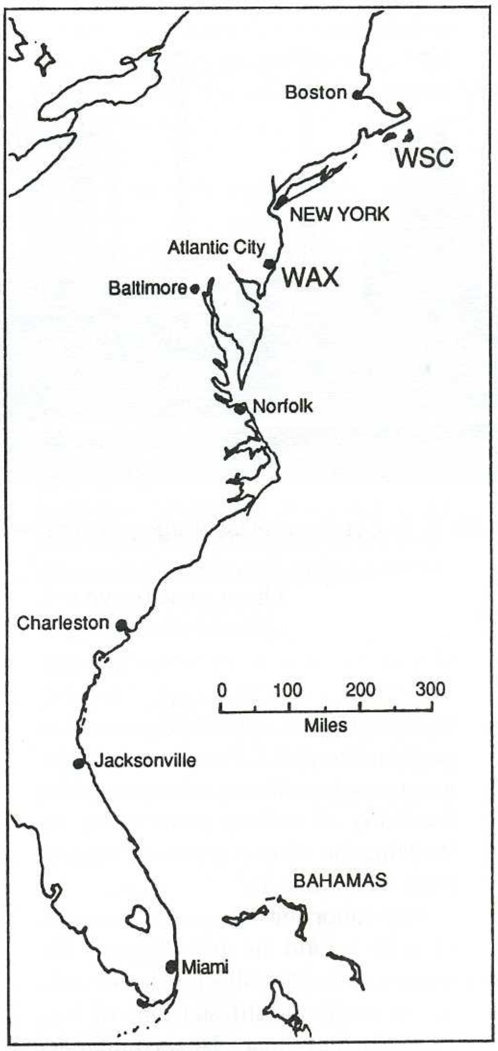
The dirigible left Atlantic City, New Jersey at 8am on Saturday, October 15 in dense fog – hardly an encouraging start to the trip. After leaving the hook-up the airship was lost to view in less than a minute. The fog continued for two days and nights.

The wireless installation was fitted at one end of a 27ft long lifeboat, suspended from the airship. The equipment was positioned in a 2ft enclosure in one of the two 9ft watertight compartments at each end of the boat. The operator was to perform his duties from the open cockpit. The transmitter consisted of a 10 inch spark coil with a specially constructed jigger (RF transformer) coil. The receiver was a magnetic detector. The station's 25 volt accumulators were charged by a small 25 volt dynamo which was driven by a belt from one of the airship's main engines. The main frame of the airship, constructed of hundreds of feet of steel tubing and wire, served as the aerial. The earth was the vessel's equilibrator which was made up of forty steel tanks, filled with petrol and threaded on a half inch steel cable, trailing in the sea. The operator was Marconi man, Jack Irwin who had served as wireless officer on many of the North Atlantic liners before being appointed to his new position.

First Contact

The first wireless contact was with station WAX, Atlantic City. With the structure and height of the aerial, all the American East Coast stations were copied but no contacts were made due to the comparatively low power of the airship's transmitter. The Marconi Company had only guaranteed a wireless range of 30 miles but the *America* was able to contact WAX at a distance of 80 miles and coast station signals were still being monitored over 100 miles distant.

During the first night out attempts were made to contact vessels but without success. The operator later wrote: 'With the immense aerial, all ships' signals came in like hammers and gave me the impression they were nearer than they actually were'. Early next morning Siasconset (WSC) was contacted and communication held until 1pm.



During the Saturday night the first of a sequence of mishaps occurred; the ball bearings seized up on the engine running the dynamo and had to be shut down. This meant the wireless batteries could not be recharged. On the following afternoon the situation deteriorated. The permanent condensation of fog on the gigantic gas bag was keeping the airship too close to the sea and some of the petrol had to be jettisoned. The following night brought further contraction of the hydrogen gas and this again resulted in a loss of altitude. The useless engine and the dynamo were then thrown overboard.

During Sunday night the airship was speeding along with a 45 mph tail wind taking her in a south-easterly direction and way off course. Despite frequent attempts no ships had been contacted. Irwin had the dilemma of deciding when to risk a call for help when he knew his batteries were slowly being drained of power.

On Monday, the third day, the wind slackened and the airship headed due south. Any prospect of reaching Europe had now been abandoned; the worry was to get down on land, anywhere.

By noon on Monday the weather had completely changed. It had turned into into a beautifully warm, sunny day. As a result of the expanding gas the airship was caused to soar upwards at an alarming rate until an altitude of 11 900 feet was attained.

Ship Ahoy!

There was full moonlight on the Monday evening and all the crew remained on watch looking for any signs of a ship. It was fortunate that the dirigible was flying in a position on the sea route between the West Indies and East American coast ports. At 3am a ship was sighted and Irwin checked his transmitter and started calling CQD with an occasional SOS which had been recently agreed as the new distress signal. There was no response.

In desperation, Irwin grabbed an electric torch and directing it at the vessel below, started calling the ship, marine style with the Morse letters 'AAA'. A cheer went up from all when the steamer eventually responded. Irwin flashed down the message that the airship carried wireless and a few minutes later, contact with the Royal Mail Liner *Trent* was established.

It was daylight before any rescue attempt could be made. Until then the *America* remained in wireless contact and exchanged orders, advice and suggestions. The airship was travelling at 12 mph and Captain Downs of the *Trent* was asked to follow until daybreak.

At 0730 the vessel and the airship were alongside and the *America* advised by wireless that she was about to descend and launch the lifeboat. The gas valve was opened and the boat was slowly lowered. The boat was released from the davits when she was 6ft above the water and fell beam on into the sea.

The sea was fairly rough which resulted in the lifeboat shipping water. Next, as the released gas bag shot skywards the equilibrator struck the lifeboat, knocking a hole in the compartment housing the wireless and dealing operator Irwin a blow on the head which stunned him.

Rescue

Perhaps the most anxious moment of the whole trip now occurred. The Royal Mail vessel, only 100 yards away, was bearing down on the boat at a speed of 17 knots. It seemed nothing could prevent a disaster. The *Trent* subsequently missed the boat by a matter of yards but succeeded in swamping all in her.

It took two attempts to complete the rescue. Next the steamer came about for another turn but she was travelling too fast for her ropes to be held by those on board the lifeboat. Finally the *Trent* approached stern on and in a matter of minutes, lifeboat and passengers were safely hoisted aboard the liner. Two days later the airship contingent were put ashore in New York.

To his surprise, Jack Irwin was treated as a celebrity. Offers were made, similar to those subsequently put to Jack Binns, heroic operator in the *Titanic* rescue eighteen months later. A career in vaudeville! Irwin accepted where Binns declined and after considering various offers from competing booking agents initially signed up for a ten week contract at a 'satisfactory salary'. He appeared on stage with a small spark installation, demonstrating its effectiveness to an enthralled audience. He later joined with the Sullivan and Considine circuit to tour the West. In all he remained in this capacity for eight months and enjoyed his spell of fame and sponsored tour of the US and parts of Canada.

Another Attempt

In June 1911, Irwin was approached with an offer of the post of wireless operator on the new airship *Akron* in which it was intended a further attempt to reach Europe would be made. He accepted and left his new-found stage career to assist during the construction stage.

During a final test launch at 6.15am on 2 July 1911 the *Akron* suddenly shot upwards at high speed, exploded and burst into flames half a mile offshore. The car with its crew of five fell into the sea. All were killed. Jack Irwin was not on board at the time of the tragedy. ***RB***

THE VINTAGE YEARS – 2
continued from page 19

which was providing a communications service to the North Atlantic liners. In addition, Poldhu was also striving to improve the wireless link with Glace Bay in order to establish a commercial W/T service with North America. In August 1902, the crack of Poldhu's spark could be heard a mile away.

In January 1904, the *Model Engineer* published an article by Geoffrey H. Cook 'A Wireless Telegraph Receiver'. It is interesting because perhaps for the first time some thought had gone into the outward appearance of the instrument; it was not a conglomeration of wires precariously held together. The base of the instrument consisted of a walnut box, French polished, which contained the dry batteries. The base of the relay and coherer stands were beech and the rest of the components were mounted on an ebonite panel.

The coherer and decoherer are shown on the right of the photograph, the signalling bell is in the middle and the relay, less cover, is fitted on the left. The design followed the normal trend but with the advantage that the position of the coherer, armature and magnets were all adjustable. No significant results were claimed. The author ended by stating the cost of materials in the construction of the receiver was between 16s. and 20s. (80p and £1) and he would not advise anyone to attempt to make one for anything less.

