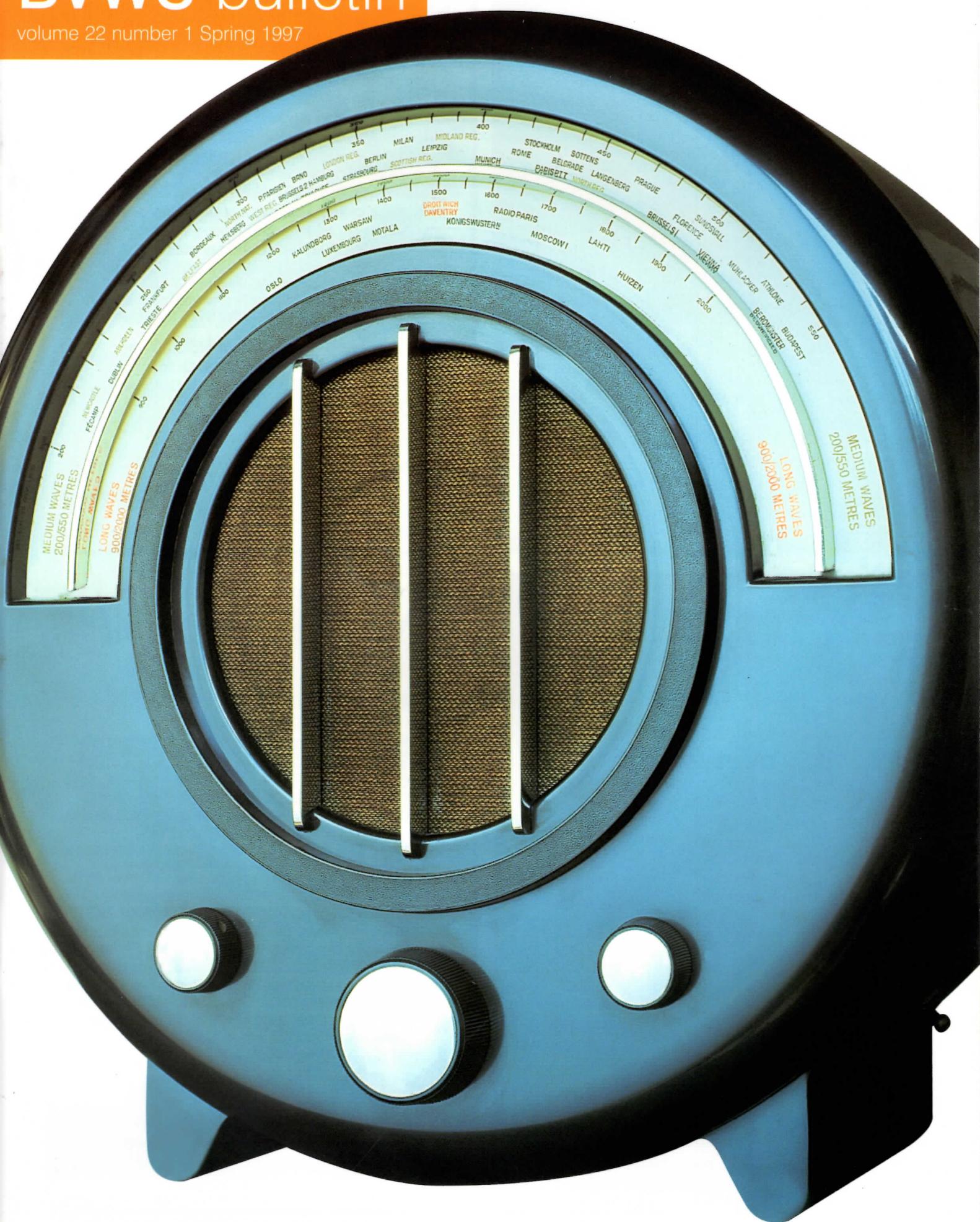


BVWS bulletin

volume 22 number 1 Spring 1997



BULLETIN OF THE BRITISH VINTAGE WIRELESS SOCIETY

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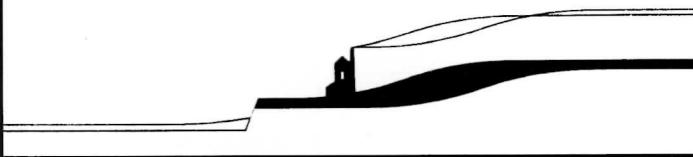
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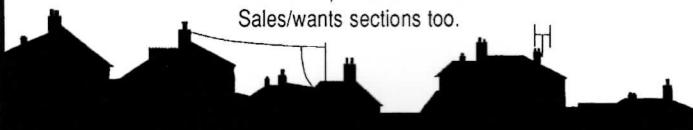
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**All enquiries to: NVCF'97, Spice House, 13 Belmont Road,
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Contents: Bulletin of the British Vintage Wireless Society Volume 22 No.1 Spring 1997

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Gordon Bussey
Dr A.R. Constable
Keith Geddes OBE
Ray Herbert
David Read
Gerald Wells



Front Cover: Ekco AD65 in black and chromium.

Rear : The back of the Ekco AD65.

Cover Photography by Mark Groep
Graphic design by Carl Glover

Contents

- 3 From the Chair,
Ralph Barrett lecture
- 4 Another AD65 story
- 10 Delightfully personal: The Marconi P20B & P17B
- 15 'Grasshopper' key, book review:
epic history of radio, story of one man, Wembley NVCF,
Uncle Caractacus
- 16 Listening in
- 22 Communication with wires
- 26 The first sixty years of wireless communication in Switzerland
- 29 Mystery object and BVWS web site
- 30 Listening in continued
- 31 The Viseotelephone
- 32 There's music in the air-
the story of Sudbury Radio Supply
- 38 A French collection
- 39 The Federal 110
- 40 Tuned circuits
- 41 The Lissen 'Skyscraper Seven',
the Roberts story,
Book review: Radio! Radio!
(third edition)
- 42 Letters
- 45 BVWS minutes, back issues
- 46 News, advertisements
- 47 Advertisements

From the chair

What will this year bring? My first act has been to banish my Marconi chair which has served me so well during Marconi's Centenary Year for a different (but certainly a more musical) seat. I had planned to return my Marconi chair to what I call out of my wife's earshot the 'wireless room', but which is generally known in our household as the 'television room', for squeezed between my historical sets there is a modernish ex-rental battered colour television. I fail to understand why my family find the gaggle of horn loudspeakers (they do look rather like black geese) that surround the TV distracting. Personally, I find looking at loudspeakers a damn sight more entertaining than most television dramas. It is true that I promised the 'one that has to be obeyed' that when we moved to our new property I would stack the old sets in the cellar. Well, I have now moved, but have discovered like many collectors before me that you cannot put a quart in a pint pot. Nor can you make a damp cellar dry overnight, so the best sets have gone 'for the moment at least' (as I tell the wife) into the television room. Oh yes, and also into the master bedroom, and the bathroom (which turns out to be drier than the cellar). This leaves me still with the Marconi chair. I now have to agree with Enrico Tedeschi that it is not a comfortable seat, but it does have the benefit of looking very eccentric, so is a great talking point with first time visitors. Actually, most are desperately keen not to talk about early radios, so will seize on any topic, even the Marconi chair.

Many of you have taken the trouble to complete the vital questions on the Membership Renewal Form whether you are interested in a BVWS Membership List and your reaction to our new Constitution. It gives me great pleasure to say that the vast majority agree with the Constitution and with a Membership List. A small number of members have written in detailed suggestions for ways to improve the Constitution. These members will be written to and their suggestions taken on board by the Committee in our process of 'fine tuning' the Constitution ready for 1998. At the same time The Committee will start to formulate our bye laws and to see whether there are ways of improving our swapmeets. Your reaction to the publication of a BVWS Membership List has also been most positive, and this will now be put in hand. It will probably be printed as a separate booklet. Of course, the members' wishes will be totally adhered to- from those who want their name only to be listed to those of you who want to preserve complete anonymity. Finally, the Membership Secretary told me how pleased he was that the vast majority of members have renewed promptly this year. Such promptness has two important benefits: it saves the Society money and it

reduces the Membership Secretary's total work load. The other important event is the annual election. This year only the Chair was contested. I hope that you took the opportunity to vote as this is important for the well-being of the Society.

On Tuesday 4th June 1996 I was present at the Marconi International Fellowship Award at the Victoria & Albert Museum. The Fellowship was created in 1974 to mark the centenary of Guglielmo Marconi's birth. This year the award went to Dr Gottfried Ungerboeck of Zürich for his invention 'Trellis-Coded Modulation' - the core technology used in modems around the world. The award was presented by HRH Princess Alexandra, who in turn received a perfect

replica of an 1899 'Grasshopper' morse key (see elsewhere in this Bulletin) from Peter Gershon, managing director of GEC-Marconi. If this was one of the high-points of the Centenary Celebrations, the low-point must surely be when GEC-Marconi decided recently to auction at Christie's South Kensington the Marconi apparatus and documents covering the first fifty years of radio. I am

sure that you are all familiar with this unique material. I have added my voice of protest on behalf of the BVWS in letters to The Times and to the Rt Hon. Virginia Bottomley, our Heritage Minister. It is quite extraordinary that the selling of the country's wireless heritage (and undoubtedly the most important archive of the history of early radio by the pioneers in this field), can be hailed as a 'celebration' by GEC-Marconi (as they did in their press release). I appreciate that it makes little commercial sense for GEC-Marconi to have the responsibility for looking after this material. I can also appreciate that there is little advantage to have this collection transferred from the company's vaults to the stores of one of our national museums. On the other hand the claim made that by breaking up the collection into 1000 lots for sale to the public will make the material more accessible for research is patently absurd. Of one thing I am absolutely certain and that is that this amazing collection which charts the most important stages in the early development of radio could never be put together again.

This collection must be protected for the nation. We have a national museum of the moving image. So what about a national museum on the technology of the spoken word? Perhaps one of our lottery millionaires could be induced to purchase the collection for the nation, or start a private museum. In the meantime I urge our members to write in the strongest terms to their MPs.

Willem Hackmann

Stop Press

It would seem that the Marconi auction will not happen. Due to a concerted effort by enthusiasts worldwide, the GEC- Marconi archive collection will not be sold piecemeal to various bidders. We can all breathe a collective sigh of relief!

tetchily commenting on television and John Logie Baird providing a more positive outlook. Due prominence was given to Baird's outstanding colour and stereoscopic television achievements.

Peter Smith assisted with the demonstration featuring two televisions showing 30-line pictures.

On 6th December, Will Wyatt, Chief Executive BBC Broadcast, gave a talk 'Television in the Millennium' at the Royal Institution and they specially requested a repeat of the IEE 30-line demonstration for this event.



Another AD65 story, or 'how I got mine'

by R.J.Grant, photography by Mark Groep, Sales literature kindly lent by Tom Going, W.E.T. Sheets kindly lent by Malcolm J. Bulcock

November 1991,
**"There's a chap
just phoned for
you" said my wife
as I came in from
the pub, "He's got
a lot of old radios
you may be
interested in and I
told him you
would phone him
back tomorrow",
Hmmm I thought,
probably another
nineteen fifties
radiogram and a
box of those
cheap plastic, last
of the valve sets
that always seem
to come in threes.**



The next day a phone call revealed a garage full of radio junk inherited from an old uncle who had just passed away and a visit was arranged for the following evening. The owner thought he'd struck gold and was eager for me to make him an offer, so a very careful inspection was made for anything worth having. He wasn't prepared to split it up so it was all or nothing. There was a pile of six drawers from an old chest of drawers full of second hand valves, mostly octal types but a good amount of B7's, B4's and 5's, all very dirty and stored in a damp place for a long time. There were four wooden cabbage crates full of loud speakers all rusted beyond repair and another two smaller crates full of transformers of all types. Next came a pile of radios, the first being an Ultra 121 from the thirties, and the one with the semi-circular glass tuning scale on the top of the cabinet,

but the veneer had all peeled off and the ply had started to come apart. The next was the Philips Monoknob with a chrome ring in the speaker grill, but the cabinet disintegrated when I moved it. Then came the prize piece, a black Ekco AD65: the cabinet had chalky water marks all down both sides, and was very dirty but otherwise intact. Inside was a very rusty chassis complete with valves and loud speaker, but the tuning scale, all of the chrome trim, knobs, back and speaker cloth were all missing. Searching on, there were about a dozen other radios all from the thirties and all in about the same condition. Right at the back there was a small chest of three drawers, and the top drawer was full of all kinds of useful knobs mostly from the thirties and forties but none for the AD65. The next drawer was full of all kinds of tuning scales, the glass ones very carefully wrapped in

newspaper but again no sign of one for the Ekco. The bottom drawer was full of volume controls and wave change switches. The contents of the chest were in good condition and relatively damp free, and there were several cardboard boxes containing all sorts of odd spares, trims, etc. After several minutes thought about how much this lot was worth and how much I could afford (and I wanted the Ekco), I finally made an offer of £100. The owner said he would let me know, but still had two other people interested. Three weeks had now passed and still no reply; it was now late November and Christmas was looming up fast, and becoming a little impatient I decided to give the chap a ring to see what was happening and was told that the other two interested parties had dropped out. He still felt that this heap of junk was worth a lot more than my offer and was trying to get a better



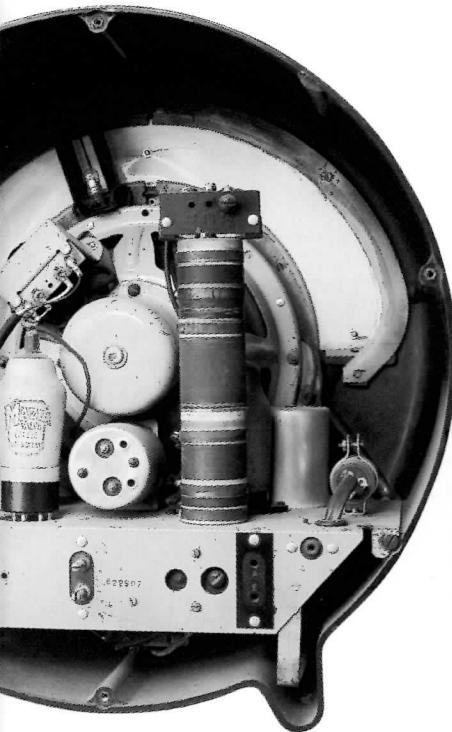
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These distinctive stands have been designed exclusively for Models 85 and 65 and are available in two finishes, walnut and black.

2916 or by the addition of 2/6 to each
Hire Purchase Payment for the receiver.

Prices do not apply in I.P.S.

EKCO RADIO



6-STAGE SUPERHET FOR UNIVERSAL MAINS

This six stage superheterodyne Receiver meets the popular demand for a Universal set that can be used on either A.C. or D.C. mains without adjustment.

Low voltage, simplicity of operation and unequalled quality of reproduction make this Receiver an outstanding proposition that will be acknowledged as such by all who appreciate good radio.

- 1 Magnificent bakelite cabinet of unique design available in two finishes, figured Walnut, and Black with chromium-plated fittings. Designed by famous architect.
- 2 Universal - for use on either A.C. or D.C. mains without adjustment. (200-250 v.)
- 3 Six stage superhet circuit with band-pass tuning.
- 4 Full Delayed Automatic Volume Control.
- 5 Interchangeable full size station scale with names and wavelengths.
- 6 Colour code waveband selector.
- 7 Single knob control.
- 8 Light beam and shadow station indicator.
- 9 New type valves including octode frequency changer, H.F. Pentode, double-diode Pentode and Rectifier.
- 10 Moving-coil speaker.
- 11 Output 2½ watts.
- 12 Average consumption on A.C. 70 watts. D.C. 65 watts.
- 13 Wavelength range - 2000-350 metres and 900-1000 metres.
- 14 Dimensions - 15½" x 15½" x 8"

Initial payment of
5s, and 12 monthly
payments of 1s.

10½ Gns.

WALNUT FINISH
BLACK & CHROME 1 GN. EXTRA.

one. I said that £100 was all I was prepared to pay in view of its condition and here the phone call ended.

One week before Christmas, a note was pushed through my letter box saying if I still wanted these radios, I could have them for the £100 and would I collect them as soon as possible. Isn't it amazing how these things always turn up at the wrong time, still mustn't complain. Two days later my workshop was piled high with this junk which needed some serious sorting. Closer inspection revealed quite a lot of salvageable spares after a good clean up. A lot of the transformers were wax or pitch impregnated and were ok, and many of the others seemed to have survived after a long drying out period. All of the radios were stripped of their valves, knobs, trims and other spares as the wooden cabinets were way beyond restoration. The remains of cabinets,

draws, crates and unsalvageable parts were taken to the local council dump and disposed of. Now the junk was cleared and the good stuff put away, the moment I've been waiting for came, and I got stuck into the AD65, my first Round Ekco. I started with the cabinet, a good blast with Servisol foam cleaner shifted most of the grime, and the chalky water marks soon came off with a drop of Bake-o-bryte. Finally a good rub all over with some Brasso and a drop of Sainsbury's best silicone polish, left the cabinet gleaming. Having put the cabinet away in a safe place I then had a good look at the chassis, and it really was very rusty. There was only one way to deal with this, strip off all the components de-rust and re-spray. Most of the major components are bolted on with B.A. nuts and bolts and only the valve holders are fixed with rivets. All the major components were removed having made a

map of their location, orientation and wiring, and placed in a box for closer examination later. Next the smaller components were removed one by one, carefully labeled and drawn on the map. The interconnecting wires were carefully number tagged and drawn on the map, trying to keep their original shape. By now the map consisted of a master plan and about a dozen separate pages of each layer as the components and wires were removed. This avoided confusion on re-assemble by not having too much on one page. Next the valve holder rivets were drilled out and valve holders removed, and I was down to the bare chassis and the front plate that holds the speaker and the tuning gear. The chassis and front plate were cleaned off with a rotary wire brush and primed with Grey primer, which filled the pit marks quite nicely and then sprayed with a top coat. Rootes

"TRADER" SERVICE SHEET
649

EKCO AD65

AC/DC SUPERHET



The Ekco AD65 in the walnut finish cabinet.