During research into this period, it has been interesting to note some statements and announcements made on the subject of wireless, which have since been confuted or now appear rather fanciful. In January 1902, a month after Marconi's transatlantic test, Professor Michael I. Pupin, head of the Electricity and Magnetism Department of Columbia University gave this opinion in the New York *Sunday World*:

'Wireless telegraphy will do well within very limited areas... it can never be of use in times of war. Wireless telegraphy is too slow for commercial use. Where, with cable we can send at 40 wpm... with wireless there is no hope within scientific possibility of increasing the present speed which is about half the speed of cable'.

A paragraph in the *English Mechanic and World of Science* of April 1902 reported an unusual effect advised by the Captain of the White Star liner *Umbria*. During the passing of W/T traffic from the *Campania*, the poles supporting the aerial gave way and the complete aerial fell overboard. Although trailing astern behind the moving vessel, communication was unaffected. The *Umbria* continued to copy the signals from the *Campania*. This was held to demonstrate that electric waves travel on water as well as in the air.

But the writing was on the wall for free and indiscriminate use of wireless telegraphy. In August 1904 the first Wireless Telegraphy Act was passed and set down to take effect on 1 January 1905. The Bill was introduced into Parliament by Lord Stanley, the Postmaster-General, and effectively gave the British Government absolute control of all wireless installations. The Act made it mandatory for any organisation, group or person wishing to establish a wireless station in the United Kingdom to first obtain a licence.

How the Wireless Telegraphy Act affected the early amateurs is related in the next issue. ***RB***

Yesterday's Circuits - No. 2

by Gordon J. King, IEng, G4VFV

Band-spreading

In these high-tech days of crystal referenced phase-locked loops, frequency synthesising and accurate digital tuning displays, even related to quite modestly priced equipment, it seems incredible that a few decades back all sorts of curious things were done to short-wave receivers to facilitate relatively easy tuning over the various segments of the international broadcasting bands. In particular, all-wave receivers of the age had generally just one or, perhaps, two SW bands in addition to the MW and LW bands. Unless one was well versed in the art of tuning SW receivers or, indeed, a SW listener, then it was often nigh impossible to winkle out a specific overseas transmission in a given SW broadcasting band.

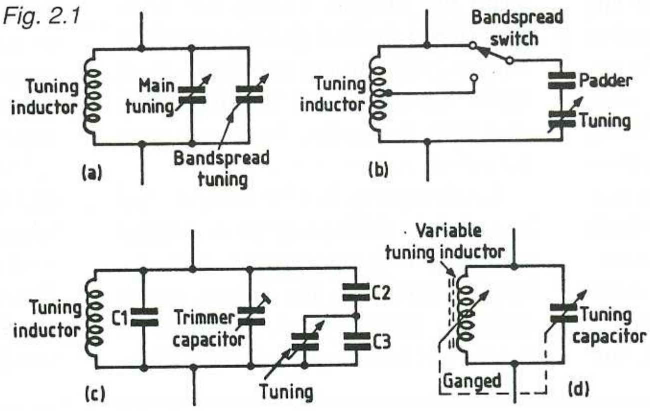
To make things easier for the lay-listener of the time, receiver designers introduced a technique known as 'band-spread tuning'. One simple form of this was merely a dual-speed tuning dial. Using the normal speed tuning to home-in to the required band, the ultra-slow band-spread tuning was then used to focus accurately on top of the required station. Sometimes these band-spread tuning dials were calibrated. In the communications receiver world, remarkably effective 'mechanical' band-spreading aids were evolved as witnessed, for instance, by the National HRO communications receiver.

Although slow-motion dials were used in many domestic receivers, they were mostly rather basic and suffered from varying degrees of backlash, making tuning a 'sharp' station very exciting! In those days an all-wave receiver often had a SW band covering a span of 12MHz or more, yet the spectrum of all the international broadcast bands within that frequency range was only around 1.65MHz. Most of the SW programmes occurred in the 16, 19, 25, 31 and 49 metre bands.

I remember a commercial set employing a special kind of tuning capacitor to aid band-spreading. This capacitor was equipped with specially tailored plates which provided swift tuning over the 'redundant' section of the SW band, while yielding effective band-spreading over the sections corresponding to the international SW broadcasting bands. When SW listening became a pastime, many ingenious schemes were evolved to make the tuning easier. The more expensive domestic receiver had up to three SW bands, so with the whole band divided up like this a well constructed slow-motion dial made tuning quite tolerable. However, eliminating tuning backlash and deleting frequency drift were problems. Dual-conversion receivers were adopted whereby band-spreading was attained by tuning the first IF.

Home constructors of the era often put a small-value variable capacitor in parallel with the main tuning to act as a band-spreader, as shown at (a) in **Fig. 2.1**. A 50pF (50μμF) variable shunting the 500pF (0.0005μF) main tuning gave reasonable results, but as the 'spread' was governed by the position of the main tuning, and hence on the segment of the SW band tuned, the control defied simple calibration. The tracking of multiple tuned circuits was sometimes achieved by the use of a separate band-spread tuning gang.

Fig. 2.1



In the scheme shown at (b), band-spreading is achieved by tapping the tuning capacitor down the tuning inductor. When this is done the effect is akin to the value of the capacitance being reduced, thereby providing a smaller frequency coverage over the full swing of the control. The effective reduction in capacitance corresponds roughly to the 'square' of the tapping ratio, but is affected by stray capacitance.

Some state-of-the-art receivers of the day featured switched tapping points like this, and sometimes the band-spread switch also introduced a series or 'padding' capacitor to tailor or, perhaps, restrict the tuning range still further, the idea being to obtain a nearly equal frequency coverage of the band-spread feature.

There were receivers where band-spreading was obtained merely by switching in a series capacitor or 'padding' capacitor without tapping the tuning capacitor down the coil. The circuit at (c) is somewhat more complicated than this since, in addition to the series capacitor C2, there is also a parallel capacitor C3. With judicious selection of capacitor values, one particular SW band was spread over the entire range of the tuning capacitor. However, in practice the tuning range was made somewhat wider than this so that the 'speed' of tuning had correspondence with that of the MW band. Switching allowed the tuning of as many of the SW bands as required over the full swing of the tuning control.

Finally, circuit (d) shows another approach to the problem. Here the tuning inductor included an iron-dust core which slid up and down the coil former in gang with the tuning capacitor. For band-spread tuning the mechanics of the scheme were such that the change in capacitance when tuning opposed the change in inductance, thereby significantly slowing down the rate of tuning. Between the international SW bands, however, the mechanics were reversed so that the change in capacitance aided the change in inductance, thereby speeding up the tuning rate!

NEXT TIME, A 'LOOK AT' MAGIC EYE TUNING INDICATORS

Culver Cliff Wireless Station, Isle of Wight

Distress calls from the Titanic?

by Tim Wander

As every reader will know, on 12 December 1901, Guglielmo Marconi laid the foundations of modern radio communications by successfully transmitting the Morse code letter 'S' (...) across the Atlantic Ocean.

Earlier, on 25 April 1900, Marconi had formed the Marconi International Marine Communication Company Limited to supply the demand for wireless equipment to ensure the safety of ships at sea. From 1903 the new company began building shore stations to handle increasing amounts of marine wireless traffic and also started equipping Trinity House lightships, Admiralty Naval stations and Coastguard stations throughout the UK.

During this period there were three historic wireless stations built specifically by the Marconi Company on the Isle of Wight. The first was at Alum Bay, now commemorated by a large monument in the lower car park even though the station actually operated from the Needles Hotel which used to stand where the upper car park is now located.

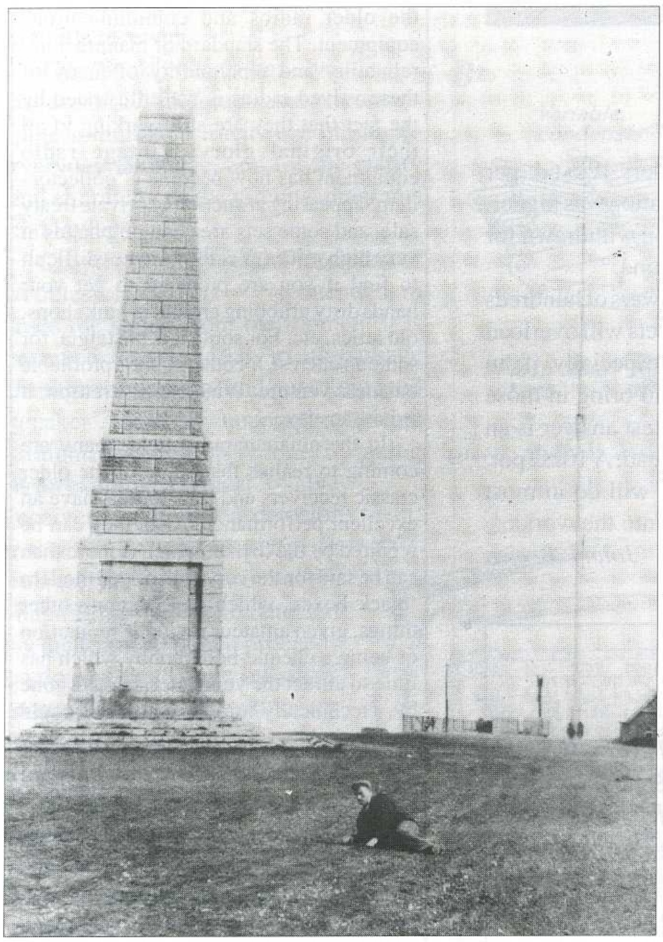
The second station operated from a small cottage next to the lighthouse around the coast at Niton. Both of these were early research stations and were fundamental in Marconi's early work that led up to his transatlantic success.

A third Island station was temporarily installed at Ladywood cottage in the grounds of Osborne house to allow Queen Victoria to talk to the Prince of Wales while off shore in his yacht *Osborne*.

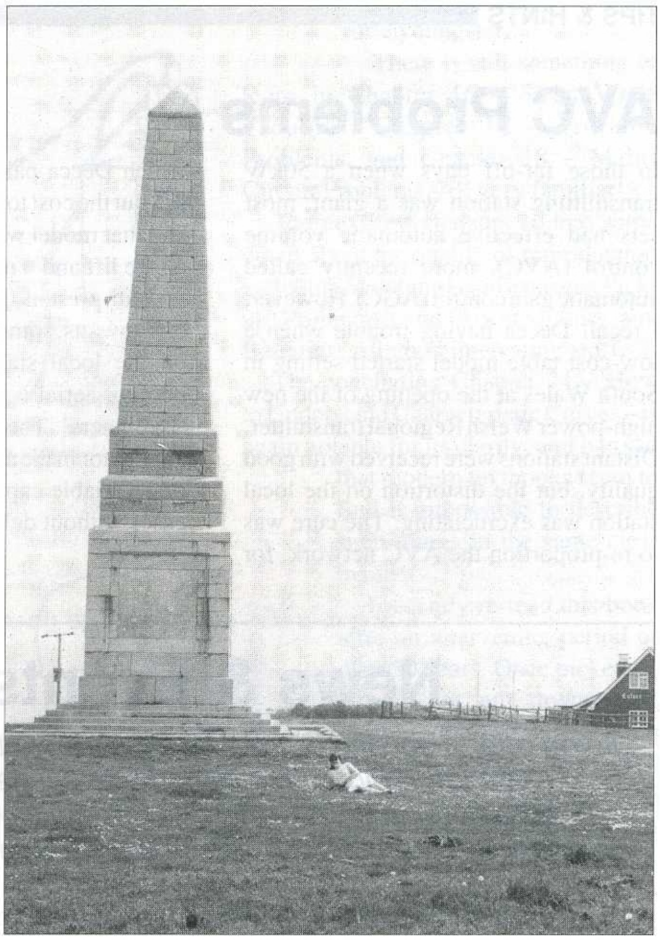
I was a little surprised when it recently came to my attention that another 'Marconi' wireless station was recorded on the Isle of Wight. This was apparently located on Culver Cliff high above Bembridge on the Island's south-eastern coast.

After some investigation it turns out that the Culver Cliff wireless station was built somewhere between 1910 and 1911, and was for many years known locally as the 'Marconi Station'. In fact the station was built and operated by the Coastguard and its misnaming probably came about as it undoubtedly used Marconi wireless equipment.

The only known photograph of the wireless telegraphy station on Culver Cliff, taken around 1912, is shown below. In the foreground is the impressive



The Culver Cliff Wireless Station in 1912



Site of the Culver Cliff Wireless Station in 1989

75 feet high Yarborough Monument, dedicated to Charles Anderson Pelham, Earl of Yarborough in the Isle of Wight who died in September 1846. Luckily the photographer also captured behind the monument the Coastguard station which stood on the extreme right of the photograph with its own water tank and a large 150 feet high sectioned pine-wood aerial behind. The second photograph was taken this year from roughly the same spot with my wife replacing the original model who was unfortunately unavailable for the reconstruction!

A popular story concerning the Culver station was that it was the first shore station to receive wireless distress signals from the doomed liner ss*Titanic* after it struck an iceberg on Sunday, 14 April 1912. This story was once recorded on the menus of the Culver Tavern although unfortunately I can find no evidence that this actually occurred, and for the time it would have been remarkable technical feat. It is widely known that the *Titanic*'s distress calls were picked up by wireless operators on ships up to 153 miles away which led to many lives being saved. The *Titanic* was also in contact with the Newfoundland shore station but it is unlikely that with the equipment on board, any signals could have carried across the Atlantic to the Isle of Wight.

All sign of the wireless station was lost by the building of the Culver Tavern some 15 years ago although the round Coastguard signal hut survived as the entrance porch to the public house until the infamous gales of October 1987.

Culver Cliff provides a spectacular walk for any visitor to the island. The cliff top also has a headland battery of concrete gun emplacements built in 1902 to protect the Spithead approaches with two 9.2 inch breech-loading guns. The site subsequently served through two World Wars and was partly dismantled for safety in 1956. The headland also has a privately owned fort built by the Palmerston administration as protection against Napoleon III between 1862 and 1867.

If any reader can add any more to the story of the Culver Cliff wireless station I would be pleased to hear from you, via the Editor of *Radio Bygones*.

RB

TIPS & HINTS

AVC Problems

In those far-off days when a 50kW transmitting station was a giant, most sets had effective automatic volume control (AVC), more recently called automatic gain control (AGC). However, I recall Decca having trouble when a low-cost table model started selling in South Wales at the opening of the new high-power Welsh Regional transmitter. Distant stations were received with good quality, but the distortion on the local station was excruciating. The cure was to re-proportion the AVC network, for which Decca paid dealers 12s. 6d. per set, but the cost to reputation was higher, and that model was soon withdrawn for a face lift and a new name.

With present-day powers of hundreds of kilowatts, some old sets will overload on the local station, especially if an outdoor aerial is used to bring in those 'foreigners'. The simplest answer is an attenuator in the aerial lead. A 10kΩ pot. or a variable capacitor will do in most cases without delving into the works.

John I. Brown

News & Events

If you offer a service or are staging an event of interest to vintage radio enthusiasts, send full details to Radio Bygones, 8A Corfe View Road, Corfe Mullen, Wimborne, Dorset BH21 3LZ, and we'll give it a mention.

Items for inclusion in our February/March issue, due out on 27 February 1990, must reach us by February 8.

Classic Book Review

This is a new occasional series which will review some of the classic textbooks which many older readers used to get the necessary experience and qualifications to enter wireless/radio either as a hobby or an occupation, or very often both.

Many of these books became standard reference and textbooks for the amateur and/or professional engineer and wireless operator. Some, like the writer, believe that if some of these books were updated, keeping the original format and clarity, then the world of hobby and technical radio would be a better place. The books come to light from time to time in old houses, junk shops and stalls, charity shops and flea-markets. Often in good condition, not appreciated for what they are, and maybe obtainable for pennies.

The period chosen for the series is up to the middle 1960s, as it was around that time that the radio industry and hobby were in turmoil during the transition from the valve age to the transistor age.

The transistor, we were told, would produce a revolution, with low-cost Utopia, in the domestic radio and communications industries. Well! It certainly produced the revolution, but the Utopia is less certain as several evils resulted, the analysis of which could form the subject of a long article.

Over the years a new interest for many has been the collection and restoration of the older radios and communications equipment. The standard of manufacture, reliability and repairability of many of these valved radios is well illustrated by the fact that they are still working in all their original glory. Vintage radio equipment has now become a 'collectors item' appearing at auction or private treaty sale, and some sets are changing hands at very high prices. Yet they are not difficult to find if you are prepared to get your hands dirty grubbing around in junk shops, old attics, etc. For some it is nostalgia, for some an interest, for others quite a profitable business venture. Whatever the reason, it is here to stay.

In the amateur radio field, many are coming to realise that some of the older classic receivers and transmitters have an excellent performance. Also, they can be repaired by the owner, which is more than can be said for the very high priced modern 'black boxes' which have, among other things, given amateur radio the reputation of being a cheque-book hobby which has little to attract the youngster. In days gone by, a technically-minded girl or boy could join the hobby financed by pocket-money plus the odd Christmas and birthday present, and perhaps some organised scrounging. Yet those who read the older classic textbooks will find that very simple equipment spanned the globe just as happily as the present-day equipment. Also it was possible to repair that simple equipment, on the spot, which is seldom possible these days. Such is progress!