HOUSED in a circular moulded cabinet, the Ekco AD65 is, in the original models, a 3-valve (plus rectifier) 2-band superhet, designed to operate from AC or DC mains of 200-250 V, 40-100 c/s in the case of AC. The standard model is finished in walnut or black and chromium, but special models have a coloured finish.

As the chassis is "live" to the mains, no provision is made for the connection of a gramophone pick-up or an external speaker. These can be attached, if re-

quired, but care must then be exercised to isolate them adequately.

In subsequent versions, considerable modifications occur, necessitated by valve changes. These are fully explained, however, under "Modified Chassis" overleaf.

Release date: 1934; Original prices: Walnut, £1 0s. 6d.; black and chromium, £1 11s.; coloured models, £1 2s. 6d.

CIRCUIT DESCRIPTION

Aerial input via mains isolating condenser C1 to tapping on primary windings of band-pass filter circuit. Primary coils L1 (MW) and L2 (LW) are tuned by C22; secondary coils L3, L4 are tuned by C24. Inductive coupling by mutual inductance between primary and secondary windings. Image suppression by pre-set condenser C21.

First valve (V1, Mullard metallised FC13) is an octode operating as frequency changer with electron coupling. Oscillator control grid coils L5 (MW) and L6 (LW) are tuned by C26. Parallel trimming by C27 (MW); tracking by specially shaped vanes of C28, with addition of series tracking condensers C5, C28 (LW). Reaction coupling from anode by coil L7 on both bands.

Second valve (V2, Mazda metallised VP1321) is a variable-mu RF pentode operating first as pentode IF amplifier, and then, by reflex action, as a triode AF amplifier. As an IF amplifier it has

tuned-primary, tuned-secondary input and output transformer couplings C29, L8, L9, C30 and C31, L10, L11, C32, which are connected in the conventional manner.

Intermediate frequency 110 kc/s.

Manual gain control for the receiver is provided in the form of a variable resistor R3 which, with R4, R5, forms part of a potential divider across the HT circuit. V1 and V2 cathodes are returned via their respective fixed GB resistors R1 and R8 through R3 to chassis, and as R3 is adjusted, the bias applied to the valves is varied.

The IF output developed across L11 is applied to diode second detector, which is part of double diode output pentode valve (V3, Mazda PenDD4020). Audio frequency component in rectified output is developed across load resistor R10 and passed via AF coupling condenser C14 back to V2 control grid via L9, C7, the latter offering a high impedance at audio frequency but effectively by-passing the intermediate frequency, and forming, with R9 and C11 an IF filter circuit.

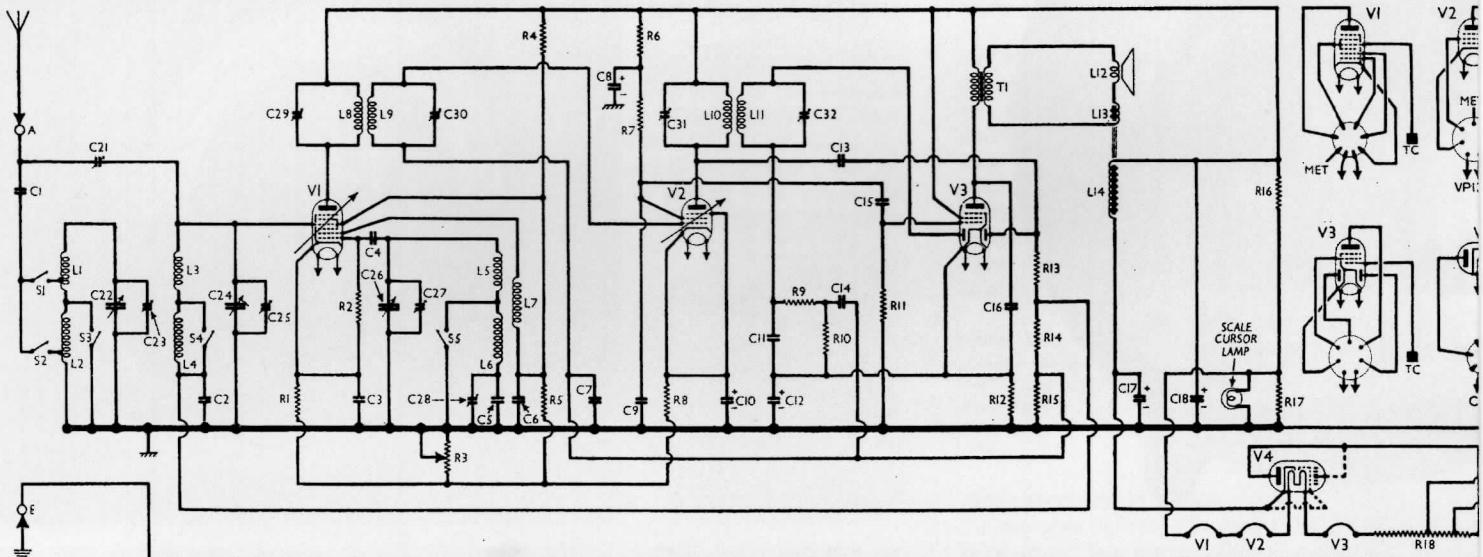
AF output from V2 is developed in amplified form across the SG load resistor R7, the by-pass condenser C9 shunting away signals at intermediate frequency while offering a high impedance to audio frequency signals, and passed via AF coupling condenser C15 to control grid of pentode section of V3. Fixed tone correction in pentode anode circuit by C16.

Under-chassis
Several components mounted on other side of component assembly, and thus hidden in this sketch are shown in detail in the overleaf. In the overleaf diagram showing detail the w band switch C8 may be retained in the b with Cr7, Cr8 on the chassis de

Second diode of via C13, provides are developed across R14 and R15 and coupled circuits a valves, giving auto Since V2 operates amplifier and is action should make practically constant gain being determined.

AVC delay volta for pentode section drop along resisto lead to chassis.

When the recei



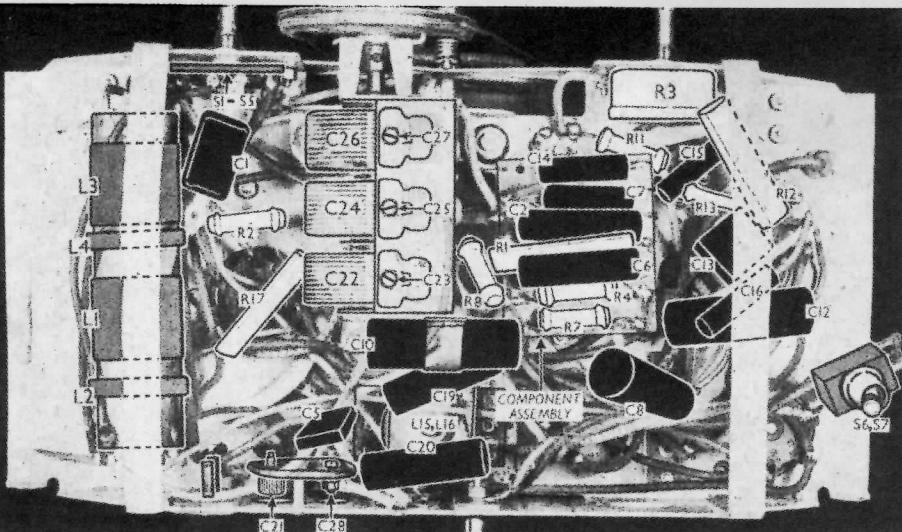
Circuit diagram of the Ekco AD65 AC/DC superhet. R3, below the chassis line, is the manual volume control. AF signals are fed back from R10 in the diode circuit then amplifies them as a triode and passes them on from its screen load R7 to V3 pentode. One half of V4 is shown dotted as this valve may be a single rectifier. Valve base connection diagrams are shown on the right for the alternative types for V4, as they are also for V2.

Dove Grey seemed a reasonable match and this was left to harden while I tackled the speaker. I look upon paint and varnish as not fully hard until you can't smell it any more, and this avoids spoiling the job by re-assembling too early.

The loudspeaker is a round mains energised type with a seven inch cone and an output transformer bolted on the side, and was about seventy percent rusty. Originally sprayed a semi-gloss black, the damp had unglued the speaker cone outer rim so desoldering the wires and removing the centre screw was all that was needed to remove the

cone completely. On inspection it was in quite good condition with the coil intact. The joint between the cone and the coil, and the coil itself, were held together with a good strong varnish which had resisted the damp. The frame of the speaker was held together with brass nuts and bolts and came apart quite easily. The field coil and output transformer were then checked and found to be intact. The output transformer lamination clamp was removed along with the rest of the frame, outer magnet former and the cone gap plate, and de-rusted with a rotary wire brush then primed with red-oxide primer and sprayed

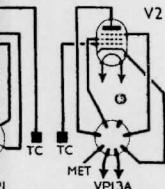
satin black. The transformer and laminations had been impregnated with a bituminous sealer and were ok, and the magnet core was also ok. On re-assembly the cone was re-centred using thick paper strips as shims, and this proved difficult as the centre spider got in the way. The outer rim was then re-glued using Cloy glue leaving the shims in until the glue had set. I used Cloy glue because it can be steamed undone should the need arise in the future. Now finished the speaker was tested using an H.T. battery to power the field coil and an audio source from my workshop radio directly into the speech coil (these were



3, fed from V2 anode DC potentials which are load resistors R13, fed back through de-GB to FC and IF. Aomatic volume control is a post-detector AF AVC controlled, AVC obtain a condition of gain, the degree of gain by the setting of

e, together with GB is obtained from the R12 in V3 cathode

r is operating from



Valve heaters, together with the scale cursor lamp and ballast resistor R18, are connected in series across the mains input circuit. The cursor lamp is shunted by R17, the two being connected in series with both the heater circuit and R16. A filter circuit comprising air-cored chokes L15, L16 and condensers C19, C20 suppresses mains-borne interference. The earth socket E is taken from the junction of C19 and C20.

COMPONENTS AND VALUES

RESISTORS		Values (ohms)
R1	V1 fixed GB resistor	200
R2	V1 osc. CG resistor	60,000
R3	Manual gain control	2,000
R4	V1 SG and osc. anode HT	15,000
R5	feed potential divider	{ 60,000
R6	V2 SG AF decoupling	15,000
R7	V2 SG AF load	50,000
R8	V2 fixed GB resistor	2,000
R9	IF stopper	30,000
R10	V3 signal diode load	250,000
R11	V3 pent. CG resistor	500,000
R12	V3 pent. GB and AVC delay resistor	165
R13	V3 AVC diode load resistors	{ 1,000,000
R14		{ 250,000
R15	HT circuit shunt	5,000
R16	Scale cursor lamp shunt	100
R17	Heater circuit ballast	760*

* Tapped at $560\Omega + 100\Omega + 100\Omega$ from V3 heater end.

close at hand at the time). Finally the speaker was stored in the airing cupboard just in case of any damp remaining in the coils.

Back to the chassis, the valve holders were the first components to go back but needed some attention. They are the Ct8 side contact type and can cause a lot of trouble if not properly treated while you have the chance. The contacts are held in place by a tag next to the solder tag being folded over the edge of the valve holder. Bend this tag straight and the contacts drop out quite easily. The body of the valve holders were washed in warm soapy water (Fairy liquid), and the contacts were

CONDENSERS		Values (μF)
C1	Aerial isolator	0.001
C2	V1 hex. CG decoupling	0.1
C3	V1 cathode by-pass	0.1
C4	V1 osc. CG condenser	0.001
C5	Osc. LW fixed tracker	0.0008
C6	V1 HT decoupling	0.1
C7	V2 CG RF by-pass	0.002
C8*	V2 SG AF decoupling	2.0
C9	V2 SG RF by-pass	0.0005
C10*	V2 cathode by-pass	25.0
C11	IF by-pass	0.0003
C12*	V3 cathode by-pass	25.0
C13	Coupling to V3 AVC diode	0.0001
C14	AF coupling to V2	0.005
C15	V2 SG to V3 pentode AF coupling	0.005
C16	Fixed tone corrector	0.005
C17*	HT smoothing condensers	{ 8.0
C18*	Mains RF by-pass condensers	{ 24.0
C19	—	0.1
C20	—	—
C21†	Image suppressor	—
C22†	Band-pass pri. tuning	—
C23†	B-P pri. MW trimmer	—
C24†	Band-pass sec. tuning	—
C25†	B-P sec. MW trimmer	—
C26†	Oscillator circuit tuning	—
C27†	Osc. circ. MW trimmer	—
C28†	Osc. circ. LW tracker	—
C29†	1st IF trans. pri. tuning	—
C30†	1st IF trans. sec. tuning	—
C31†	2nd IF trans. pri. tuning	—
C32†	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Band-pass primary coils	{ 4.0
L2		{ 13.0
L3	Band-pass secondary coils	{ 4.0
L4		{ 13.0
L5	Osc. MW tuning coil	5.0
L6	Osc. LW tuning coil	10.0
L7	Oscillator reaction coil	5.5
L8	1st IF trans. { Pri.	{ 100.0
L9	Sec.	{ 100.0
L10	2nd IF trans. { Pri.	{ 100.0
L11	Sec.	{ 100.0
L12	Speaker speech coil	2.0
L13	Hum neutralising coil	0.1
L14	Speaker field coil	400.0
L15	Mains RF filter chokes	{ 3.0
L16		{ 3.0
T1	Speaker input { Pri. trans. { Sec.	{ 625.0
S1-S5	Waveband switches	0.5
S6, S7	Mains circuit switches	—

found to be very dirty and heavily oxidised and some damaged by verdigris. These were de-greased with Ardrox solvent and then de-oxidised in Goddard's Silver Dip, making sure they were not left in too long to avoid losing their nickel plating. They were then washed in warm soapy water to remove any last traces of this mild etchant. The contacts that were covered in verdigris were a bit more of a problem, and it seems the only way to remove the verdigris is to scrape it off leaving bare brass, and I think the verdigris had eaten the nickel plating anyway. They were then polished with Brasso to get them smooth



Carl Glover pictured with the famous £20,000 green Ekco AD65, the day before it was allegedly auctioned off. Note that the knobs were not made with metal inserts. This was probably due to the weak and volatile nature of the urea formaldehyde which composed the knobs and cabinet - a material prone to cracking very easily.

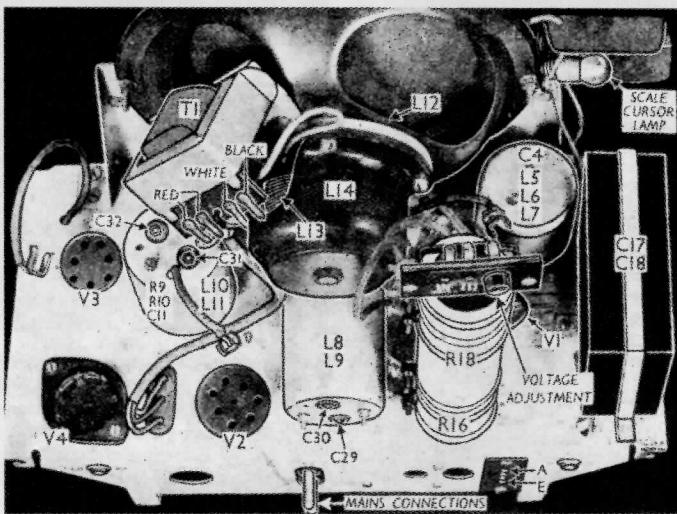
again, and washed to remove all traces of Brasso, as anything other than clean metal will cause crackling.

Checking with the circuit diagram, I noticed that not all the contacts are used on all of the valves, so the plain brass ones were put in the slots where there is no connection. Unfortunately there was not enough of these slots, so I had to pinch a few contacts from my only spare valve holder of this manufacturer. The valve holders were then riveted back into the chassis, making sure of position and orientation using bifurcated rivets, since these are as near as I could get to the originals (and are quite close).

The point to point wiring is of single core solid tinned copper wire of about 20 SWG with a cloth over rubber covering. The rubber had become hard but the cloth covering held it all together, and was even robust enough to withstand a washing off with a small stiff paint brush and some soapy water. These wires were washed and put back one at a time as I removed their location labels and referenced them to the map. Most of the small components went back in the same way after checking that they were electrically ok.