>

Classic Book Review – No. 1

by Richard Q. Marris G2BZQ

'Everymans Wireless' by F. J. Camm

An extract from the Preface of this book states: 'It has been prepared with the needs of every listener in mind – the amateur, the experimenter, and the ordinary listener who merely wishes to know how to locate, and rectify, the trouble and defects which arise from time to time in radio receivers.' In fact, it can be said that anyone who was 'into' magnetism and electricity in the physics class at school, could get a very fair idea as to what wireless was all about. The techniques described cover the period of domestic wireless in the 1930s and early 1940s, but in fact much of what is said is still true today. The book would be especially useful for anyone who is trying to restore a 1930s receiver.

This book, which has 296 pages and 224 diagrams and circuits, is quite remarkable for its use of simple everyday language, and for the clarity and simplicity of the circuits, diagrams and layouts.

Chapter 1 – General Principles of Wireless Receivers – 'is intended to trace the signal from the moment it is received on the aerial, to its passage through the receiver and out of the loud speaker'. How very uncomplicated and straightforward. This is done 'by taking as an example a typical 3-valve receiver employing a detector valve and two amplifying valves, the latter two valves magnifying the signals detected by the former'. It then proceeds to do just that, stage by stage, in simple language, with every stage fully illustrated with a circuit and exploded layout.

Chapters 2 – 4 take us through 'How to Understand Circuits', 'Testing Instruments' and 'Faults Classified'. Chapter 5, entitled 'Systematic Trouble Shooting', clearly illustrates how to identify each problem, and a typical schematic is shown below in '**A**'. The chapter concludes with a 'Table of Receiver Faults and Remedies' over six pages.

Chapter 6 – Faulty Operation – takes us through faulty operation of controls, as well as the effect of incorrect voltages.

A

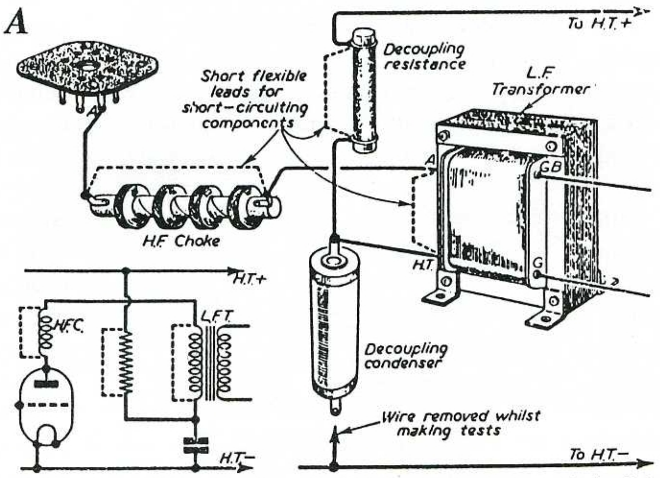


Fig. 59.—Showing how various components in a typical anode circuit should be short-circuited in turn to find which is faulty.

Chapters 7 to 12 between them deal with the problems of interference attributable to local conditions and faulty workmanship, connections, electrical interference, and general equipment troubles and design faults. It all seemed very familiar. Again, each point is clearly illustrated.

Chapters 13 and 14 – Testing Components – are full of useful 'wrinkles', many of which would be useful today. A method of testing for a short circuit between the plates of a variable capacitor can be seen in '**B**', and could still be effectively used with a torch bulb and battery, by any reader without a continuity meter. Or how about the home-made, 4-range test-meter in Chapter 15 (see '**C**') using a 10 milli-amp meter calibrated 0 – 10. A very useful first project for a youngster.

B

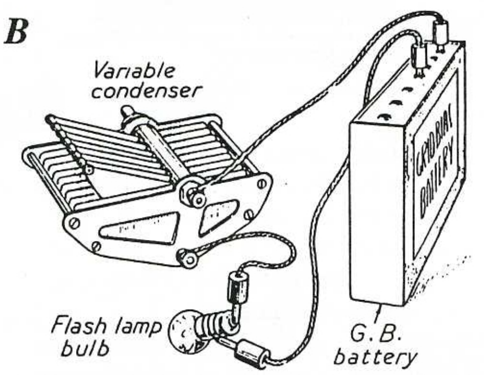


Fig. 133.—A simple method of testing for a short circuit between fixed and moving vanes of variable condenser.

There is still something to learn in Chapter 16 – Short Wave Troubles; Chapter 17 – Portable Problems, and Chapter 18 – Mains Circuit Problems. All very familiar!

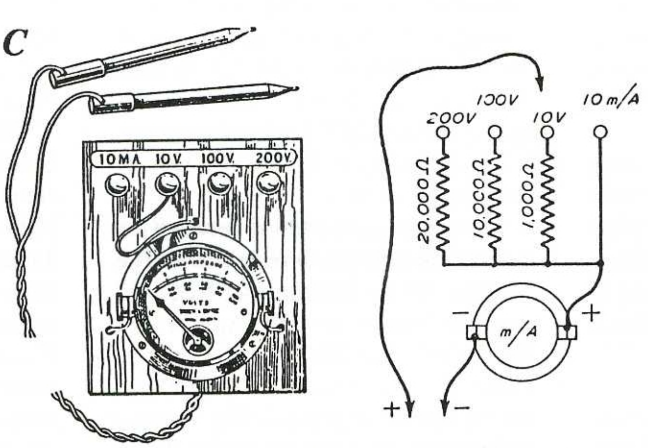
The next few chapters go into some detail about the quality of reproduction including Matching Loudspeakers; Pick-up Problems; and Accumulators and Batteries. All good interesting stuff.

The concluding Chapter 24 – How to Understand Characteristic Curves – is again notable for its clarity, and it is sad that modern textbooks seem to find it impossible to describe such things in the same clear manner.

I recently re-read this book after an intervening period of over 50 years. Once picked up it was not put down until reaching the last page, taking me back to the happy days when home construction was the normal thing. Though such vast progress and achievements have been made since this book was written, it also seems that we have forgotten an awful lot!

RB

C



Figs. 158 and 159.—The complete four-range test meter with test prods together with diagram of wiring connections.

Sounding History
Fifty Years of the BBC World Service

In the late 1920s, the British government wanted a radio service to broadcast to the Empire – but it did not want to pay for it. The BBC wanted such an international service too – but did not see why the licence-payer should pay for it.

For five years there was deadlock until, 10 years after it had begun domestic broadcasting, the BBC reluctantly decided to go ahead from its own resources.

Experimental transmissions with short-wave broadcasting had started in 1921, though its future was not very bright. An international gathering of the world's major radio manufacturers in 1924 concluded that broadcasting across the Atlantic could only be achieved by waves as long as 10 000 to 20 000 metres, which would have required receivers as large as a trunk and aerials more than a mile long!

But short-wave development was rapid, and by 19 December 1932, when the Empire Service came on the air, linking territories scattered from Vancouver to Fiji, the BBC was lagging behind other nations – in 1930 the new Soviet Union was already broadcasting in 50 languages and dialects.

In 1935, Nazi Germany turned its attentions to letting the world know of the ideas of the Third Reich, spending £3 million on international broadcasting. Hitler had already identified psychological dislocation as an essential part of war: 'Our strategy is to destroy the enemy from within, to conquer him through himself. Mental confusion, contradictions of feeling, indecision, panic – these are our weapons.'

By 1937 Argentina alone was carrying 500 rebroadcast German radio programmes a year, at a time when Britain's could be counted on the fingers of one hand. Germany even bought up local radio stations in Latin America.

Ethiopia Invaded

It took a challenge by Fascist Italy to a major area of British interest, the Middle East, to stir the British government into action. Mussolini, having invaded Ethiopia, had a simple aim: to undermine Britain in the Arab world.

He faced two major obstacles: Arabs had practically no radios and very few clocks. How could they listen and, if they could hear, how could they know when to tune in? Both problems were solved with ingenuity. Radio sets were distributed, tuned to one station only – Radio Bari in Southern Italy. And, as Arabs are used to saying their prayers according to the position of the sun, transmissions were announced in terms of sunrise and sunset.

It was a brilliantly successful campaign, a mixture of entertainment and scurrilous propaganda alleging British atrocities. Made aware by diplomats abroad that anti-British feeling was being seriously inflamed, the government decided to fund a BBC Arabic Service. This time there was no question of the BBC finding the money.

On 3 January 1938, the first service from Britain began.

There was some friction between the politicians and the broadcasters. The Foreign Office thought that it should organise broadcasts to the Arab world; Lord Reith, the BBC's first Director-General, argued that only the BBC had the necessary expertise. The Foreign Office thought news items should be entirely in Britain's interests, omitting those 'to which broadcasting by wireless would give undue emphasis'; Reith insisted on the same freedom from government control possessed by the BBC's domestic services.

On the first day, the news bulletin carried an item reporting that a Palestinian Arab had been executed after being found in possession of arms. The Foreign Office complained. The reply of the Director of the Overseas Service encapsulated the principle that governed editorial decisions then and in the future: 'The omission of unwelcome facts of news and the consequent suppression of truth runs counter to the Corporation's policy laid down by appropriate authority.'

Broadcasting in Arabic alone would have seemed like a direct challenge to the dictators. That, of course, is what it was, but in an age of appeasement the government felt it expedient not to make this obvious. In March, transmissions began in Spanish and Portuguese to Latin America, where Britain had commercial if not strategic interests to defend.

Evening Standard
47 Shoe Lane, E.C.4.
Cutting from issue dated 12 NOV 1938

Ban on Listening

HERR HITLER is not pleased with the increasing infiltration of foreign news broadcasts into Germany.

He is still less pleased with the intellectual and other groups in Germany which listen to these broadcasts, and which he blames for breaking the war-like spirit of Germany during the crisis, and spreading the fear of war.

Steps are therefore being taken to prevent the recurrence of such a situation. For the next crisis I learn that the German authorities have arranged to collect all wireless sets in the country and to replace them with sets on which it is possible to listen only to German stations.

Munich Crisis

The Munich crisis in the autumn of 1938 led to a further growth in external broadcasting. The British fleet had mobilised in response to Hitler's claim to parts of Czechoslovakia, the news was not reported in Germany, and to remedy this, on the evening of September 27, the government asked the BBC to broadcast in German, French and Italian the text of a speech by the Prime Minister, Neville Chamberlain.

When war broke out the BBC was broadcasting in English and seven foreign languages (Afrikaans was added in 1939 and Spanish and Portuguese was directed to Europe as well as Latin America). With the radio stations of occupied Europe in the hands of the Nazis, the BBC had to undertake an enormous expansion of services, including transmissions to countries outside Europe – India, Malaya and Japan, for example.

The Empire Service, undergoing several changes of title, developed a number of regional strands. One was for the USA, still neutral in 1940, and Radio Newsreel – which continues to be broadcast several times a day in the World Service in English – was devised to bring eye-witness accounts and the sounds of war home to the American people.

In the beginning, the European services went out from Broadcasting House, but they were made homeless when it was damaged by bombs. The move to Bush House began in March 1941.

There were numerous historic broadcasts. General de Gaulle rallied French soldiers to continue to fight when he spoke from London at the time of the French surrender in 1940 (The Free – later the Fighting – French were allowed to prepare their own programmes like several other nationalities); Winston Churchill also broadcast to the French that year, his opening words still retaining their emotional power: 'Francais! C'est moi, Churchill, qui vous parle.'

Right through the war the editorial policy laid down at the beginning was consolidated. A future Director-General, Hugh Carleton Green, who was in charge of broadcasts to Germany, recalled many years later that there was no doubt about the correct policy – to tell the truth consistently and never to play down a disaster. 'Having heard us talk frankly about our defeats, the Germans would believe us when we talked about our victories.'

By the end of the war the BBC was broadcasting 850 hours a week in 45 languages – the largest international broadcasting system in the world.

In 1946 the Russian Service began, with the aim of 'enabling the Soviet people to get to know the British people.' Within a couple of years, with the Communist coup in Czechoslovakia and the Berlin blockade marking the onset of the Cold War, it became more a question of letting the Soviet people hear the Western point of view. In 1949 the Soviet authorities jammed the BBC for the first time.

The Cold War meant a shift in the balance of programmes. Those directed to Eastern Europe were increased, those to Western Europe curtailed or, in the case of Scandinavia and the Benelux countries, eventually dropped altogether.

Michael Reynolds, a BBC war correspondent reporting from liberated Venice in April 1945, using the portable recording equipment of the day

'I'd go, but the BBC hasn't reported it yet'
From the Pakistan Herald, *November 1977*

Suez

The editorial independence of the BBC underwent the severest of tests at the time of Suez, the Anglo-French military operation against Egypt in 1956 after President Nasser seized the Canal. The British people were divided on the wisdom of the action and the BBC World Service knew it had to report this: had it concealed the extent of the opposition it would have lost credibility and, as a former Director-General, Sir William Haley, had put it some years earlier, 'The BBC does not attempt to have one story for its own people and another for the rest of the world.' Nonetheless, the BBC's stance caused considerable friction with the government.

The Suez crisis coincided with the Hungarian revolution, the uprising put down by Soviet troops. The BBC was thanked for its coverage by the Free Hungarian radio station. An American station, accused of inciting the Hungarian people, sent a team to Bush House and concluded that the BBC was trusted because it often reported items which reflected no great credit on Britain. The American broadcasters decided that in future every bulletin should contain a 'credibility item' – a piece of news which showed the less favourable side of American life.

In the more than 30 years since, there have been a number of cuts in services, but some new ones have appeared, reflecting a changing world. In 1957 – coinciding with the beginning of the transistor revolution – the BBC started broadcasting to Africa in Hausa, Swahili and Somali and in 1960 a French for Africa Service began; over a 20-year period the number of transistorised radio receivers in Africa increased from less than half a million to 22 million (in India it rose from a million to 18 million). A Nepali Service was introduced in 1969, Pashto in 1981.

On 19 December 1982 the BBC World Service celebrated its golden jubilee with a thanksgiving service at the church of St Martin-in-the-Fields, London.

Reproduced by kind permission of the BBC World Service, from their publication Voice for the World.

The Murphy Short-wave Specials

Part 1

by Lorin Knight MIEE G2DXK

In the mid-1930s, with the developing interest in short-wave reception, many of the radio manufacturers started to bring out 'all-wave' receivers. These were usually nothing more than the conventional 4-valve MW/LW superhet with an added short-wave band which covered from 6MHz to around 18MHz, and they had a number of shortcomings for short-wave reception.

First, they were difficult to tune. Whereas the tuning scale covered a span of just 1MHz on MW, it covered 12MHz or more on SW and the whole of the 19m broadcast band, for example, would be compressed into a small fraction of an inch. Many present-day all-wave receivers still have this shortcoming!

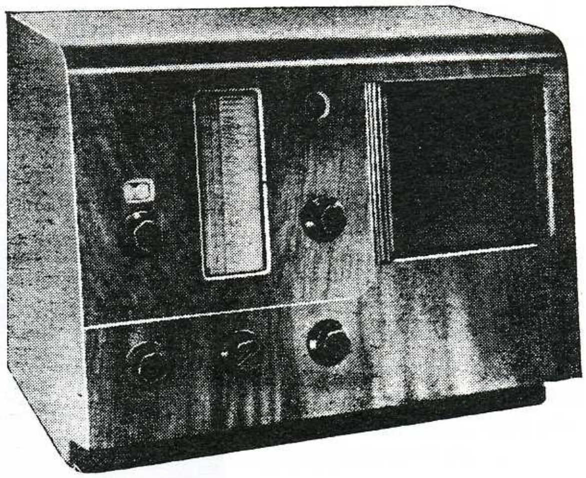
Secondly, the image rejection was quite inadequate, often resulting in the reception of a station being completely ruined by interference from a signal on the image frequency. The receivers just did not have a high enough intermediate frequency and/or sufficient selectivity ahead of the frequency changer.

Thirdly, the sensitivity was inadequate for any but the most powerful SW signals.

The A36

The first British domestic receiver to tackle these shortcomings seriously was the Murphy A36, which came out in 1937 and sold for £15 10s. At heart it was a fairly conventional MW/LW superhet. It had a single 119kHz IF stage and a triode-pentode frequency changer which was preceded by a double-tuned bandpass circuit.

For short-wave reception, however, this basic receiver was transformed into a double superhet by switching in a SW converter ahead of it. This converter had a triode-hexode frequency changer preceded by an RF amplifier and it tuned from 6MHz to 22MHz using a separate 3-gang capacitor. The output from the converter was arranged to fall in the MW band and it was subsequently processed by the main receiver. The arrangement is shown in **Fig. 1.1**. The SW tuning control was used to select the required broadcast or amateur band. One could then tune over that band using the main tuning control to vary the first IF within the MW band. The SW tuning control had a notched locator mechanism which made it easy to reset it very close to the same position each time one selected a given band.