Most of the electrolytic and paper capacitors were leaky and had to be dealt with. The electrolytics in oblong box form were easily undone when the wax was melted with a heat gun. They were put back together the same way after the innards had been replaced with new capacitors and shaped pieces of wood to take up the space, as the new components are usually smaller than the old. I use a Black & Decker heat gun intended for stripping paint and control the temperature by the distance from the job. The paper capacitors are the type in a paxolin or cardboard tube with the ends sealed with a plug of pitch. This I remove with an old soldering iron running on a variac to control the temperature, and this avoids burning the pitch and all that pong and blue smoke. After replacement of the capacitor, the pitch is put back in the same way, and finally given a quick blast with the heat gun to smooth the ends over and put the shine back on the pitch. Some of the cardboard tubes didn't survive so the new cylindrical capacitors were wrapped with mat black cloth tank tape to disguise them. I find taking the trouble of putting the new components inside the old is well worth while, as there's nothing worse than brightly coloured plastic components inside a vintage wireless.

continued on next page



Plan view of the chassis. C8 may be included in the block with C17, C18. V1 holder is almost completely obscured by the heater ballast resistor R18. The speaker connections are indicated at their tags T1.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted in the makers' manual. They represent conditions to be expected in the average chassis when it is operating on AC mains of 230 V, using the 220/230 V tapping on the heater ballast resistor. Voltages were measured on the 1,200 V scale of a standard Avometer, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 FC13	{ 200 90	{ 1.6 2.1	90	6.0
V2 VP1321	200	4.5	145	0.8
V3 Pen DD4020	180	29.0	200	10.0
V4 UR1	245*	—	—	—

* Cathode to chassis, DC.

DISMANTLING THE SET

Removing Chassis.—Withdraw mains connecting plug and remove six (or in some cases seven) screws holding back cover to the rear of the cabinet, lifting off cover so that the heat vent cowl attached to it clears the voltage adjustment panel; remove the three control knobs (recessed grub screws) from front of cabinet; remove fixing nut from mains switch at side of cabinet, and push the switch into the cabinet; remove the two cheese-head screws (with washers) holding the lugs at rear of chassis to ribs moulded in the cabinet; remove two nuts (with washers) holding speaker mounting bracket to the front of the cabinet.

The chassis and speaker may now be withdrawn as a single unit.

When replacing, do not omit to re-wax the heads of the grub screws in the control knobs.

Removing Speaker.—First remove the chassis as described above; unsolder from the tags on the input transformer the three leads connecting it to the chassis; remove the four nuts and bolts (with washers) holding the speaker to its mounting bracket.

When replacing, the transformer should be at top left (viewed from rear), and the leads should be connected as follows, numbering the tags from left to right: 1 and 2, joined together, red; 3, white; 4, black.

GENERAL NOTES

Switches.—S1 S5 are the waveband switches ganged in a single rotary unit beneath the chassis. The unit is indicated in our under-chassis view, and shown in detail in the diagram below, where it is drawn as seen from the rear of the underside of the chassis. S1, S3, S4 and S5 close on MW, and open on LW; S2

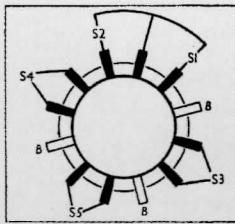


Diagram of the switch unit, as seen from the rear of the underside of the chassis.

The restoration of the chassis was coming along quite nicely now, with only the big bits to go back, and much to my amazement, both the IFT's and the tuning coil were all ok. A bit of cleaning was all that was required, and a quick rub with a wet piece of scotchkrite got the corrosion off of the aluminium screening cans, and removal of the spiders' graveyard inside with a small paint brush.

The mains dropper was more of a problem,

as the bottom section was open circuit and all the brass connection clamps were verdigris.

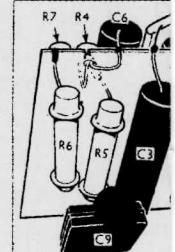
After de-soldering the eureka wire, the clamps were removed and cleaned with a rotary wire

brush and then polished with a coarse abrasive to remove the marks made by the wire brush. The dropper itself is quite large and well able to handle its working current. The open circuit was found to be the bottom-most turn, so when the brass clamps were replaced, one turn was removed to gain enough wire for re-connection. This was scraped clean with a modelling knife and resoldered. The dropper is mounted vertically on the chassis with a central threaded rod, and when re-fitted was a bit wobbly because the bottom of the granulated mica tube from which it is made had become a little

compressed for the first eighth inch or so below the bottom clamp. This was cured by fitting a length of 22mm copper tube (an off cut from the central heating), inside the dropper. It fitted almost exactly, and supported the dropper quite firmly when the central rod was tightened.

The volume control and wavechange switch came to pieces quite easily and were cleaned and re-fitted with just a touch of silicon grease. The tuning gang also required little attention, and the tuning wand lamp house was cleaned and re-sprayed mat black. The drive drums which were rust free, were re-fitted and re-

Component Asses
and six condensers double-sided insula
tional beneath the compone
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Sketch showing the component assembly mounted out of view. The method of described in

of it are indicated; side, however, are i
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This can be done
R13 and the yellow
IF transformer have
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Heater Circuit Ba
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Alternative Rectif
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UR2 or UR1, but th
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CY2 is of the voltaic
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As will be seen
connection diagrams
circuit diagram, wh
types are given, pins
and anode respective
in the chassis, pins
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Chassis Divergenc
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the component values
occur in two insta
500,000 Ω, and C14

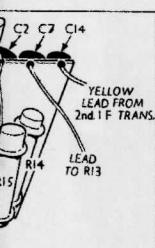
CIRCUIT A

The makers recom
meter should be co
of about 2 μF if o
tained in the meter

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ly. -Seven resistors are mounted on a g panel lying hori-chassis. The assem- under-chassis view, ts on the underside



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nel. The tags con-
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Fig. 1.—This is a wire-
mesh vertically on the
bottom of a bottom of a frame

Image Suppressor.—This was arranged to operate originally at 479 m, but owing to changed conditions the original adjustment may not now be effective.

R18. The fourth
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is 5,000 Ω .

ng Valves.—V4 is manual as Mullard
se valves have since
Y2 and CY1 respec-
t replacements. The
doubler type, with
and cathodes and

and cathodes, and
half-wave type.
From the valve base
on the right of the
diagrams of both
4 and 8 are cathode

in either type, and
4 and 1 are joined
pins 5 and 8, so
they be inserted and
without alteration

— Apart from the divergencies from quoted in our tables es : R14 may be may be 0.01 μ F.

IGNMENT
end that the output
ected between **V3**
ssis, via a condenser
is not already con-

borne in mind that the meter will be live to the mains, although the chassis could be isolated from the mains for the whole of the alignment procedure if it were connected via a double-wound mains transformer.

If image interference is experienced, therefore, it may be minimised by tuning the receiver to a frequency at which the interference is found, and adjusting **C21** for minimum interference, using the speaker as an indicator.

MODIFIED CHASSIS

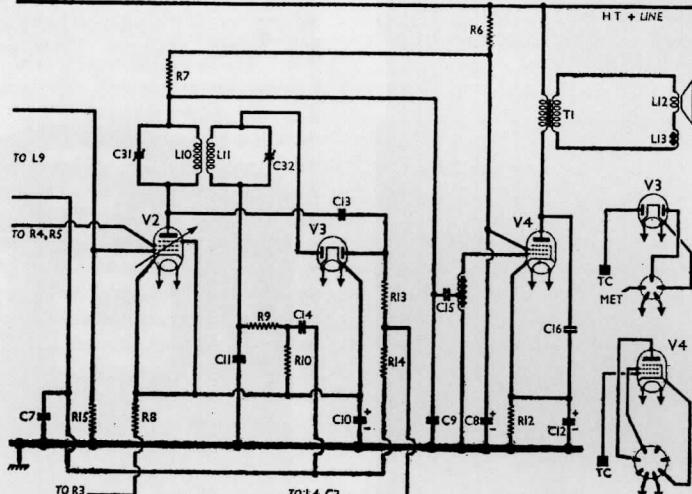
There are two distinct modified versions of the AD65 chassis. In the first case, some of the original types, otherwise like the sample on which this Service Sheet is based, use a Mullard VP13A valve as **V2**, instead of a Mazda VP1321. This means that the top cap is the control grid connection instead of anode. Fortunately the two valves have different bases, so that confusion between them is unlikely. The top cap lead then comes from the **L8**, **L9** IF unit, instead of from the **L10**, **L11** unit.

Still greater changes occur in the second case. **V3** is replaced by two separate Mullard valves : a 2D13 and a Pen26. The affected section of the circuit is redrawn and shown in the diagram below.

Reflex amplification is retained. **V2** operates as a pentode IF and AF amplifier, **R7** still acting as the AF load, but in the anode instead of the screen circuit. The AF output is passed to **V4** via a parallel-fed auto transformer with **C15**.

The remainder of the circuit behaves

very much as in the original model, although several circuit changes will be noticed. **R15**, for instance, is connected at its upper end to the opposite side of **L9**, so that AVC diode current flows through **L9**; and **V2 SG** is now connected to **V1 SG**. Component values do not alter considerably, except in the case of **R12**, which becomes 450 Ω . **V2** will usually be a VPI13A; and **V3** heater comes between those of **V4** and **V5** (the HT rectifier).



Circuit diagram, showing the affected section in the second modified version of the original model. V_2 is a VP13A, and the original V_3 is now split into two separate valves, V_3 and V_4 . A step-up auto-transformer coupling is used between V_2 anode (instead of the screen) and the output valve V_4 . The rectifier thus becomes V_5 .

strung with no problems. The rubber wires leading the speaker were perished and had to be replaced, but fortunately I had found a length of five core rubber wire which, when the outer cover was stripped off, revealed five different colours of multi-strand rubber wires of about the right type, and this came in very handy on several restorations.

The chassis was now ready for valving up and testing, and sorting through my stock of valves, I picked out a couple of sets selected on best emission and good looks. The valves installed, I then checked the heater chain and H.T. rails for shorts and all was well.

When switched on, the dial lamp lit quite brightly and then dimmed slightly as the valves warmed up, and a quick check with the AVO showed H.T. rising nicely. A slight purr from the speaker suggested that the audio stages were ok, as was soon proved with a loud buzz from the speaker when the grids of V1 and 2 were touched. Next I hung my oscilloscope on the anode of V1 and checked that the local oscillator was running; and getting out the signal generator I ran through a full RF/IF alignment following the procedure on the trader sheet, this set having an unusual IF frequency of 110 Kc/s. All went well and

when tuned through the band the set proved quite sensitive even without an aerial. This was probably due to the RF tuning coil being mounted horizontally and relatively unobstructed by metal parts. The output quality was very good, and the set has the bassy "whamp" as you pass through the stations very characteristic of these thirties sets.

Now the chassis was ready to go back in its cabinet, I had the problem of where to obtain the missing trim etc. An advert in the BVWS 'wants' page only proved that I wasn't the only one looking for these parts, and a visit to Gerry Wells' museum came up with a photo copy of the tuning scale and a sketch of the rest of the trim. This was at least a start so reproduction could get under way, and I started with the tuning scale. For this I tried several types of perspex, the white opaque type let no light through at all, and the translucent variety was better, but defocused the indicator line from the tuning wand. I finally settled on a piece of eighth clear perspex with the back sprayed with white primer, and the station names and wave-lengths printed on the front with letraset. Unfortunately, Letraset doesn't come in red or green and the photocopy I was working from was black and white so I decided to do it all in black and solve the problem later. The chrome trim on the tuning scale was made from a length of three-sixteenths by one eighth brass and run through three very carefully placed ball races screwed to the bench, with the middle one adjusted to get the diameter of the arc exactly right. The sharp edges were rounded off, and the whole piece polished ready for chromium plating. The speaker bars were also made from brass and just needed cutting to shape, polishing and plating. The knobs and back would have to wait as I had nothing to work from so at this point in time all I could do was fit a set of similar knobs (black ones from an old Sobell) and a speaker cloth as near to silver as I could get and put the set in my collection as it was and await developments.

Three years then passed with nothing more to add, then at the summer swapmeet at Harpenden bingo! Nigel Pollicott is manufacturing reproduction backs for some thirties radio's, the AD65 being one of them (and very good they are too). At the same time Clive Mason said he had a set of reproduction knobs for an AD65, but the chap he had made them for had not turned up, and if he didn't show by the end of the day they were mine. The chap didn't show and these components were fitted as soon as I got home, and all I need now is a speaker cloth and the job's finished.

Time passed and the final piece turned up at National Vintage Communications Fair at the NEC Birmingham in the Spring of 96, where some Americans from Kansas were selling reproduction speaker cloths, doing a silver one identical to the original in the AD65. Being very pleased at obtaining the final piece, I then discovered ten minutes later that Clive Mason was now reproducing tuning scales, and his were in full colour and much better than mine. My AD65 is now as good as it was when it left the factory and in full working order.

Restoring this classic vintage wireless has been great fun and been worth every minute spent on it. For anyone who enjoys nineteen thirties technology this set is an excellent example, and it even sounds good when you've finished., happy hunting.

Delightfully 'Personal'

The Marconiphone P20B & P17B by John Ounsted

Photography by John Ounsted and Mark Groep. W.E.T. Sheets kindly lent by Malcolm J. Bulcock



Petite and portable: The Marconi P20B
note wrong handle on this example

'Delightfully personal, absolutely self-contained, light as a camera, convenient as a handbag...' Thus spake the Marconiphone Company, making their pitch in the newly-identified post-war 'feminine' radio market, back in 1948. The object of all this fulsome hyperbole was their new model P20B, a tiny 'casket'-style battery portable. The effusive brochure proclaims that the set is 'ready to give you news and entertainment on several programmes wherever you go' and extols the radio's 'handsome snakeskin finish' and 'leather carrying handle'.

A picture shows the little set perched lid-up on the dressing-table of a chic lady, surrounded by lipstick, hairbrush and perfume bottle, and clearly denoted as an elegant and indispensable accoutrement of the modern New-Look woman, who is herself also shown, in an approving pose, with one hand lightly resting on the tuning dial. Another picture has a more haunting *film-noir* feel to it: our heroine, decked out this time in bracelets and spangles, holds the little casket (now closed) up to her mirror, which duplicates both it and her. A strange image - low key and eerie - but somehow tranquil, like a religious icon. But what could be in that little box? A bundle of love letters tied with a pink ribbon?... a miniature pearl-handled revolver? It's a bit disappointing to find that it merely contains a radio, but we also see shots of the lady (now attired in more sensible clothes) in her streamline kitchen, and even out in the spacious garden, her P20B apparently her constant companion.

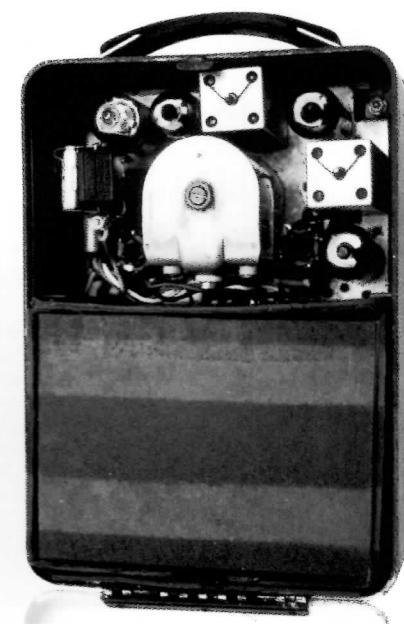
If the P20B was intended as a woman's radio then the P17B, which preceded it, was clearly styled for men. With its jazzy modernistic black-and-latticed-chrome looks, it seemed to suggest one of those roll-your-own-cigarette-making contraptions, and was wider (but shallower) than the P20B, despite not offering the LW band. Today, it seems easily the best looking of the two - sleek, dark and raffish - in contrast to the P20B's twee brown and ivory picnic-box appearance. Seldom can two sets, so similar in internal

circuitry, have been so different in external appearance. Both were aimed at the 'better class customer' and were minor triumphs of post-war miniaturisation, using the new button-base 50mA battery valves, as well as illiputian speakers and output transformers. In this article, we lift the lids on both sets and see what's inside.

A first look Around

Your first impression, on examining the outer cases of both models, is of how modern they seem. Regrettably, that's not really intended as a compliment. The '20 scores over its rival by at least employing a die-cast metal case -

seems to be the leather carrying-handles which soon unstitched themselves, just like all those 'Genuine Cowhide - Empire Made' carrying cases on sixties transistor radios. Additionally, the P20B's lid springs are far too strong, so that if the lid is allowed to pop up without control, it puts a great strain on the four meagre rivets that fix it to the two hinges. This can cause visible cracks in the plastic. The base has far worse problems, with stress concentrations that can lead to disintegration in extreme cases. The paint on the exposed metal portions is also prone to chipping and flaking, as on the painted bakelite cabinets of the larger Marconi 'Companion' mains

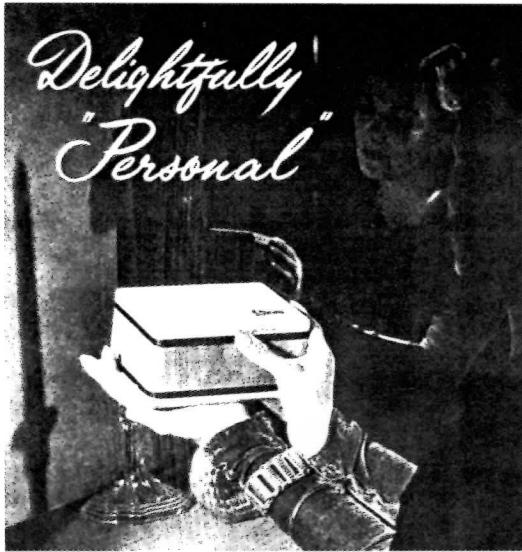


Inside the P20B; note the home-made battery

this is the part that is decorated with the endearingly-tacky imitation snakeskin. But the ivory-coloured spring-loaded lid and hinged base are both fragile plastic. The P17B goes even further; the only substantial external metalwork is the chrome-embellished grille and trim atop the receiver. All the rest of the case is plastic. Unsurprisingly then, these little Marconis have not weathered the last half-century too well, and are rarely seen in good condition today. In some ways they ironically anticipated the small throwaway receivers of twenty years later. A particular casualty of time

transportables. On both the '17 and the '20 the frame aerial cover is held in place by circular push-in spring-steel clips, of the same type used to secure cardboard back covers on some of the 'Companion's. Needless to say, these clips will often be found missing, and it's difficult to get exact replacements.

Moving away from these gloomy practical considerations, let's check out the aesthetics of each model. The P17B is a single-band set with only two controls. These are attractively presented as twin edgewise knobs sunk in recesses which are part of the latticed design



*Sleek, dark and raffish:
The P17B*

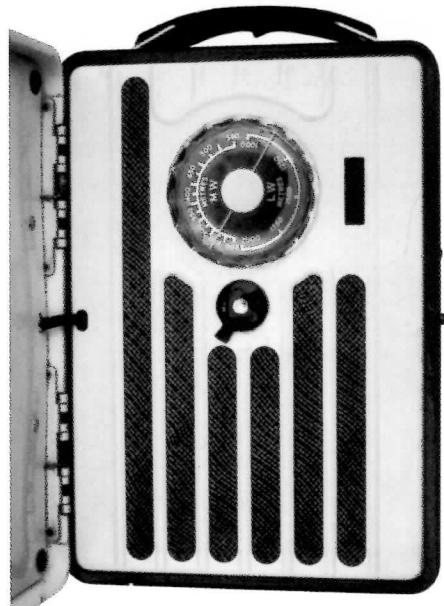


mentioned earlier. The styling lends this receiver its own ecclesiastical undertones: turn the set through a right-angle and the grille suggests a sort of chrome-plated version of Victorian Gothic tracery that you might see on a cathedral window, or on a building by Pugin, perhaps. One can almost hear John Betjeman waxing lyrical about it. The P20B, by contrast, is nothing like that at all. Since it's a two-band set, three controls have to be accommodated, and each has a different appearance. Tuning is accomplished by a small translucent aeroplane dial (or 'Full vision tuning scale' as the brochure has it), whilst the band is selected by a tiny rotary bakelite knob. An edgewise

the alignment adjustments. Complete dismantling is necessary to re-align the set, since two of the IF transformer adjustments (and, for that matter, most of the smaller components) are hidden on the blind side of the chassis. Brilliant. The frame aerial has to stay with the chassis during any RF tweaking, since it forms part of the front-end tuned circuit. Don't be tempted to temporarily lengthen the leads to it to make things a bit less unwieldy, since the RF tracking at the HF end of MW will be knocked for six. For the same reason, ensure that the twin white aerial leads are placed in the cleat provided, so that they don't slop about or get too close to the battery, before

neat moulded cover plate, made of the same material as the frame aerial cover, and secured by a single screw. When this is in turn removed, the bulk of the chassis and components are made accessible, with only a few awkward exceptions. Unfortunately the exceptions include - yes, you guessed - two of the IF transformer adjustments, which are positioned so close to other items that it's just about impossible to get a straight tweaker to them. On the other hand, the bulk of the resistors, including many of the troublesome ones, are handily mounted on a small tagboard right on top of the chassis. Similarly, most of the naughtier capacitors can be changed without removing (or melting) other components.

Both models use a four-valve circuit of the type that was to become standard in the later 1950's battery portables. There are one or two surprises, however. For a start, the IF is 365 kHz on the '20, but the IF transformers are the same type as used on the '17, where they are more conventionally tuned to 465 kHz. On LW, the '20 uses its MW loop aerial with a loading coil (L2) in series (groan) and the manufacturers have curiously seen fit to add a capacitor (C2), presumably to neutralise LO re-radiation from the loop. On to the AF stages. Here we find that negative feedback is applied, via R10, fitted on the '20 only. The '17 has a gridstopper fitted to its DAF 91 (or ZD 17 in Marconi-speak) which performs IF filtering, but this is strangely not fitted on the P20B.



volume control is again featured, but this time it protrudes above the surface of the metal control-panel. The speaker cloth is visible through six slots shaped like ice-lolly sticks and cut into this panel, which is otherwise virtually unadorned. No tracery here, just simple clean lines.

Inside the receivers

On the little P20B, simply opening the hinged base gives a measure of access to the battery, valves and some (though irritatingly, not all) of

attempting RF tweaking.

Also prominent on the chassis is the little 3 inch speaker, by all accounts a 10 ohm unit, which must have been quite a curiosity in its own right in 1948. On to it is bolted an equally diminutive output transformer, which is about the size of the driver transformer on an early transistor radio.

Having already discussed the external dissimilarities of the two radios, it comes as no surprise to find that they are also very different on the inside. The P17B's plastic case is at least easily removed. This action reveals a

Personal Problems - Mending the Marcons

When considering restoration, we've already mentioned that the cabinets may well need serious attention before any electrical renovation is contemplated. On the P20B it's possible to reinforce shattered portions of the plastic lid or base with internal metal sheets which can be secured to broken portions with countersunk screws. The visible surface can then be made good with car filler or similar and rubbed down before spraying with an appropriate paint. Broken aerial cover plates can be replaced by paxolin sheet, cut to size and sprayed. The black 'top hat' insulators used in power transistor mounting kits can make an acceptable substitute for missing securing clips for this plate. If the leather handle is still holding on, it can be restitched - if it's missing, it's time to visit your local tanner!

Hopefully, the tuning knob will still be present and correct on any P20B you might

MARCONIPHONE P20B

All-Dry "Personal" Portable



THE Marconiphone P20B is a "Personal" receiver in a casket-shaped die-cast case with a spring-loaded lid and a hinged base. Miniature components are used throughout, and the battery is a combined H.T. and L.T. unit. The complete receiver weighs 4lb.

Release date and original price: December 1948; £11 19s. 6d. complete, plus purchase tax.

CIRCUIT DESCRIPTION

Tuned frame aerial input by **L1**, **C23** (M.W.), with the addition of loading coil **L2** on L.W., precedes a heptode valve (**V1**, Marconi X17) operating as frequency changer with electron coupling.

Oscillator grid coils **L3** (M.W.) and **L4** (L.W.) are tuned by **C24**, with parallel trimming by **C6**, **C25** (M.W.) and **C7**, **C26** (L.W.). Tracking is by series capacitor **C8** on both bands.

Capacitative reaction coupling is employed on both bands, due to the common impedance of **C8** in grid and anode circuits, with additional inductive coupling on M.W. by **L5**.

Second valve (**V2**, Marconi W17) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-transformer couplings **C3**, **L6**, **L7**, **C4** and **C11**, **L8**, **L9**, **C12** in which the timing capacitors are fixed and alignment is effected by adjusting the positions of the iron-dust cores.

Intermediate frequency 365 kc/s.

Diode second detector is part of single diode pentode valve (**V3**, Marconi ZD17). Audio frequency component in rectified output is developed across manual volume control **R5**, which is the diode load resistor, and passed via A.F. coupling capacitor **C14** and C.G. resistor **R6** to grid of pentode section, which operates as A.F.

amplifier. I.F. filtering by **C13** and **C16** in diode and pentode anode circuits respectively.

The D.C. potential developed across **R5** is tapped off and fed back, through a decoupling circuit, as G.B. to F.C. and I.F. valves, giving automatic gain control.

Resistance-capacitance coupling by **R8**, **C17**, **R9** between **V3** pentode and pentode output valve (**V4**, Marconi N17), the twin filament sections of which are wired in parallel. Fixed tone correction by **C18** in anode circuit, and negative voltage feedback by **R10**.

The G.B. potential for **V4** is obtained from the drop across **R11** in the H.T. negative lead to chassis.

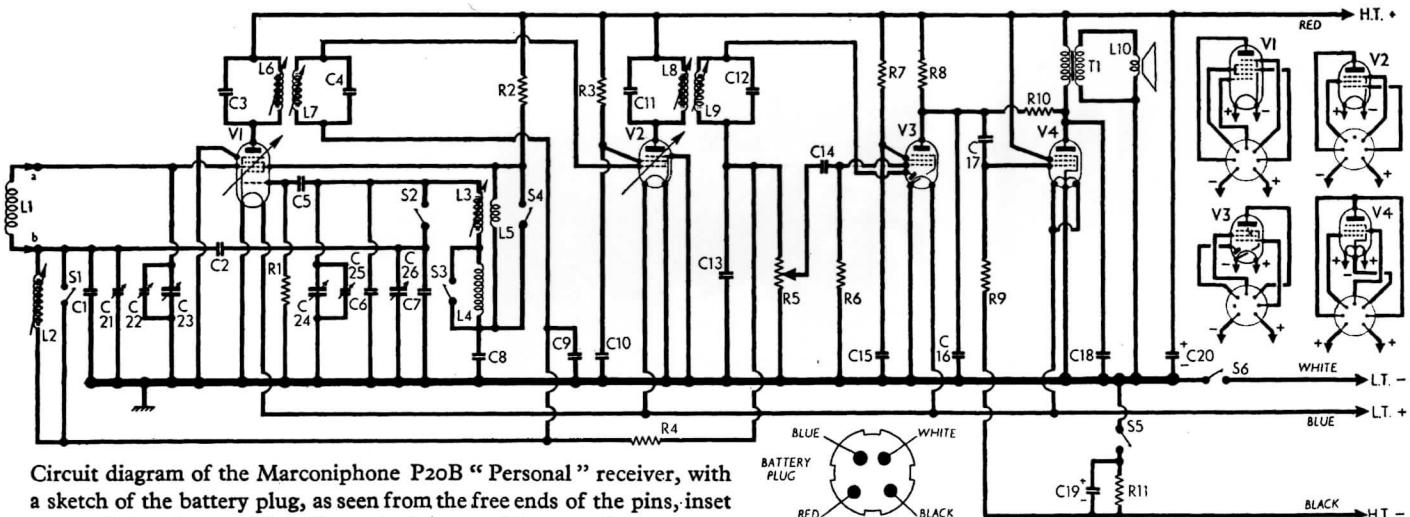
COMPONENTS AND VALUES

CAPACITORS		Values (μ F)	Loca-tions
C1	L.W. aerial trim ...	0.00003	A1
C2	L.W. neutralizing ...	0.00001	A2
C3	{ 1st I.F. transformer {	0.0001	C1
C4	tuning ...	0.0001	C1
C5	V1 osc. C.G. ...	0.0001	C2
C6	Osc. M.W. trim ...	0.00001	B2
C7	Osc. L.W. trim ...	0.00015	A1
C8	Osc. tracker ...	0.0005	D8
C9	A.G.C. decoupling ...	0.1	G8
C10	V2 S.G. decoup. ...	0.1	E6
C11	{ 2nd I.F. trans - {	0.0001	B1
C12	former tuning ...	0.0001	B1
C13	I.F. by-pass ...	0.0001	E6
C14	A.F. coupling ...	0.005	G5
C15	V3 S.G. decoup. ...	0.1	F7
C16	I.F. by-pass ...	0.0001	F6
C17	A.F. coupling ...	0.01	F6
C18	Tone corrector ...	0.005	A4
C19*	G.B. by-pass ...	20.0	B4
C20*	H.T. reservoir ...	2.0	A2
C21†	Aerial L.W. trim ...	—	A1
C22†	Aerial M.W. trim ...	—	B2
C23†	Aerial tuning ...	0.000037	B2
C24†	Oscillator tuning ...	0.000037	B2
C25†	Osc. M.W. trim ...	—	B2
C26†	Osc. L.W. trim ...	—	A1

* Electrolytic. † Variable. ‡ Pre-set.

RESISTORS		Values (ohms)	Loca-tions
R1	V1 osc. C.G.	100,000	D7
R2	Osc. anode load	22,000	D6
R3	V2 S.G. feed	22,000	E5
R4	A.G.C. decoupling	2,200,000	E6
R5	Volume control	1,000,000	G7
R6	V3 pent. C.G.	6,800,000	F5
R7	V3 S.G. feed	2,200,000	E5
R8	V3 pent. load	470,000	E5
R9	V4 C.G. resistor	1,000,000	G8
R10	F.B. coupling	2,200,000	F5
R11	V4 G.B. resistor	1,000	B4

OTHER COMPONENTS		Approx. Values (ohms)	Loca-tions
L1	Frame aerial ...	1.5	—
L2	L.W. loading coil ...	16.0	A2
L3	{ Oscillator tuning {	2.75	C2
L4	coils ...	4.5	C2
L5	Osc. reaction coil ...	1.0	C2
L6	{ 1st I.F. { Pri. ...	11.0	C1
L7	trans. { Sec. ...	11.0	C1
L8	{ 2nd I.F. { Pri. ...	11.0	B1
L9	trans. { Sec. ...	11.0	B1
L10	Speech coil ...	10.0	B3
T1	Speaker { Pri. ...	730.0	B4
S1-S4	W/band switches ...	1.0	B4
S5	H.T. circuit switch ...	—	F8
S6	L.T. circuit switch ...	—	B4



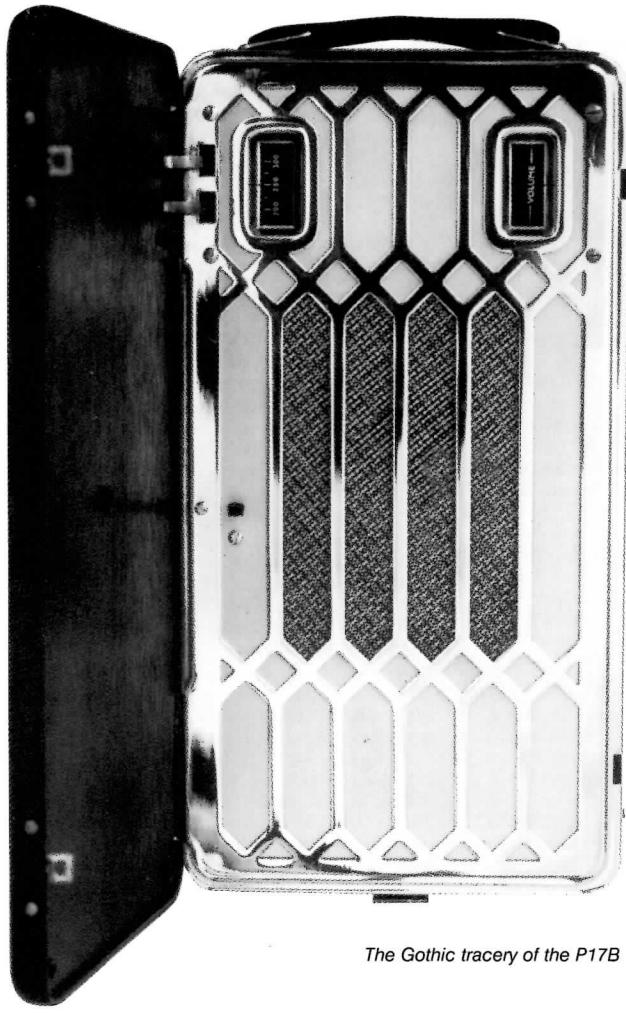
Circuit diagram of the Marconiphone P20B "Personal" receiver, with a sketch of the battery plug, as seen from the free ends of the pins, inset below it. **a** and **b** indicate the frame aerial connections.

buy. To dismantle the receiver, it's unfortunately necessary to remove it, and, like much of the rest of the set, its collar is fragile and easily broken. If this happens, don't feel too guilty about it. Instead, console yourself with the knowledge that plastic push-on knobs were always fracturing on later, fifties sets. Also, you'll probably find that the knob still fits and functions perfectly well with large parts of its collar missing, the damaged portion being

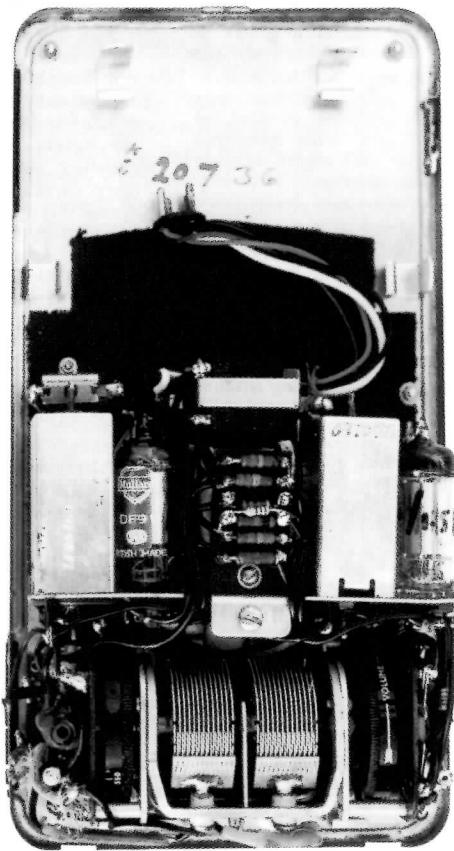
thankfully invisible. No-one need ever know! If you do manage to remove it in one piece, it's best to file the internal flat to produce a much looser fit prior to eventual reassembly.