The Murphy A36

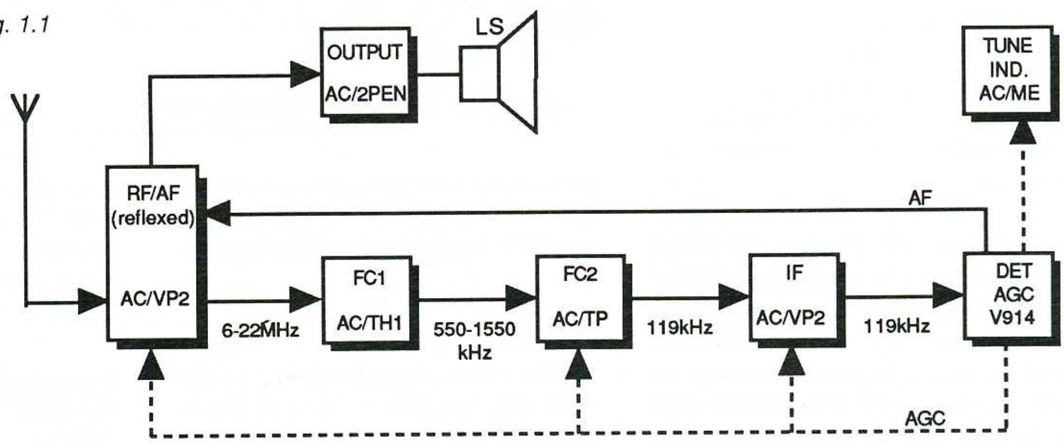
Short-wave stations could consequently be tuned just as easily as MW stations. The converter gave a significant increase in gain on the SW bands and the higher first IF, together with the two tuned circuits ahead of the first frequency changer, resulted in good image rejection – even though this was not a perfect arrangement because the tuning of the two signal-frequency circuits stayed fixed as one tuned across a SW band.

On the mechanical side, considerable care was taken to provide adequate screening and this made an important contribution to the performance on short waves. In particular, it prevented any significant break-through from MW stations into the first IF circuits.

The A36 had another interesting feature. The required AF amplification between the diode detector and the output pentode was obtained by using the RF stage in a reflex circuit. Moreover this reflexed stage had a fraction of the AGC voltage applied to it, thus giving a degree of audio AGC for good measure.

There was also a switchable 'noise suppressor'. This was a squelch circuit, with a preset threshold, which muted the

Fig. 1.1



receiver when tuning between stations. And there was a 'magic-eye' tuning indicator.

One of Murphy Radio's pet gimmicks at that time was 'alphabetic tuning' and so the A36 also included this feature. The main tuning scale was cylindrical and rotated about a vertical axis. Alongside it was a list of sixty MW and LW stations, arranged in alphabetical order, and opposite each station name there was a circumferential line around the cylinder. One adjusted the tuning control until the little circle at the end of the line appeared under the vertical cursor line – and there the station was! On SW one used the 0 – 10 scale at the top of the cylinder.

The A52

The following year Murphy Radio brought out a successor to the A36, which was known as the A52. This also used a double superhet arrangement for short waves, but it was quite different in detail. It was also more elaborate and more expensive, selling for £18 10s. On SW the schematic arrangement was as shown in **Fig. 1.2**.

The RF stage used the SP41 high-slope pentode which had recently been developed for use in television receivers. It had a slope of 8.5mA/V, compared with a figure of 2 for the AC/VP2 used in the A36, and this gave a considerable improvement in gain and signal/noise ratio. The first frequency changer tuned from 6MHz to 18.8MHz and band-spreading was obtained by a secondary control of the oscillator frequency – operated by moving a small metal disc within the oscillator coil.

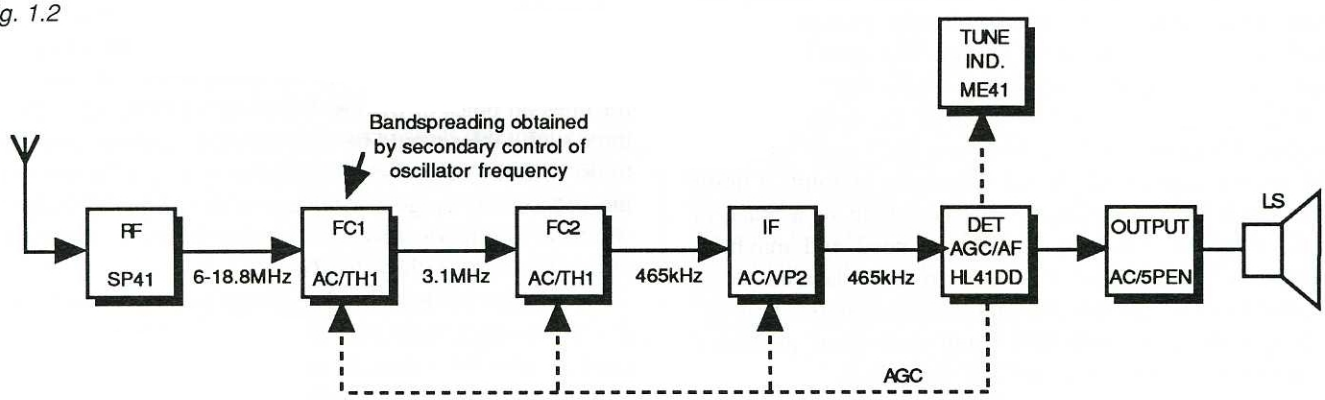
The first IF was 3.1MHz and the second frequency changer was pretuned to convert from 3.1MHz to 465kHz. The latter was now the standard IF for Murphy receivers, the use of IF transformers wound with litz wire and having the new iron-dust cores now enabling the gain and selectivity at 465kHz to rival that obtainable at the lower frequencies used earlier.

On MW and LW the second frequency changer was bypassed, the 465kHz output of the first frequency changer being fed directly into the IF amplifier. However, the RF stage was left in circuit, resulting in very good image rejection and exceptional sensitivity on these bands. In fact the sensitivity was sometimes too good. If one lived close to a broadcast transmitter, this could completely overload the front end of the receiver. In such an eventuality, one had to resort to adjusting the preset control at the back which reduced the RF gain on MW and LW.

Another novel feature of the A52 was the motorised tuning which was operated by push-buttons. Fixed to the spindle of the 3-gang tuning capacitor was a commutator disc, upon which rested a number of sprung contacts. When a push button was depressed one of these contacts was energised, causing a small motor to rotate the tuning capacitor in the appropriate direction until that contact reached the insulated gap in the commutator.

There were seven push buttons and, with the set switched to MW or LW, seven different stations could be selected. The necessary setting up of the contacts on the commutator would have been done by the local Murphy dealer. As might be expected, the motorised tuning was not terribly precise but this was compensated for by the use of an automatic tuning correction. An error voltage was derived from a discriminator which used a separate double-diode valve, and the second AC/TH1, redundant as a frequency changer on MW and LW, became the reactance valve for adjusting the oscillator tuning.

Fig. 1.2



When the set was switched to SW, each push button caused the tuning capacitor to tune to the centre of a different SW band. There were five broadcast bands (16, 19, 25, 31 and 49m) and two amateur bands (20 and 40m). The tuning within each of these was done using the band-spread tuning mechanism.

On MW and LW the user had the option of manual tuning. This meant that there were two separate and quite different tuning mechanisms available to the user, the band-spread mechanism for SW and the 3-gang capacitor for MW and LW. Each mechanism had its own pointer on the tuning scale but there was only one tuning knob. The drive from this was transferred from one mechanism to the the other by a spring-loaded friction wheel which was mechanically linked to the wavechange switch.

In our next issue, Lorin Knight describes the Murphy A76 and A92 short-wave specials

Feedback...

The page where you can air your views

Letters should be original, and not copied to or from other magazines

Opinion

You asked for comments on *Radio Bygones*. As a disabled OAP to whom pennies count, I feel there are frankly too many contributions by authors already over-exposed in other magazines, month after month. The same names and expressions continually cropping up is tiresome.

Readers' adverts will bring a bit of the unexpected and interest. What about a 'What have you got?' page – unusual/odd/never before heard of and valuations of same. I don't really regard the 'Carolines', etc., deserving of a place in *Radio Bygones*. There is however a need and maybe a demand for authoritative magazines of this class but don't let's fall into the 'amateur' trap; not everyone wants to be a 'G'. I spent many years with RGD, and since heart problems, collecting and restoring crystal sets. Good luck.

Ray Williams RS6072
Grantham

Though I fully understand the comments on 'over-exposed' authors, there are a great many readers who enjoy the articles from their regular favourites. Without a backbone of well-known contributors, few hobbyist magazines, whether in radio or any other field, could hope to fill the pages of each issue.

The aim for Radio Bygones *is to include a good 'mix' of established and new authors in each issue. – Ed.*

Decibels

On the subject of decibels, raised in the first issue of *Radio Bygones*, I can only caution readers in the manner which we (as Civilian Instructors to REME, a quarter of a century ago) were ordered to stress that the basic/fundamental concept of 'bel' figures is that of **power** comparison, based on the human ear's assessment of two noises, one sounding twice as loud as the other. This apparently requiring ten times the power.

There are methods of measuring (and thus comparing) power levels in terms of actual energy, temperature, calories, bolometer bridges or radiated fields, all usually most inconvenient to a serviceman, crouched in a corner or hanging onto a ladder, etc. So, for convenience, voltages are read either side of whatever device is under consideration, be it box of tricks, length of cable, aerial system, or whatever, but across what pairs of terminals and across what impedances? Old 'lines' men will have been weaned on 600 ohms, balanced of course, and while the techniques developed have proved adequate for audio frequencies, coping with the seasonal changes to cables, compensating for phasings, even to 'pairing' pairs of lines for stereophony, pulsing signals for computers have unleashed a new breed of problems.

Us radio chappies **were** content with open-wire 600 ohm feeders, even 300 ohm versions on high-power HF transmitters, then flexible twin, polythene spaced 300 ohm came along, and 75 ohm ditto for the FM market. Television brought mass-produced 75 ohm coaxial cable.

It is worth realising that our 'elder brethren' in the power supply industry had used coaxial cables for years, for shunting the odd megawatt of DC along routes too awkward for lines on poles or pylons. When AC won the day, sets of three such cables would be laid, whose dimensions had more to do with the current-carrying capacity of the 'inner', with the proportions to give a voltage-withstanding spacing (in whatever insulation of oil-impregnated paper, etc.) in the order of dozens of kilovolts.

An old gent by the name of Leibnitz (a German mathematical philosopher, who admired the organ fugues of Bach!) gave a ratio for optimum power-transfer, that we would recognise as 50 ohms, a figure well known to every tyro, amateur or CBer. Ironically, some German instruments and cables are made to 60 ohms impedance, being the geometric mean of the 50/75 systems.

Coaxial voltmeters have earned their place over the years, as long as really good, close-woven-outer type cable is used, even double-screened. The outer conductor of coaxial cable is rather more 'transparent' to RF than most makers' specifications would suggest, leading the unwary to suffer errors through pick-up from other sources – transmitters, computers, TV receivers, even thermostatic switching of soldering irons – all introducing unwanted or 'noise' signals in addition to any really small voltages being measured.

So, summarising, to use 'volts – dB' comparisons, constant impedance and beware of extra signals creeping in.

Wyn Mainwaring I.Eng G8AWT
Cowes, Isle of Wight

The HRO

Regarding Peter Hopwood's fascinating article on the National HRO in *RB* No. 2, I would mention that there were apparently not one, but at least three wartime German copies, together with various others produced in Switzerland, and a further post-war copy (AQST) made in East Germany. There also appear to have been two wartime Japanese copies, one with the 'PW' dial, one without, and certainly this latter version used plug-in coil-packs.

I wasn't aware of any wartime American models with higher IFs than the standard HRO, but I do remember coming across an RAS model a few years ago, with an IF of 175kHz – the images on this set above about 3MHz had to be heard to be believed!

Neil Clyne
Uxbridge

A Rose by Any Other Name?

As one who is much depressed by the increasing tendency to omit Fahrenheit temperatures from forecasts, since only they tell me how warm or cold I am going to feel, I am slightly alarmed by your piece on technical terms. I do hope that you are just pulling our legs and that your very welcome periodical will offer refuge from modernity in this respect as in others.

I beg to point out that my Murphy A50 and my Marconi CR100 never heard of hertz as a unit, or of capacitors or resistors either. They resolve kilocycles per second, or metres, and were assembled with condensers and resistances (with decent wattages too), and if I try to tell them anything else they can refer me to the *Admiralty Handbook of Wireless Telegraphy* (1931 and 1939), or even *The Radio Amateur's Handbook* (1950) on all but the last, which reflects American terminology (like antenna). It would be entirely anomalous and infelicitous to write of them and refer to these other things. More generally, the date of the subject should determine the terms which will be appropriate; I cannot specify a suitable date although these changes came upon me suddenly, because of a personal radio hiatus between about 1956 (disgust with the Morse imposition) and 1979 (delight with 11m CB) but in many cases original literature should settle the point.

I look for your support because, some time ago, writing to me from another Editorial chair, you deplored my objection to a far more hurtful survival, namely the prevention of access to legitimate amateur HF 'phone transmission by insistence on a Morse test. To be consistent with your support for that anachronism, I could even ask that your columns should express capacity in jars! And you ask, rhetorically, what is a kilocycle? I reply, what is a kilohertz? One thousand clones of a Second Reich scientist, all making sparks fly and lots of RFI? Pity they could not have used Maxwell, really; I do not know off-hand if the poor fellow is still even a minor unit.

Alex L. Dick (Sandy) GM0IRZ, ex-GM6KKP
Dundee

I'm afraid that Mr Maxwell was ousted by Mr Weber in the change-over from the CGS to the SI system of units.

The big problem with trying to relate terms to the date of the subject is that terms have changed at different times in different places. Jars were only replaced by farads in naval radio engineering during the 1930s, yet neither A Handbook of Practical Telegraphy, *(London 1878) nor* The Calculation and Measurement of Inductance and Capacity, *(London 1916) acknowledge the existence of a jar. Similarly, the latter work dismisses 'aerial' in an index cross-reference instruction to 'See antenna', but* The Elements of Radio-Communication, *(London 1937) does precisely the opposite!*

Things have never been the same since they stopped quoting wavelengths in feet! – Ed.

FREE READERS' ADVERTISEMENTS

You can advertise your goods for sale or wanted, using up to a maximum of 30 words including whatever details of your name, address, telephone number, etc., that you wish to be published in the advert.

Please ensure that you write your advertisement clearly, preferably in block letters or typewritten, and include the corner flash cut from the current issue of *Radio Bygones*, (see below). Every advertisement sent in **must** have your full name and address attached, even if you do not want those details published in full.

This service is for the use of *Radio Bygones* readers for their private sales and wants only. Any advertisements from traders, or apparent traders, will be rejected.

SEND YOUR ADVERTISEMENT TO:
Radio Bygones, 8A Corfe View Road,
Corfe Mullen, Wimborne, Dorset BH21 3LZ,
marking the envelope 'Readers' Advert'.

The closing date for adverts to appear in our next issue, due out on 27 February 1990, is February 9.

FOR SALE

Marconi signal generator TF2002AS, 10kHz to 72MHz AM/FM, complete with TF2170 synchroniser and manual. Working order. £35 o.n.o. or would swap for vintage radio or w.h.y? St Albans 62272.

Bush VHF80 bakelite radio in working order. £25 or swop? What have you? G Baker, 16 Ravensworth Village, Richmond, North Yorkshire DL11 7ES, tel 0325 718614.

WANTED

Circuit, wiring details, values of tapped capacitors for Ekco AC18 and 25 eliminators. Operating instructions, Wireless Set No. 17 Mk II. Mr M Shepherd, 66 Westerland Ave, Canvey Island, Essex SS8 8JS.

History of Wireless Telegraphy 1838 – 1899 by J J Fahie. Either original or 1971 Arno Press reprint. Taylor, 89 Lion Road, Twickenham TW1 4HT, tel 01-891 2820.

Type 'L' remote control kit, also rotary transformer for WS-62, TX section for WS-48, set of EMERs for Larkspur control harness. G4WWX, 28 Welbourne Rd, Liverpool L16 6AJ.

Dial glass for Lissen 8401 or Ever Ready 5117. Tuning indicators DM21 6T5. Circuit Beam Echo SPA11 amplifier. Philip Taylor, 14 Willow Walk, Canewdon, Rochford, Essex SS4 3QH, tel 0702 258598.

Connector 12 point No. C1A ('B' Set to PSU) for restoration of Wireless Set (Canadian) No. 29. Write: M G Taylor, 27 Glen Road, Fleet, Hants GU13 9QS.

Help with repair of Telequipment Serviscope, Oscilloscope Type S42a. The equipment was made in the early 1960s, and has a couple of small faults. Please telephone Terry on 01-923 0823.

BC348 or BC224 receivers for spares/restoration, any parts, especially dynamotors DM24 or DM28, IFTs, crystal filters, BFO coils, etc. What have you? Neil Clyne, tel Uxbridge (0895) 30006.

Bits & Pieces

Baghdad Morse?

Folk-lore, of course, tends to be shrouded in history with a little swampy fog. Though other versions along similar lines have been heard, the following is the most probable explanation of the origins of Baghdad Morse.

In the 1930s, when the British Empire was still in existence, world-wide communications were carried almost exclusively by wireless telegraphy. Long-distance airmail and telephone calls were in their infancy.

The Royal Air Force maintained Command Headquarters and bases overseas, in such exotic places as the Middle East, India, Singapore and Hong Kong, and vital communications had to be maintained.