Moving on to the electronics, one finds that the incredibly high impedances of these battery valve circuits put big demands on the leakage insulation of the original capacitors, particularly in the AF stages. The already high-value resistors are also prone to go even

higher over the years. Best then to test all these troublesome components, replacing if in doubt, before plugging in those precious, delicate and hard-to-find valves, which will need to be in good emissive order, especially in the output stage, if either set is to even give acceptable results. Don't overlook R7 and C15 in the first AF stage, check R11 has not crept up in value from 1k, and, whatever you do, make sure there are no shorts from other



The Gothic tracery of the P17B



components to the LT+ line before applying power. It's highly unlikely you'll have the correct battery for the Marconis, but it's possible to make your own by soldering six PP3's in series for the HT, and two HP11's in parallel for LT. This arrangement makes the fullest use of the available battery space, with the somewhat reduced HT voltage - 54V rather than the nominal 69V- making virtually no discernible difference to performance. Like most battery portables, these models will still function on a very much lower HT voltage than this, but their already puny sound output will be further reduced. Indeed, it may well be found that the sound is noticeably distorted even with seemingly good valves, new components and correct HT and LT voltages. If the distortion is worse on faint stations, with local transmissions coming through unscathed, try shunting the detector diode in the DAF 91 with a wire-ended OA 81, or similar (à la Kolster Brandes BM 20, see last edition but one). If the sound improves, then the valve should (ideally) be replaced, if you can find a good one. If not, it will be necessary to wire the OA 81 permanently into circuit. Should the sound not improve, or if it's poor on all stations anyway, we must look later in the circuit, with the output stage being the prime suspect. To check this, the audio can be tapped off from the grid of the DL 92, and fed to an external amp and speaker, where it may still sound refreshingly pure as the driven snow. If so, this points the finger at one of the three main sound output components,viz the output valve, output transformer, or the loudspeaker. We've assumed that the first of these has been checked for good emission; the second is unlikely to give trouble, and is actually not bad at the bass end, despite its size. This leaves the speaker, which may well

be the culprit... well, one of them, anyway. First, check that the braided voice-coil link-wires are not touching the chassis of the unit, gently bending them clear if necessary. Next check the unit for rubbing by very lightly pushing in the cone, using an even pressure. Any clicking or scratching noises should be cause for concern.

Unfortunately, even if the speaker seems in reasonable shape, its size alone mitigates against its likely efficiency; a key trick, which the setmakers soon learned when designing with battery valves (and early transistors, for that matter) was to fit as large a loudspeaker as practicable, to make the most of the flea-powered output stages. For obvious reasons a big speaker was impossible in these two Marconis (and in other rival 'personal' receivers) and the resulting shrill sound quality likely accounts for the general decline in this class of portable in favour of the larger 'attaché' or 'upright' sets, capable of better tone.

More bad news: the Marconi engineers seem to have designed this output stage to run virtually in class B, with certain specimens of DL 92 at least. Any appreciable negative-going grid excursions will then push the valve into cutoff. This was deliberately done, one supposes, in the interests of battery economy. The deadly combination of tiny, shrill loudspeakers and probable electronic distortion in the AF stages is hardly music to the ears, and can render the standard receivers strictly speech-only sets. All of which brings us on to some modifications that may improve the situation.

Modifications

The P17B has no audio negative feedback, but it's the work of a moment to add it, by

incorporating a 2.2M resistor between the anodes of the two AF valves, as on the P20B. The value can be varied to taste, and may help to tame the distortion. On both sets, it's also possible to slightly reduce the overly large standing negative bias on the output valve by adding extra resistors in parallel with R11, but don't get too carried away with this. Remember that any marked increase in standing anode current will also flow through the filament. The author arrived at a compromise total value of 720 ohms by trial and error, feeding a sinusoid to the valve's grid and placing a 'scope across the speaker. If the value is made too low, the top of the amplified waveform is compressed - if too high, the original distortion persists, with the bottom of the sinusoid being distorted. The standing quiescent current through the output stage can be conveniently measured by observing the difference in voltage across R11 with the output valve in its holder and then out, and was calculated at 3.3 mA after the above mod. This is well within the valve's ratings.

These experiments also revealed that even after this modification, the valve was being driven into grid current under overdrive conditions, and hence self-biasing back into non-linearity. This behaviour contrasts with that of standard mains pentodes, which overload first in the anode circuit. It also suggests that if you require more volume, you'd be well advised to re-wire the output stage to take a DL 94, which requires a lesser grid swing for a given power output, and was fitted to later 90V HT portables. With a proper choice of bias voltage and output transformer, this valve would probably out-perform the DL 92 and hence improve the output power.

Thanks to its rudimentary aerial arrangements, the '20's LW performance is laughable,

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted by the manufacturers, who give the total H.T. current as 8 mA. Their receiver was operating with the volume control at maximum, and voltages were measured with a 1,000 ohms per volt meter, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 X17	62	0.08	26	1.4
V2 W17	62	1.35	44	0.5
V3 ZD17	13	0.1	6	†
V4 N17	59	3.6	62	†

† Measurement impracticable, owing to compactness of chassis.

GENERAL NOTES

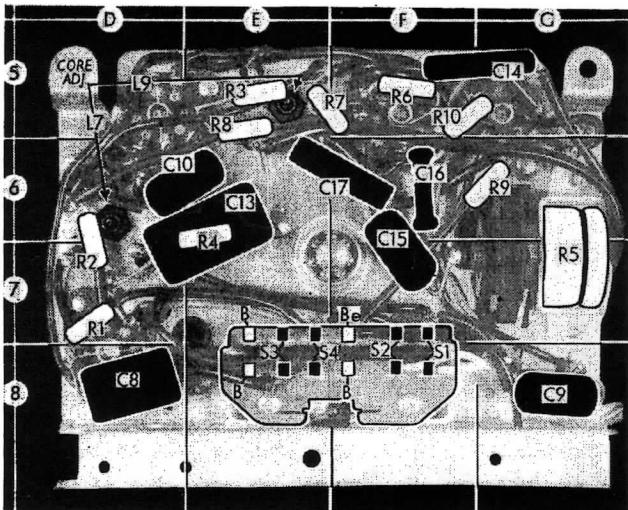
Switches.—S1-S4 are the waveband switches, ganged in a slide-operated switch mounted on the upper side of the chassis. S1 and S3 close on M.W., and S2 and S4 close on L.W.

S5, S6 are the battery circuit switches, ganged in a spring-loaded plunger-operated unit mounted at one end of the chassis near the speaker. The plunger is depressed when the lid is closed, opening the switches. They close automatically when the lid is opened.

Coils.—The frame winding is concealed in the lid. It is mounted on the rear face of the panel which lines the inside of the lid, and can be reached upon removal of four press-studs. Its lead terminations are indicated in our underside view of the chassis by the letters a and b.

The oscillator coils and L.W. aerial coils are in two unscreened units on the underside of the chassis. Each has an adjustable iron-dust core.

Batteries and Leads.—The combined all-dry H.T. and L.T. battery is a Marconi-phone or an Ever Ready "Batrymax" type B114, with a 4-pin outlet socket. A diagram of the associated plug, drawn as seen from the free ends of the pins, is inset in the circuit diagram overleaf. The L.T. section is rated at 1.5 V, and the H.T. section at 69 V.



with poor sensitivity and unlikely image frequencies everywhere. Ironically, the '17 scores by not even pretending to work on this band! Again, as on the Kolster Brandes, a ferrite rod could be used to advantage, discarding the now-redundant series loading coil, but space would have to be found for it. A flat rod might be the solution, squeezed into the aerial compartment. Happily, the MW response is much better, with both receivers turning in a respectable crop of stations as the tuning is swung from end to end. As already

DISMANTLING THE SET

To gain access to the battery, place the receiver on a piece of cloth, face downward with the lid closed, and press the stud located above the carrying handle, when the back cover may be opened on its hinge.

Removing Assembly.—Open the lid and very carefully ease off the tuning knob (push fit); close the lid and place receiver face downward again; with the back of the carrying case open, remove the 6BA nut located at each corner of the assembly, and lift off the body and back cover; unsolder the two cream plastic covered frame aerial connecting leads, at points indicated in our underside view of the chassis, by the letters a, b (location reference B2), and remove the 6BA securing nut and cleat of these leads at the centre of the chassis; remove the 6BA nut located at each corner of the chassis, and lift the chassis off the front panel. When replacing, note that the four thin 6BA nuts must be used to secure the chassis assembly to the front panel.

CIRCUIT ALIGNMENT

For I.F. alignment purposes it is necessary to remove the chassis from the carrying case and front panel, but the frame aerial leads must not be disconnected. A suitable tool for adjustment of the iron-dust cores (E.M.I. Stock No. Q/D5025) is available from the Service Develop-

ment Division, 100, Blythe Road, Hayes, Middlesex.

I.F. Stages.—Connect signal generator, via an 0.1 μ F capacitor in the "live" lead, to control grid (pin 6) of V2 and chassis. Turn gang to minimum capacitance and volume control to maximum. Switch set to M.W., feed in a 365 kc/s (821.8 m) signal, and adjust the cores of L9 and L8 (location references E5, B1), in that order, for maximum output.

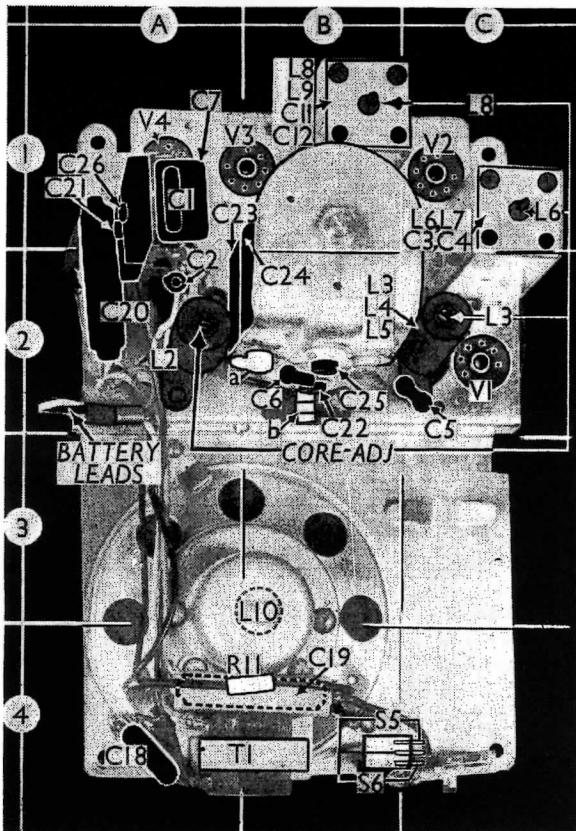
Transfer "live" signal generator lead to control grid (pin 6) of V1 and adjust the cores of L7 and L6 (D6, C1), in that order, for maximum output.

R.F. and Oscillator Stages.—Couple the signal generator output via a loop of wire set up on the bench at a minimum distance of two feet from the frame aerial.

M.W.—Tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust C25 (B2) for maximum output. Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal, and adjust the core of L3 (C2) for maximum output. Repeat the 200 m adjustment, and then feed in a 230 m (1,300 kc/s) signal, and adjust C22 (B2) for maximum output.

L.W.—Switch set to L.W., tune to 1,500 m on scale, feed in a 1,500 m (200 kc/s) signal, and adjust C26 (A1) for maximum output. Feed in a 1,000 m (300 kc/s) signal, tune it in, and adjust C21 (A1) for maximum output. Feed in a 1,500 m signal, tune it in, and adjust the core of L2 (A2) for maximum output. Finally, repeat the 1,000 m adjustment.

Upper view (below) and underside view (right) of the chassis. The frame aerial connections a and b are indicated in the underside view, just below the gang unit C23, C24.



discussed, the sound quality can be enhanced by careful modifications to the circuit, after which the sound is acceptable at moderate volume levels. Surprisingly, the '20's tone is better than the larger '17's, which can sound distinctly Japanese on occasion.

Summing up then, both sets could at least provide basic MW reception around the house, and offered the then novelty - which we now take completely for granted - of outdoor listening on the move. You paid heavily for this though, in more ways than

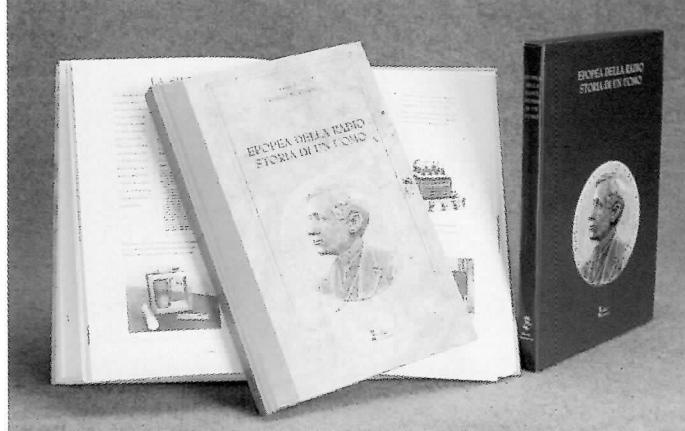
one; the build standard and sound quality were definite Achilles heels, and running costs would have been high, too, what with 250 mA of filament consumption to provide for. But then perhaps our heroine - the New Look woman - was prepared to overlook these and other shortcomings as she brushed her hair, applied her makeup and then cooked the dinner, in her chi-chi villa, in those far off days half a century ago.

This is one of the ten replicas of the 1899 'Grasshopper' Morse key produced by Gordon Bussey for GEC-Marconi in 1996 to commemorate their Marconi Centenary. The same materials were used as in the 1899 original, that is brass, ebonite and mahogany. What Gordon found particularly difficult to reproduce was the colour of the original lacquer. He observed that the 1899 lacquer used by the Marconi Company was not the same as that used by them after c. 1900. Gordon telephoned to tell me that he achieved the 1899 finish early in 1996, but that he did not manage to get a good match of the 1900 lacquer until 21 December 1996. It certainly made his Christmas!

This key was called the 'Grasshopper' because of its shape. It also acted as a 'send/receive' switch. The terminal at the rear of the ebonite rod was connected to the aerial by a flexible wire, and the screened terminal beneath it was connected to the receiver by a lead-covered wire. A spring kept the terminals' contacts together until the operator pulled the handle for transmitting, thereby disconnecting aerial and receiver.

The International Marconi Award was held on 4 July 1996 at the Victoria & Albert Museum. Guy Peskett and your Chairman were fortunate enough to be present as the guests of Gordon. After a splendid dinner and the awards ceremony, HRH Princess Alexandra who presented the awards, received one of the 'Grasshopper' keys. The delegates to this gala event did not go empty handed either. We were given a 'Marconi Centenary' radio controlled clock, which now ensures that I get to work on time.

Willem Hackmann



Epoepa della radio, storia di un uomo
(Epic history of Radio, Story of one man)

Mosé Edizioni Publishers have been involved in the heritage of vintage wireless for quite a while now and are the publishers of the excellent Antique Radio Magazine (which is unfortunately in Italian for us linguistically challenged Britons)

This book (which is also in Italian) on Marconi has been compiled by Professor Franco Soresini after much time spent on documental research and reconstruction. It contains over 300 photographs, many, of which have not seen publication before.

Mosé Edizioni, Via Bosco n. 4, 31010 Maser (TV) Italy.
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Above: an aerial view of the Wembley NVCF meeting of Sunday, December the first, organised by Jonathan Hill; this was the first to be held in Wembley. Similar in feel to Birmingham NEC, it attracted the usual huge amount of buyers and sellers, but the venue lacked suitable parking facilities.

Uncle Caractacus by Pat Leggatt

Readers may have seen the Times obituary of C.A.Lewis who died on January 27th.

Lewis has a particular link with us in the BVWS, for he was one of the very first managerial staff in the newly-formed British Broadcasting Company in Autumn 1922. Reith was General Manager, P.F.Anderson was Company Secretary, Stanton Jefferies was Director of the London Station, and Arthur Burrows was Director of Programmes with Cecil Lewis his deputy, Organiser of Programmes. Peter Eckersley joined as Chief Engineer a few weeks later. When children's programmes were hosted by various 'Uncles', Lewis became Uncle Caractacus.

He had a splendidly varied career, starting by lying about his then age of 17 to join the Royal Flying Corps in 1915, where he won the MC for 'continuous bravery'. He left the BBC in 1926, disenchanted with the inevitably increasing bureaucracy, and took up writing books and plays

and some ventures into film production. In Hollywood he wrote the screenplay for the Leslie Howard/Wendy Hiller film Pygmalion for which he was awarded an Oscar. In World War II he joined the RAF as a flying instructor.

After the War, Lewis turned to religion and earned a living for some years in journalism. Finally he settled in Corfu, where he died aged 98.

In his book *Broadcasting from Within*, he gives a very graphic account of the hectic early days of the BBC - literally the first days, not just weeks or months. He pays generous tribute to one he calls 'The Tame Wizard' who was too modest to allow his name to be mentioned. Lewis describes him as one of the great brains in the country, saying "I doubt if there is any one living who knows more about the technical side of wireless". From his work in producing a new and much improved microphone and "leaving wherever he goes unmistakable traces of vaseline, cotton wool, felt and rubber sponge" the Wizard can readily be identified as Captain Henry Round of the Marconi Company. It's nice to find one of our own BVWS heroes so well appreciated.



Fig. 5 The B.B.C. engineer Jack Cooper at 5IT (Birmingham) in 1923. Unfranked real studio photo postcard by Elliott & Kane of Harborne.

Confessions of a cartologist part V

Listening in

by Willem Hackmann



Fig. 2 Real photograph with postcard back, unfranked, probably about 1923/4.

Listen-in on your Radio,
We just want to say 'How-do';
Listen-in on your Radio,
We've a programme here for you.
Songs old and new,
Dance-music too,
Sung by request;
Listen-in on your Radio,
Listen North, South, East and West.'

This special theme song for the 1933 Radiolympia by Stanley Damerell (words) and Tolchard Evans (music) neatly summed up popular reaction to the wireless. The B.B.C. was just eleven years old. During this first decade of public broadcasting listening figures had grown dramatically so that by the early thirties 'listening to the wireless' had become a routine part of daily life. In the early twenties 'listening in' was quite a technical adventure only open to the tinkerer and the well to do - the former making their own sets, either at home or in one of the many amateur wireless constructor clubs that sprang up all over the country, while the latter could afford to purchase a ready-made set whose number of valves depended on the size of their wallets.

What both had in common was that they fancied being photographed with their sets. Many of these have survived as photographs with postcard backs. This enabled the photograph to be sent to the sitter's nearest and dearest so that they could share in the pleasure of the sitter's ownership of such a fine instrument. For the radio historian these real photograph postcards are a good source for the appearance of early sets, especially the home-made ones. Figures 1 and 2 are typical examples of this genre. The 'guts' of the wireless of the pipe-smoking gent listening contently in his garden (Fig. 1) could be an ex-military set or a Tingey tuner with home-made improvements. The tuning coil delicately balanced on the table is a particularly noteworthy feature. In the next illustration our listener is caught in the act of tuning his 'four valver'. As is usually the case with this type of card, neither has been posted. I will return to the subject of real postcard photographs of actual sets in another Part of this series.

Public reaction to the new-fangled wireless can be gauged from the many comic postcards on this subject that began to appear shortly after the founding of the

B.B.C. If the period between 1900 and 1918 is considered to be the 'Golden Age' of postcards by collectors, that for wireless comic postcards is the twenties up to the mid-thirties. Postcards on this theme continued to be published well into the fifties, after which it tapers off and the television theme takes over, but these later wireless postcards do not have the spontaneity produced by the novelty of the medium when broadcasting was new. Everyone could 'listen in' from the spinster (Fig. 3) who mistakes the howling of her 'three-valver' for her cat who wants to be let in, to the drunk (Fig. 4) who after a hard night is eyeing his battery wireless set in philosophical mood and muses 'Funny the wife won't listen to me, but she'll listen to that thing for ever—and it's juice that makes it talk jus' the same!'. Both jokes are popular with comic postcard cartoonists. The delicately drawn spinster in her dressing gown and cap is by Frederick George Lewin, a popular postcard artist, although this is the only card by him I know on the theme of wireless. It is not unusual to find the same card with different captions. I know two versions of this one: the one shown here (which I have come across several times now



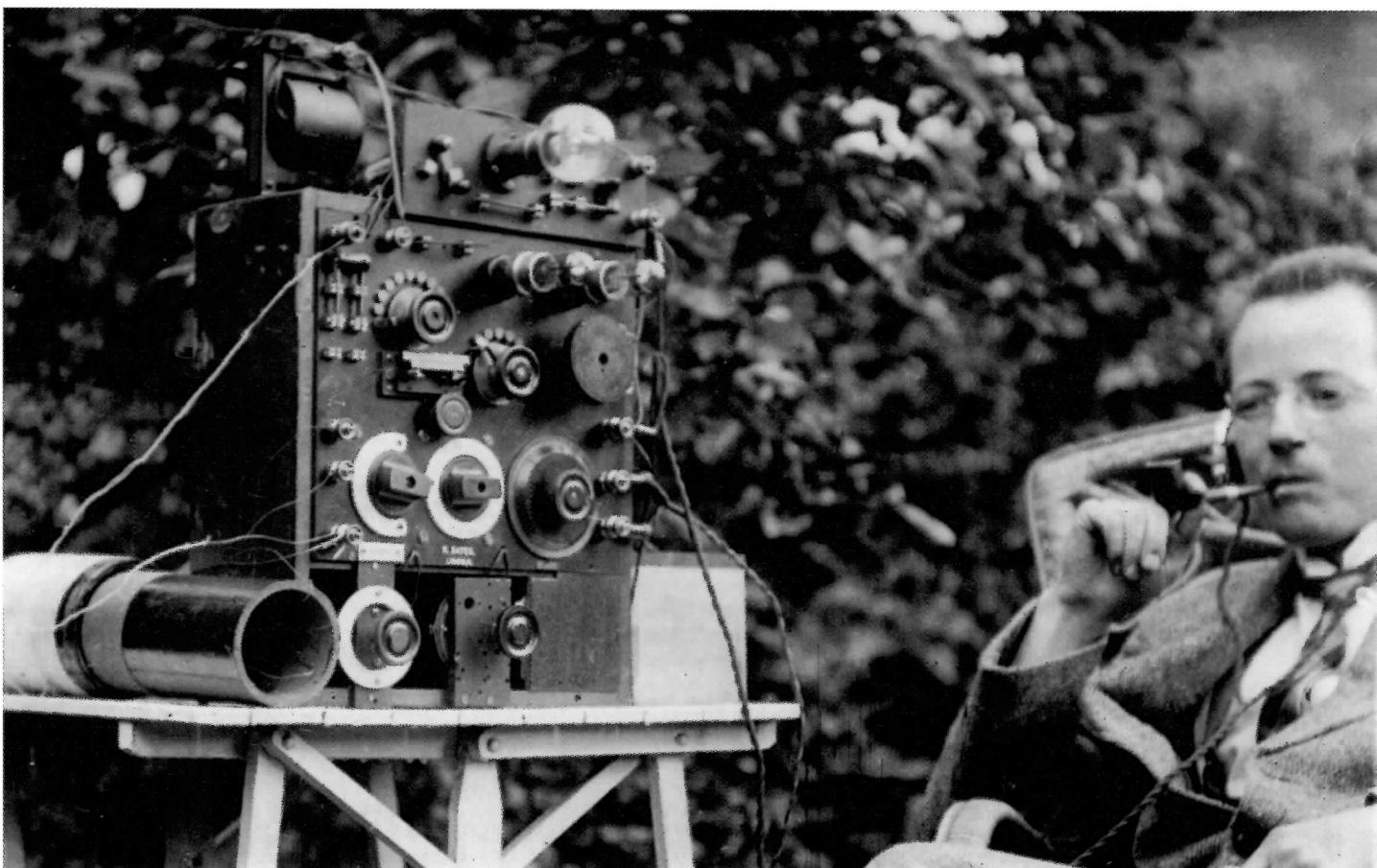
FUNNY THE WIFE WON'T LISTEN TO ME, BUT SHE'LL LISTEN TO THAT THING FOR EVER--AND IT'S JUICE THAT MAKES IT TALK JUS' THE SAME!



Fig. 3 (top) Comic postcard retailed by J.E. Beale Ltd of Bournemouth, but published by J. Salmon of Sevenoaks under their 'Salmon Series' trademark, no. 2985. Posted in Swanage, 14 February 1928.

Fig. 4 (second from top) Bamforth postcard from their 'Comic' Series, no. 2411. Posted in Coventry, 4 August 1927.

Fig. 1. (below) Real photograph with postcard back, unfranked, probably about 1922/3.



at postcard fairs), and another with the caption: 'Wireless Nights', which I have only seen as an illustration in Jonathan Hill's delightful *The Cat's Whisker. 25 Years of Wireless Design* (1978, p. 51). The Bamforth 'Comic' series is a very long one indeed, spanning many years, and includes quite a number of wireless cards, many drawn by Douglas Tempest. I am planning to return to these in a later Part of this series. From the mid-twenties onwards many postcards were published of wireless celebrities which included not only the stars but also announcers and even engineers (Fig. 5), such as this card of Jack Cooper at the controls of the B.B.C.'s Birmingham (5IT) station in 1923. The card has printed underneath the picture 'Elliott & Kane The Studio Harborne', and is signed by Cooper with the station's call sign. So it was probably a publicity postcard sent to listeners. The plain postcard back gives no indication of publisher or printer. One only comes across this card very infrequently, so it was a pleasure to see it illustrated in Jonathan Hill's latest edition of *Radio! Radio!* (p.223), albeit the borders have been cropped so not the entire card is shown. You may remember that in the previous Part in this series which is on the B.B.C. in postcards, there is another fine example, in that case of Captain Eckersley (see Fig. 27, pp. 10-11), the Chief Engineer.

My main intention here is to list and sort out the seven main comic wireless postcard series published in the twenties, based on the serial numbers printed on their backs and postal dates (if franked). This is the first attempt to establish both the number of

cards and the sequences of these series based primarily (but not exclusively) on my own collection. This information is summarized in the Appendix. What is interesting is that good reference works such as Anthony Byatt's *Picture Postcards and their Publishers* (1978) have very little indeed on wireless postcards. For instance, none of the series dealt with here are mentioned at all. I hope that BWWS readers who have some of these cards will not only find my lists useful but that they will also write to me with additional information, in particular regarding the extraordinarily large 'Listenin!' series listed in item 7 of the Appendix. The reason for publishing series or sets of postcards was the same as for cigarette cards and that was to tempt the collecting instinct!

The plainest cards are 'Rist's Humorous Wireless Postcards' which was published in six sets by the manufacturer of wireless accessories in Lowestoft, A. Rist, Ltd. These cards were issued in sets of six in brown envelopes on which all the sets were listed under the letters of the alphabet from A to F, thus there were 36 cards in all. The envelope was stamped on the front by the letter of the alphabet denoting that particular set, but from my observation of the cards and envelopes I have seen, sets of six miscellaneous cards were also issued when no letter of the alphabet was stamped on the envelope. Several of these cards are fairly common, but others are quite difficult to find. The jokes, as you can judge by the examples illustrated (Figs 6 - 9), all centre on the double meaning of common wireless terms and are pretty mild. This is not surprising as

the last thing a firm wants to happen is that their publicity postcards should cause offence. I suspect that these cards were given away over the counter perhaps when goods over a specific value were purchased. They are fairly thin which might well be one reason why I never yet have seen one that has been sent through the post! Of the twenty-two in my collection, only one is signed by the artist (Fig. 8), René Blair, who is not known as a regular postcard artist. Judging by the wireless terms in this series, the cards date from the mid twenties.

One of the most prolific publishers of postcards the Photochrom Co. of London and Tunbridge Wells was of Swiss origins. The firm was registered in Great Britain in December 1896 and quickly grew from strength to strength. Their 'Celesque' Series is a long-running one, starting before the First World War, and covering many topics. They appear to have published two sets of 'Wireless Terms Illustrated' cards, of which the first set (Figs 10 - 12) has the serial numbers 2261 to 2266 and dates, judging by the postmarks, from about 1924. The colour printing is on good quality extra thick cards (for which the 'Celesque' series was noted), and the artist was L.C. MacBean. The second series is by the better known postcard artist George Fyffe Christie who drew humorous cards for several well known postcard publishers. I have never seen a complete set of this second series (see Appendix, item 2).

The series with undoubtedly the most detailed drawings are the 'Listening In' post cards drawn by Albert Kaye for C.W. Faulkner & Co., Ltd of London (Figs 13 - 15). Individual cards are not numbered. Instead the two sets carry the Series numbers 1805 and 1810 respectively. The two series can be easily distinguished from the front as the first series has the title 'Listening In' printed at the bottom of the card directly followed by the caption, while the second series has it printed at the top of the card and the caption only at the bottom (see Appendix, item 3). The only card lacking from the second series is probably a postcard version of one of the two framed cartoons in Anthony Constable's *Early Wireless* (1980, Fig. 152, p. 114), with the caption: '2 LO London Calling Good Night Sleep Well!' Of the other one illustrated in the book with the caption: 'Hubby's Best Investment', I have a postcard version. Faulkner, established in 1895, became well known artistic colour printers as these fine cards amply testify. Most of these cards I have come across are unfranked, and were probably bought to keep by the purchaser. Only two in my collection were posted; both with a 1923 postmark.

The next series (Appendix, item 4) is American and has printed on the back 'Series No. 489 Radio Comics 12 Designs' (Figs 16 - 17). I have eight of these and they are of a rather striking design, with the borders being formed of two radios with horns and an aerial. It is a pity that they have no artist's signature. The only franked one I have was posted in the States in 1932. These cards can be found occasionally at postcard fairs, but they may well be recent imports for the English collectors. On the other hand, some American cards were available for sale in this country at the time.

Millar & Lang Ltd of Glasgow traded under the 'National' trademark (Appendix, item 5). They were one of the foremost publishers of

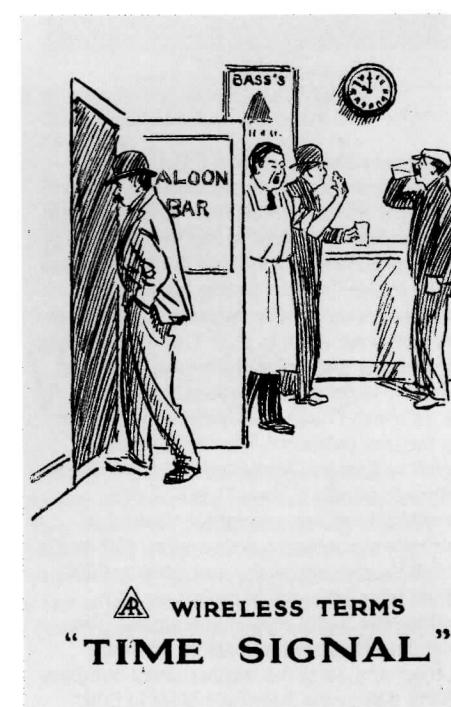
Edwardian postcards and continued until well after the Second World War, although by then they produced mainly view cards. Their 'Listening In' series (Figs. 18 - 19) is not very well known, certainly not to the postcard collecting fraternity, and you will not find it mentioned in the standard reference books. The first series of six cards carries numbers in the 2640s and the second in the 2670s. There are probably twelve different designs in all. It is a pity that these cartoons are not signed. There is space under the 'Listening In' for another caption such as the name of a (seaside) town. This was a well known device to 'personalize' the postcard. One of these cards also doubles up as a Valentine card by means of the additional comic caption: 'Listening In/ No Secret Safe/ From your Valentine'.

Art & Humour Publishing Co. (A & H) of London with their offices at 27 Chancery

Figs 6 - 9 Four of the 'Wireless Terms' advertising postcards, drawn by René Blair, published by A. Rist, Ltd of Lowestoft, three overprinted on back by rubber stamp with 'USE VOLTEX MAGNETOS.' All are unfranked. See Appendix, item 1. Date c. 1925.

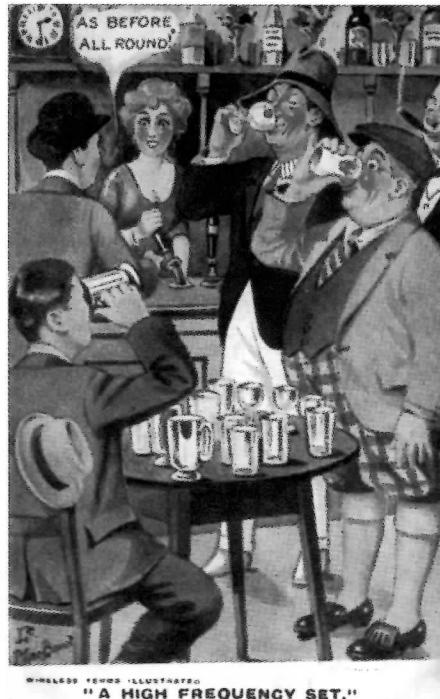
Lane, was established in 1915, became a limited company in 1918, reorganized in 1924 when they moved to 69 Southwark Bridge Road across the Thames, and ceased operation a couple of years later. Their 'Wireless' Series drawn by the well known postcard cartoonist Fred Spurgin (Figs 20 - 21) dates from 1924 and was, therefore, very short lived. They are of a very bold design. I have never seen a complete English set (Appendix, item 6), but I do know what the six designs look like as of three of them I have the Dutch version! The backs of these carry the English A & H's trademark, but also their later address. Perhaps these Dutch cards were prototypes since their borders have been cut somewhat crudely and none have been posted.

The most extraordinary series is the 'Listenin!' published jointly by Woolstone Brothers of 29-30 Newbury Street,





Figs 10 - 12 (above) and figs 13 - 15 (below)



Loud Speakers
Oh! there are many kinds of loud speakers.



Another "Loud Speaker."
LISTENING IN.
Reception is better on one pair of 'Phones.'

Aldersgate Street, London E.C.1, and the International Art Co., more familiarly known as 'Inter-Art Co.' of Florence House, Barnes, London S.W. This was in fact the address of their warehouse. Woolstone published these cards in their 'Milton' Series (named after their previous London address), while Inter-Art published them in their 'Comique' Series. My belief is that there are five sets of six in this very large series, making thirty cards in all, of which I have twenty-eight, but not all by the one publisher. The serial numbers seem as follows: Woolstone (denoted by an (M) in Appendix 7, item 7) 526 to 543 (making three sets or eighteen cards) of miscellaneous topics, followed by 629 to 631 (three Woolstone cards) and 5086 to 5088 (three Inter-Art cards, denoted by (C)), making the fourth miscellaneous set. The final (and fifth) set has cats as the main subject and carry the 'Milton' serial numbers 633 to 638 or the Inter-Art's 5092 to 5097.

Unlike the earlier cards the serial numbers of these ones are not strictly in sequence, so I have had to guess a little, but I am fairly confident that the entire series consists of thirty cards, although after quite strenuous searching two have never been seen (probably (M) 542 and 543). This could well mean, of course, that the 540s set was never completed and consisted of four and not six cards. Perhaps there are only twenty-eight cards after all!