So, apparently, the RAF Inter-Command W/T Network was formed, to maintain 2-way telegraphy communication between the Air Ministry in London and Singapore, etc. The Inter-Command Network was manned by the best RAF CW operators, most of whom had been trained together, or 'knew' each other well, because they had worked each other so often on the key, and knew each others 'fist'.

The powers-that-be were very verbose, like all present-day officialdom, so that every operator coming on watch had a huge pile of traffic waiting for conditions to 'open', so that traffic could be sent. Much of this traffic was relayed through the RAF HQ in what is now Iraq (capital Baghdad). Now, obviously, there was only a limited period each day when this traffic could be transmitted and received, so that some unofficial short-cuts were taken; for example Baghdad Morse.

Baghdad Morse was a very high speed technique, evolved by the W/T operators. It depended on a rhythm or 'swing' sending technique, with letters, words and groups severely clipped, to get up speed. It was at its best (or worst?) when the operators at each end knew each others 'fist', and very high speeds were attained. Just about all official procedure was dispensed with, to try to get rid of all the traffic while there was a slot open in the conditions. It was more or less unintelligible to mere mortals such as myself, until I 'tinkered' with it in 1940. I did not become an expert Baghdad Morser, but was suitably impressed, and still retain a few of its bad(?) habits learned in a short time, including a dislike of long-winded QSOs, and the use of a certain amount of CW swing if and when I wind things up a bit.

G2BZQ

The Wireless Fairies – A Christmas Tale

by Tony Hopwood

Once upon a time, when the *Radio Times* was just that, the Wireless Fairies brought music and laughter into every home as they trimmed the wicks of the magic lamps inside each and every wireless set.

Every tiny filament a lot to them – and now that there aren't many magic lamps still alight, the fairies must ride the airwaves far and wide to find some quiet corner where they can still bask in the warm glow of a few remaining valves.

So that we don't forget them this Christmas, let me introduce those faithful Wireless Fairies who have kept your sets bright and warm these 60 years... In the Technical Section there's GALENA and CRYSTAL, ANTENNA, META, RESISTA, CAPACITA, DETECTA, INDUCTA, TUNA – not forgetting poor old ACCUMULATA, who's run down and flat these days because nobody wants to put her on charge because she's not lead-free.

On the cultural side, generating those endless rhymes that fairies need to tell their tales are twins ANN and KATH ODE, and elder sister DI.

Ground wave transport is organised by the HENRY family; but please spare a thought for MILLI, who used to drive a MEGACYCLE until she was banned by the powers that be – it was years ago but it still HERTZ, and she never once had a KILOCYCLE.

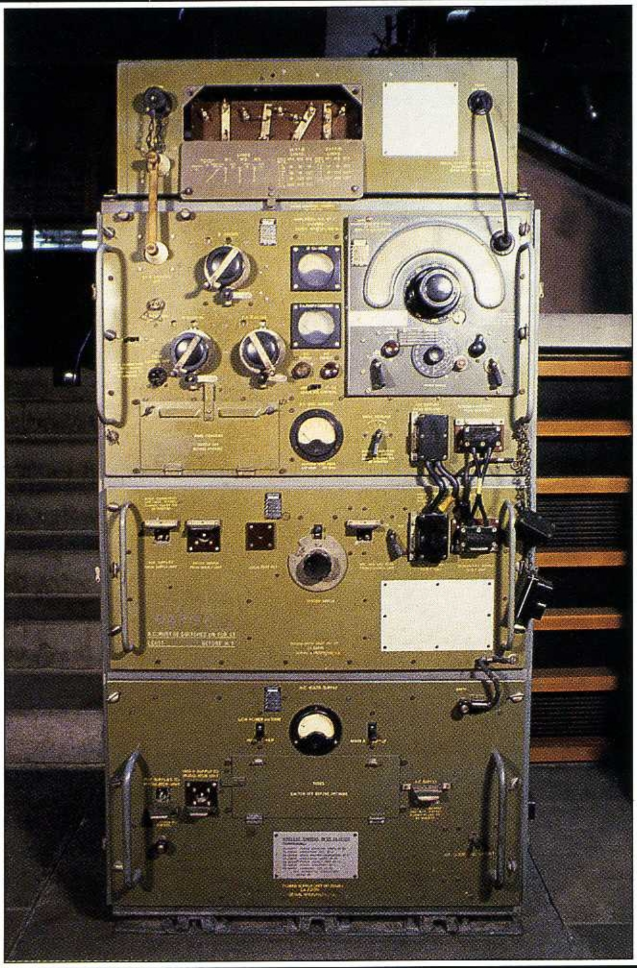
Sadly, as each valve goes cold for the last time, another fairy lets go of life, and drifts silently away on the long slow aerial waves into the eternal ether.

But it's a poor Christmas Fairy Tale that has an unhappy ending; As the original Wireless Fairies waft silently out of the valvelight, a new and sturdy generation founded by AUDIA and VIDEA bring Radio and Television into your home. These new Wireless Fairies are tiny sprites, CHIPS off the old block, SILICA. They all look alike and have lots of little legs like insects – not wings like fairies. They're all called TRANSISTA and SEMICONDUCTA, and are so tiny you hardly know they are there – but you'd miss them if they weren't!

Please don't forget the Wireless Fairies this Christmas – light a valve and keep one warm!

A Merry Christmas and a Happy New Year to You All

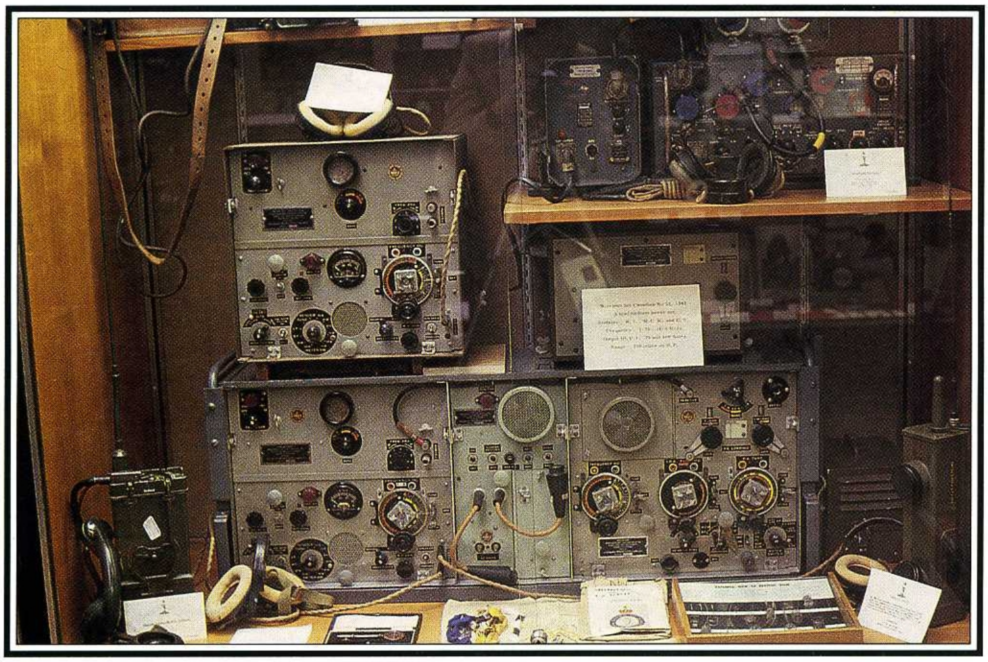
Published bi-monthly by G C Arnold Partners, 8A Corfe View Road, Corfe Mullen, Wimborne, Dorset BH21 3LZ. Printed in England by The Friary Press Ltd, Dorchester, Dorset. Subscription £12.00 post-free UK, £13.00 overseas inc Eire, for six issues. Overseas airmail rates on request. Overseas payments must be in Sterling.



A Wireless Sender No. 53 (1943). A CW/MCW and R/T transmitter giving 250W output between 1.2 and 17.5Mc/s. It was used up to 1960, mainly in vehicles but also as a ground station, usually with the R107 receiver

MUSEUM PIECES

A German 'Enigma' cipher machine, with cover opened to show the rotors



A No. 52 Set (1942) providing R/T, MCW and CW communications in the band 1.75 – 16Mc/s. The transmitter power was 70 – 100W

MUSEUM PIECES

This month featuring items from the Royal Signals Museum, Blandford Camp, Dorset. See the article about the Museum in this issue

A No. 10 Set (1944). This operated on 4.4GHz (4400Mc/s), and was intended to be used to bridge hostile terrain on landline circuits. It was the first set to employ pulse-code modulation for voice communications at SHF (then called UHF), and was used extensively during the North African Campaign