Some of these cards were more popular judging by the frequency these turn up at postcard fairs. Two contain the popular twenties cartoon character Felix the cat (Figs 23 and 24 on page 30) of which I also have a 'pirated' version printed in the USA by Bamforth Comic in their 'Radio Comic' Series no. 1027. Furthermore, I have a caption-less German version of one of the cats cards (numbered by Inter-Art 5095), which has printed on the back 'A.R & Co., I.B. 1450-VI'

(a firm unknown to me), posted by Zeppelin mail in July 1926. Most of the cards carry no artist signature, but there are three signed by Donald McGill, probably the best loved of the postcard humorists. He will be the subject in our next foray into the world of wireless postcards. I will 'sign off' with two popular rhymes which, like the comic postcards, capture the magic of wireless all those years ago.

I made myself a wireless set
The beast was styled a 'super het'...
It whooped just like a whooper,
A chronic Babel-swooper.' (1933)

After three or four hours hard fight,
I get my 'set' working all right;
I put on the 'phones,
Then hear, in sweet tones,
'Good-night, everybody - good-night.'
(limerick 1928)



Figs 16 - 17 (top row), figs 18 - 19 (centre row) and figs 20 - 21 (bottom row)

Figs 10 - 12 Three from the 'Wireless Terms Illustrated' by L.C. MacBean, from the 'Celesque' Series published by the The Photchrom Co. Ltd of London and Tunbridge Wells, nos 2265 and 2261 (posted Bridlington, 12 August 1924), and 2262. See Appendix, item 2.

Figs 13 - 15 Three from the 'LISTENING IN' Series by Albert Kaye, published by C.W. Faulkner of London, the first from the 1805 Series, and the other two from the 1810 Series. Date c. 1923/4. See Appendix, item 3.

Figs 16 - 17 Two in the American 'Radio Comics' Series No. 489. First one posted

in the States on 12 February 1932. See Appendix, item 4.

Figs 18 - 19 Two from the 'LISTENING IN' Series published by Millar & Lang of Glasgow under their 'National Series' trademark, nos 2643 and 2674. Unfranked but c. 1924. See Appendix, item 5.

Figs 20 - 21 Two from the 'Wireless' Series by Art & Humour Publishing Co. of London, nos 2037 (posted in Darlington, 7 July 1924) and 2039 (unfranked). These are by the well known postcard cartoonist Fred Spurgin. See Appendix, item 6.

Appendix: Wireless Postcards Series

1. Rist's Humorous Wireless Postcards in six series from A to F as printed on their envelopes:

Series A
Broken Connection
Atmospherics
Bare Copper
Secondary
Wave Lengths
Crystal Reception

Series B
High Tension
Short
Single Silk Covered
Strong Signals
Group Frequency
Interference

Series C
Distortion
Loud Speaker
Single Cotton Covered
Covered
Nuts and Screws
Transformers
Resistance

Series D
Dull Emitter
Listening In
Time Signal
Jamming
Howling Receiver
Weak Reception

Series E
Negative
Twin Conductor
Coupling
Fading Away
Good Contact
Bar Magnet

Series F
Earth Contact
Broadcasting
Director
Transmitter
Loosely Coupled

It appears that some envelopes contained a miscellany of six cards.

Communication with wires

an astounding collection

Photography & collection: Fons Vanden Berghen- Halle Belgium- BVWS Member

Fons Vanden Berghen has a passion for early forms of telecommunication dating back to the days when, thanks to Samuel Morse, person-to-person contact finally extended beyond hearing distance, when telecommunications were still referred to as telegraphy, when telegraph sets where still hewn out of mahogany and people were still speaking of how miraculous it all was. More than just a slice of history.

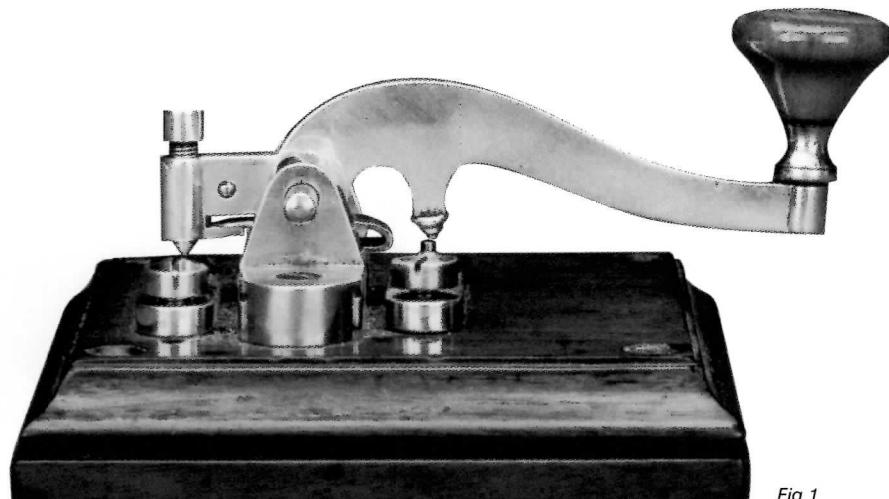


Fig 1

"I work on it almost every evening," says Fons Vanden Berghen, a Belgian BVWS member. He has a soft spot for telegraphy in particular. He calls it "the patriarch" or, if you prefer, "the mother of all telecommunications".

"I have always been attracted by the aesthetic aspect of the equipment, the warmth of the mahogany and the lustre and brilliance of the brass fittings, as well as the incredible workmanship," he says. "Just look at the Hughes telegraph designed by Professor Hughes back in 1855. You see that piano keyboard? One key for each character!" It was first imported into Belgium in 1869 and was used there until at least 1947, when it still

worked on the basis of the same principle used in 1855

In the 18th century, tests were already being carried out using static electricity to transmit signals, but the experiments were doomed to failure because of the volatile nature of this form of electricity (which was generated by friction machines). Of course, the fact that it was stored in Leyden jars didn't help either!

Gradually, however, the time was right for a durable telegraph based on the findings of A. Volta (who invented the 'pile' in 1800), H.C. Oersted (influence of current on a magnetic needle in 1819-20), Schweigger (the coil in

Fig 2

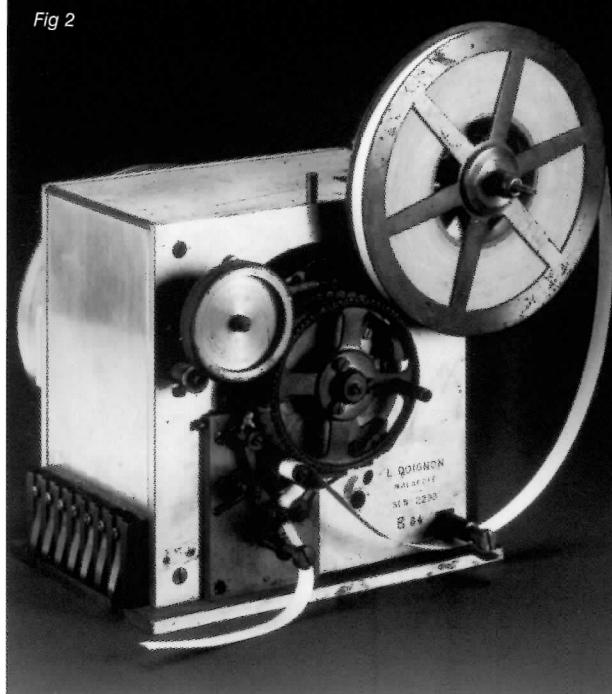
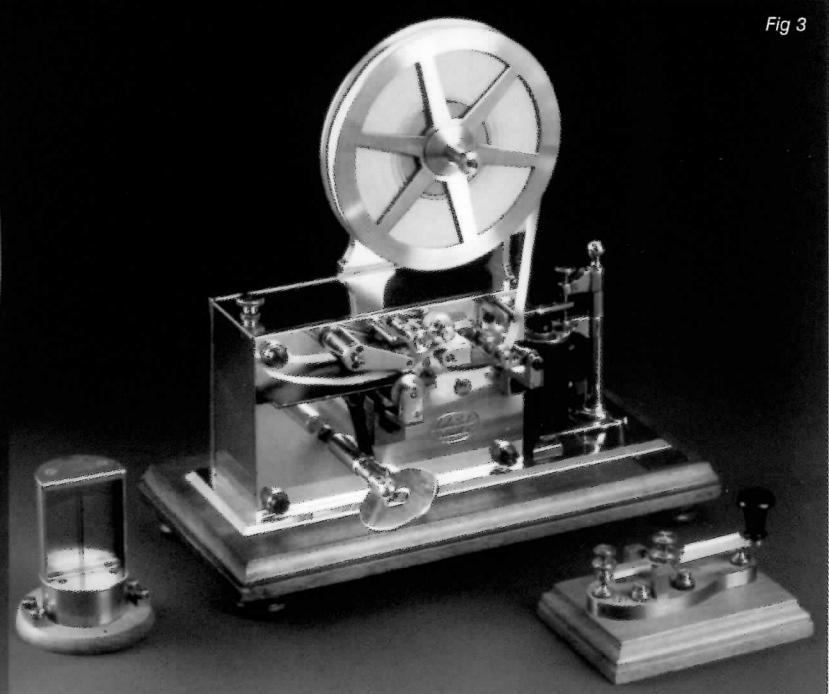


Fig 3



1820) and Ampere (the solenoid in 1822).

1837 was a landmark year in the development of telegraphy. Steinheil introduced his telegraph based on Gauss and Weber's forerunner from 1833. Cooke and Wheatstone patented their 5-needle telegraph, which was also built to a design by Shilling. But the best-known pioneer is undoubtedly the painter and inventor Samuel Morse who, on 4 September 1837 - after five years of experimenting - astonished the world with his first demonstration. Almost seven years later, on 24 May 1844, telecommunications came of age with the historic first transmission between Washington and Baltimore. Morse's signals travelled an amazing 40 miles!

In Europe Cooke and Wheatstone's needle telegraph was still in use in the early 1840s. In Belgium the first telegraph - a Cooke and Wheatstone 'two-needle telegraph' - was installed in 1845 along the railway track between Brussels and Antwerp. Back in 1840 Cooke and Wheatstone had already come up with the dial telegraph. Five years later, the Frenchman L. Bréguet introduced his version which was used for the first time on 16 April 1851 on the international Brussels-Paris line (fig 6 & 13). When you rotated the transmit lever on the 'manipulator', the dial at the receiving end repeated the movement. You simply stopped on the letter you wanted to transmit, and at the other end the receiver wrote it down. In the late 1850s, however, the

needle and dial telegraphs were supplanted by Morse telegraphs. The oldest model in Fons' collection dates from around 1848, the surface printing machine, which uses a steel tip to scratch the dots and dashes of Morse code into the paper (fig 5). This was later replaced by ink writers, whereby the two most common systems used the ink roller (e.g. figs 3 & 4) and ink well (see figs 18 & 19). A rare model built by Siemens in 1853 (fig 7) had no spring-operated motor, but was instead driven by weights.

The Hughes telegraph (mentioned above) was the first that could also print letters. In 1874 the Frenchman E. Baudot (who introduced the unit of modulation speed, the 'baud') developed the writing telegraph (fig 2). He then added a mechanical multiplex system so that up to six machines could be used on a single cable pair, representing an enormous saving! Baudot did not use the prevailing Morse code, preferring to develop his own code in which each character had five parts. Incidentally, some 30 years later this same code was used by the first 'teleprinters' and subsequently by telex.

One particularly handsome set is Wheatstone's speed telegraph dating from the 1870s. This set contains all the features which later, in the 20th century, would figure prominently in the telex machine. A strip of paper is punched and then fed into the 'reader', which can cope with 40 steps per

second - incredibly fast at the time. The model on fig 19 is driven by weights. The receiver printed out the characters on a strip of paper using conventional Morse dots and dashes (fig 16 & 17). Another form of reproduction was the 'undulator', a siphon recorder which marked an undulation on the strip of paper. A sideways shift to the left stands for a dot, while a shift to the right stands for a dash. Depending on the polarity of the current ('+' means a dot and '-' means a dash) the 'double plate sounder' causes either the left or right clapper of the 'sounder' to strike, making reception fully audible (fig 11). Single 'sounders' were mainly used in the United States. They were inexpensive and could cope with high speeds. They did not print out a message, but that was not viewed as a problem.

Fons Vanden Berghen also owns a few 'partial collections', including galvanometers, sounders, hand keys, relays and equipment used for teaching and toy models. Finally, there are also a number of accessories such as lightning conductors, changeover switches and training sets.

Fig 4

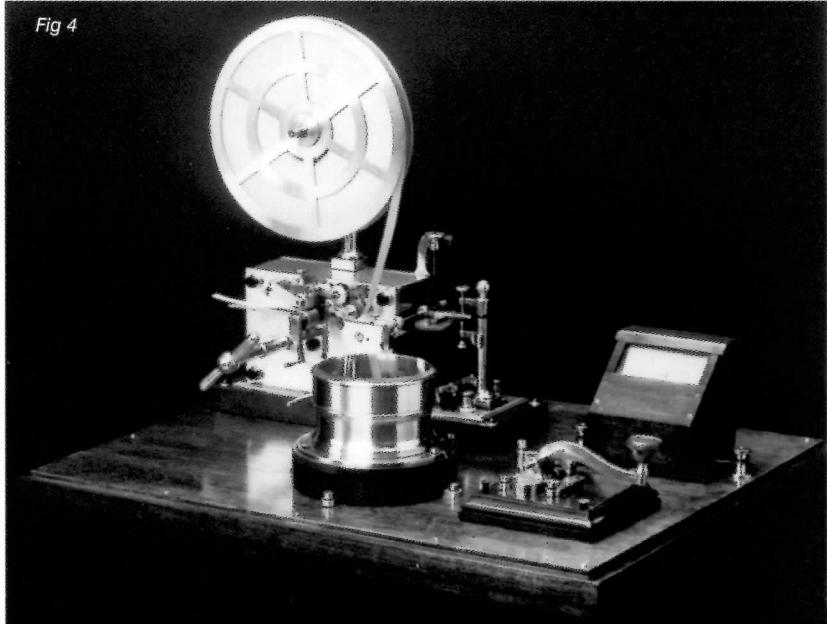


Fig 5

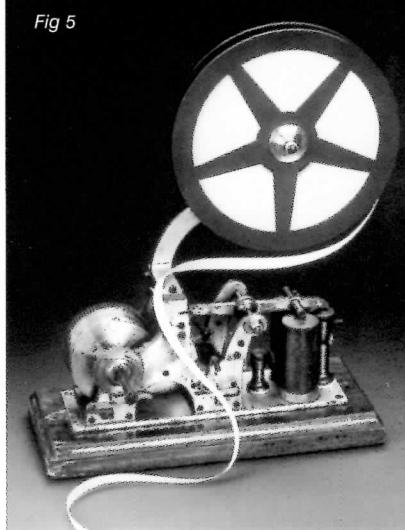


Fig 6



Fig 7

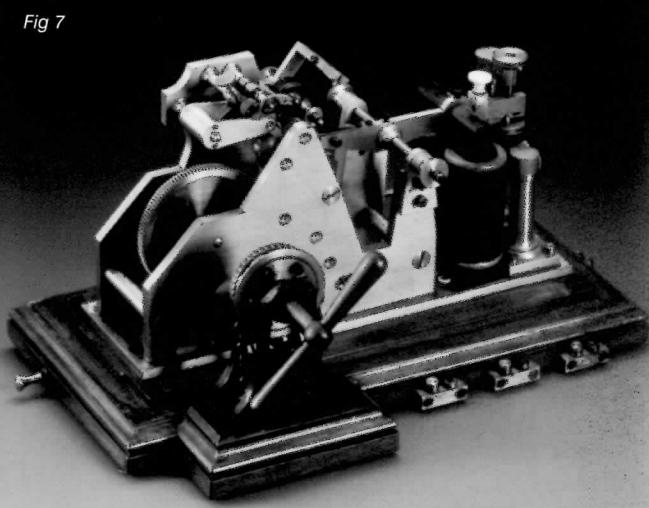


Fig 1: A nice example of a 'Camel Back Key' circa 1860

Fig 2: Baudot (France circa 1880)

Fig 3: Belgian set: typical receiver, key & galvanometer

Fig 4: Complete table- Caminada/Holland- but made by

Digney Frères of Paris circa 1860

Fig 5: Model with scratching steel needle

Fig 6: ABC or Dial telegraph by Bréguet (France 1855)

Fig 7: Siemens & Halske model 1853: driven by weights

A cry for help

For several years Fons has been advertising in our 'Members Advertisements', he wonders why he has had almost no reaction at all. Among other things he is looking for a 'single needle telegraph'. Almost every railway station must have had one; where have they all gone? Fons has a lot of swap items: radios, valves, telephones, telegraphs, keys and scientific instruments (especially Crookes, Geissler and X-Ray tubes). He is also wondering who else is collecting Telegraph items. He has a contact address in Newbury. You can contact him at:

Lenniksesteenweg 462/22, B-1500 Halle, Belgium

Tel: (after 8pm): +32 2 356 05 56

Office: +32 16 38 24 38

e-mail: fovabe@telindus.be

Fig 8

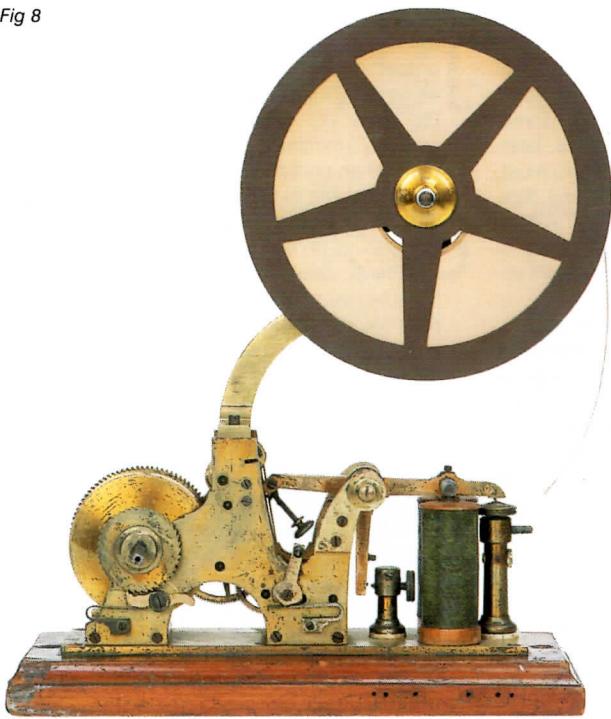


Fig 9

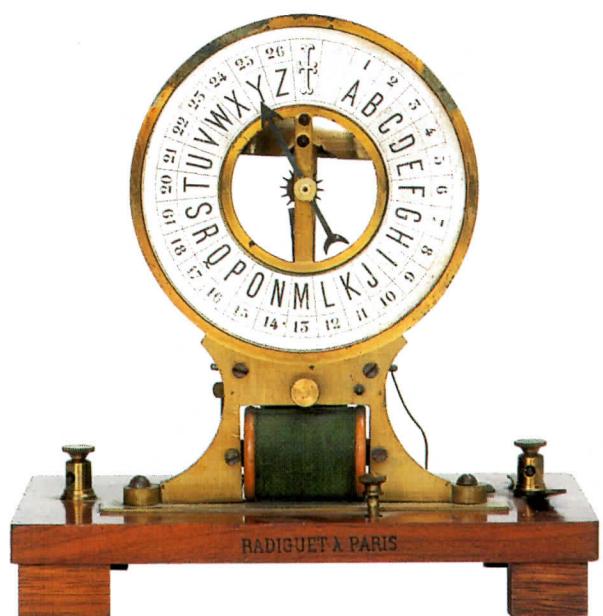


Fig 12

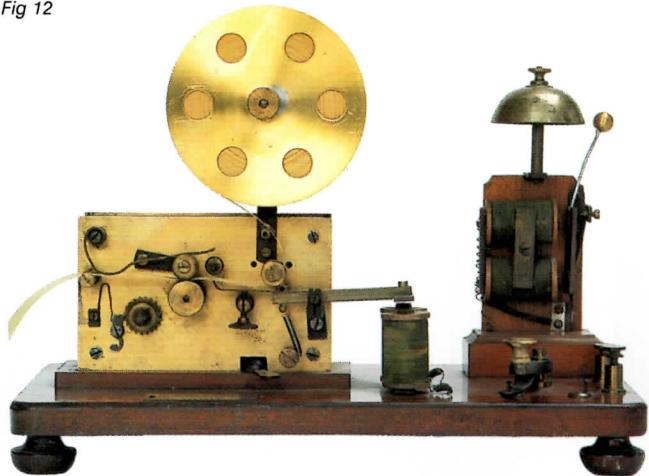


Fig 13



Fig 16



Fig 17



Fig 8: 'Relief' recorder- late 1840's

Fig 9: Demo/Toy ABC telegraph- Radiguet- Paris

Fig 10: Belgian 'Richez'- but made by Digney Frères- Paris

Fig 11: Double plate sounder in parabolic, acoustic wooden resonator case.

Approx 1870

Fig 12: Demo/Toy Morse telegraph- Radiguet & Massiot- Paris

Fig 13: Bréguet ABC or Dial telegraph approx 1860

Fig 14: Siemens & Halske- internal spring

Fig 10

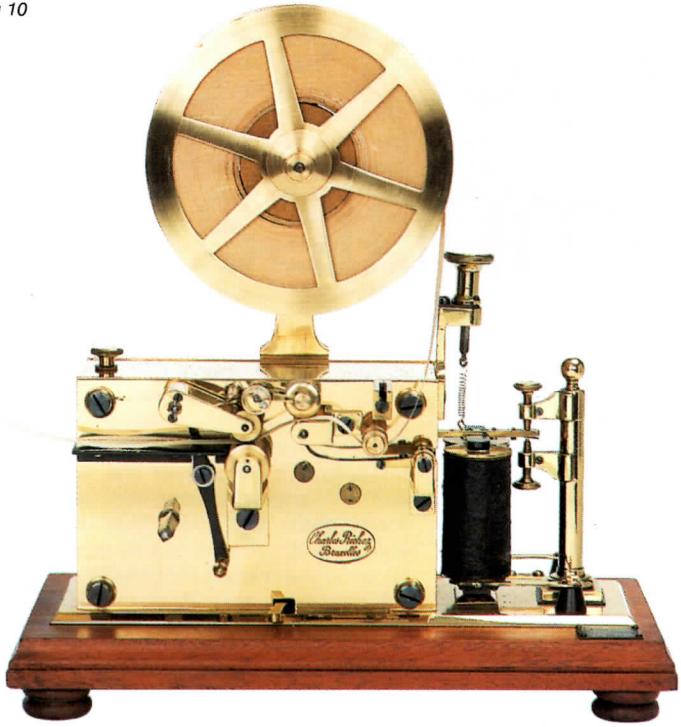


Fig 14

Fig 11



Fig 15

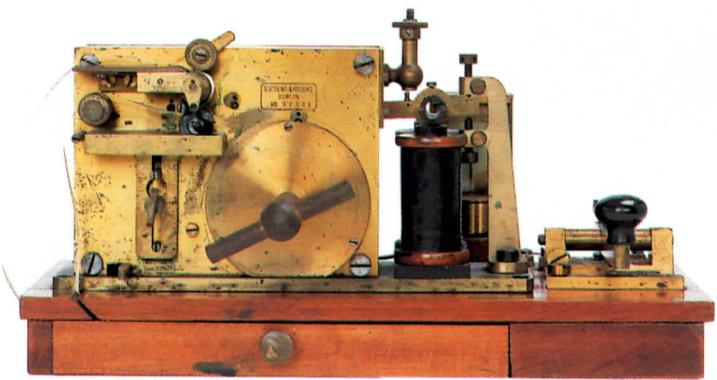


Fig 18

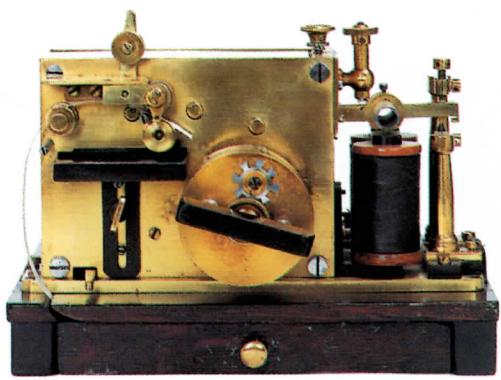


Fig 19

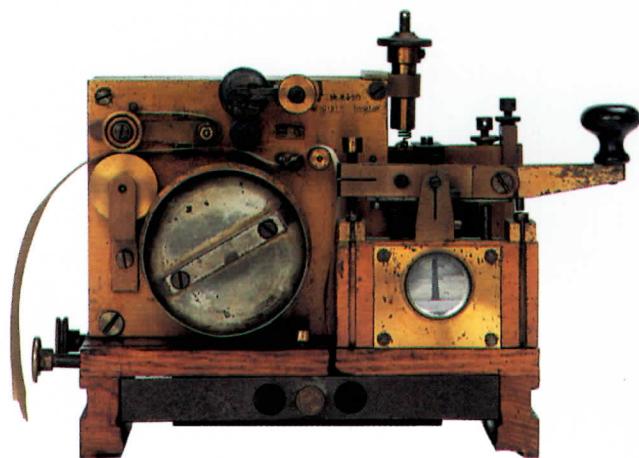


Fig 15: Siemens & Halske- external spring- model 1862

Figs 16 & 17: Wheatstone speed receiver front and back (circa 1870)

Fig 18: Lightweight portable military set (including galvanometer and key)

Fig 19: Wheatstone speed transmitter- driven by chain/weight (circa 1870)

Photography & collection: Fons Vanden Berghen- Halle Belgium- BVWS Member

The first sixty years of wireless communication in Switzerland

R J Ritter, P.O. Box 130, CH-9424 Rheineck, Switzerland

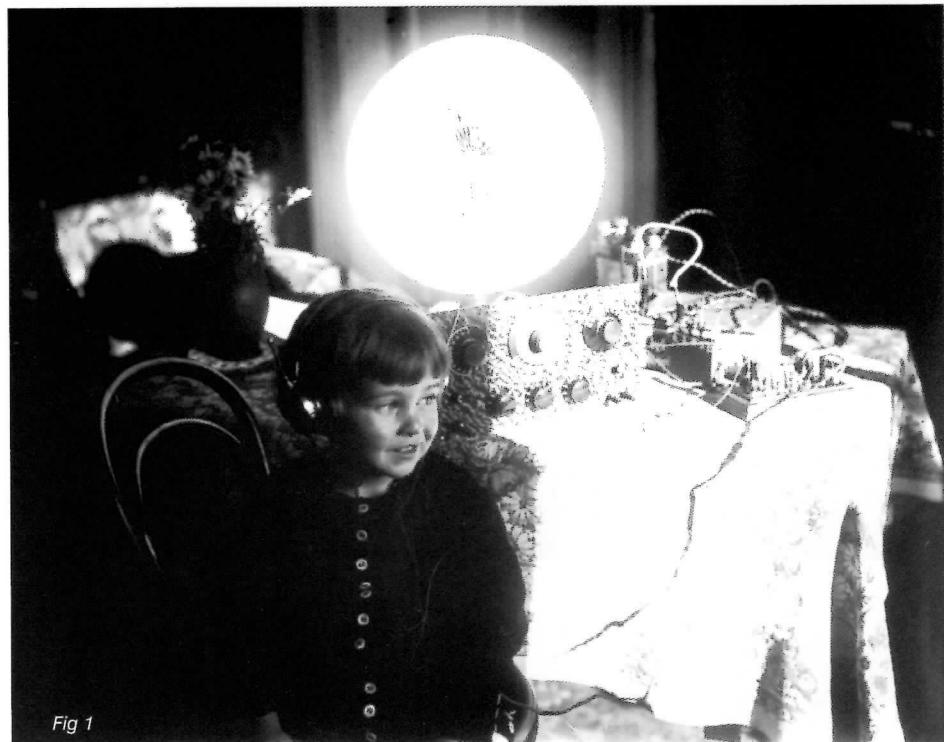


Fig 1



Fig 2

The beginnings

The work of Heinrich Hertz, Marconi and Braun found wide interest in academic circles in this country; by 1900 there was a small industrial component manufacturing activity. *Fritz Klingelfuss & Co* of Basle made induction coils and *Ignace Moscicki* of Fribourg built properly designed and reliable high voltage capacitors.

The first body to develop an interest in Wireless Telegraphy was the Ministry of Defence: the opening of the trans-alpine Gotthard Railway in 1882 had led to the decision to fortify the Gotthard region and the lower Rhone valley. Colonel Robert Weber of the Engineers Corps, deeply engaged in fortification work, formed an interest in W/T as a means to secure communications between Army High Command and the fortifications. In 1901 — now the head of the Engineer's Corps — he contacted his German counterpart, who referred him to Professor Braun's company for Wireless Telegraphy. Braun's company having been absorbed in the Gesellschaft für drahtlose Telegraphie — better known under its telegraphic address Telefunken, the new company, eager to gain experience in an alpine environment, offered equipment on a trial-and-purchase basis. Weber's main objectives were the strategic W/T links between Lucerne and the fortification commands of St. Gotthard and St. Maurice, which called for nothing less than bridging the Alpine massif; but he did not neglect tactical W/T as a side objective. Telefunken considering fixed relay stations at high altitude to be essential, he undertook the construction of station buildings at Mount *Rigi* at 1016m asl and at Fort *Stoeckli*, at 2350m asl above Andermatt in the Gotthard region. The Federal Council appointed a *Commission for Wireless Telegraphy* to conduct the evaluation with

Fig 1: The author (1927)

Fig 2: Funkversuche Thun (1905)

Colonel Weber as a chairman. Captain Otto Hilfiker, his right hand for signals since 1902, was appointed Director of Trials.

The equipment being slow to arrive, the 1905 trials were confined to mobile and portable field equipment with inconclusive results; the Commission rejected the portable equipment, but acquired two mobile stations for further experimental work. The 1906 trials

with the fixed stations were no better and acceptance was refused, much to the annoyance of Telefunken. The latter then proposed the installation of 15kW fixed stations at Lucerne and St Maurice. Because of the lack of funds this was not considered - as was proved later by the course of events to be fortunate. In 1908 the Commission invited other European companies to undertake field

trials; all were willing to sell, but with the exception of Marconi they flatly refused to undertake field trials. In 1909 a 3kW Marconi field station gave no better results. The Commission then formed the view that '*the Marconi system not being superior to the Telefunken system, it is the opinion of the Commission that the evaluation should continue with the latter company, which had so far*

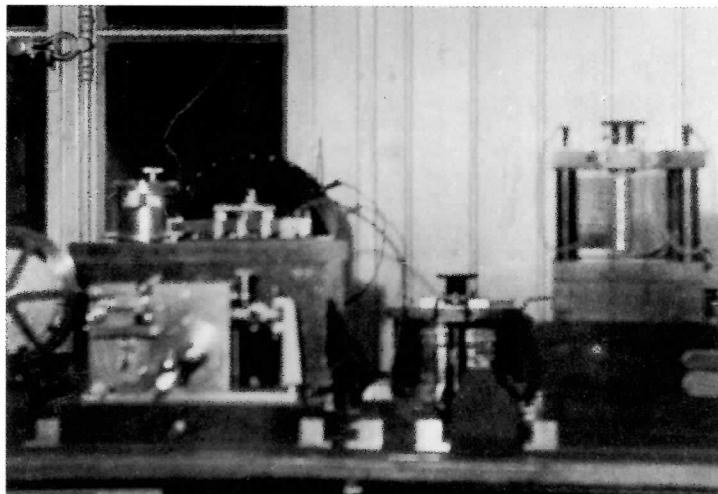


Fig 3

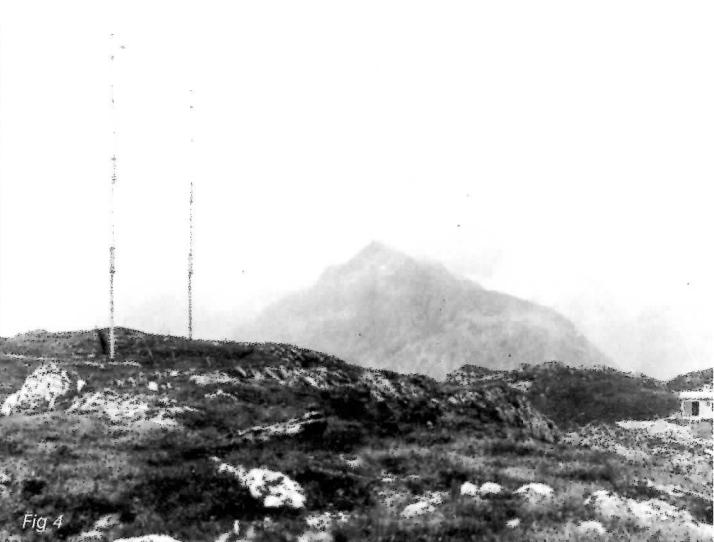


Fig 4

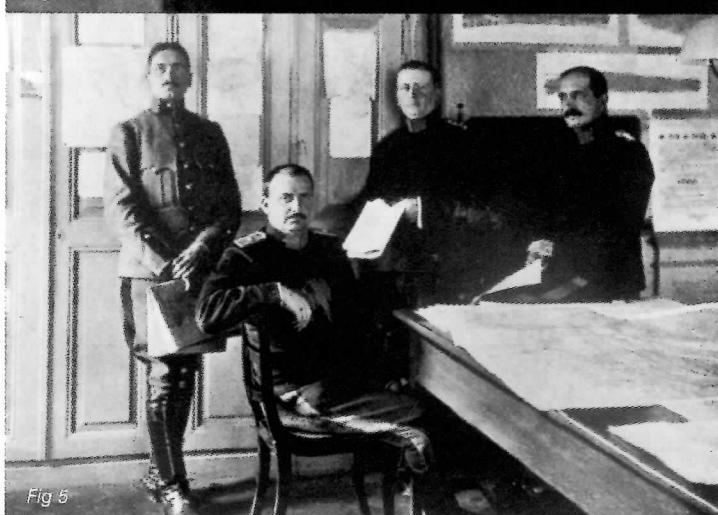


Fig 5

Fig 3: Receiving equipment, Mount Rigi W/T station (1906)

Fig 4: Fort Stoeckli Stn. (1906)

Fig 5: Army Command Signals Section
(Major Hilfiker (GS) standing on left, 1915)

Fig 6: Marconi trials (Andermatt 1909)

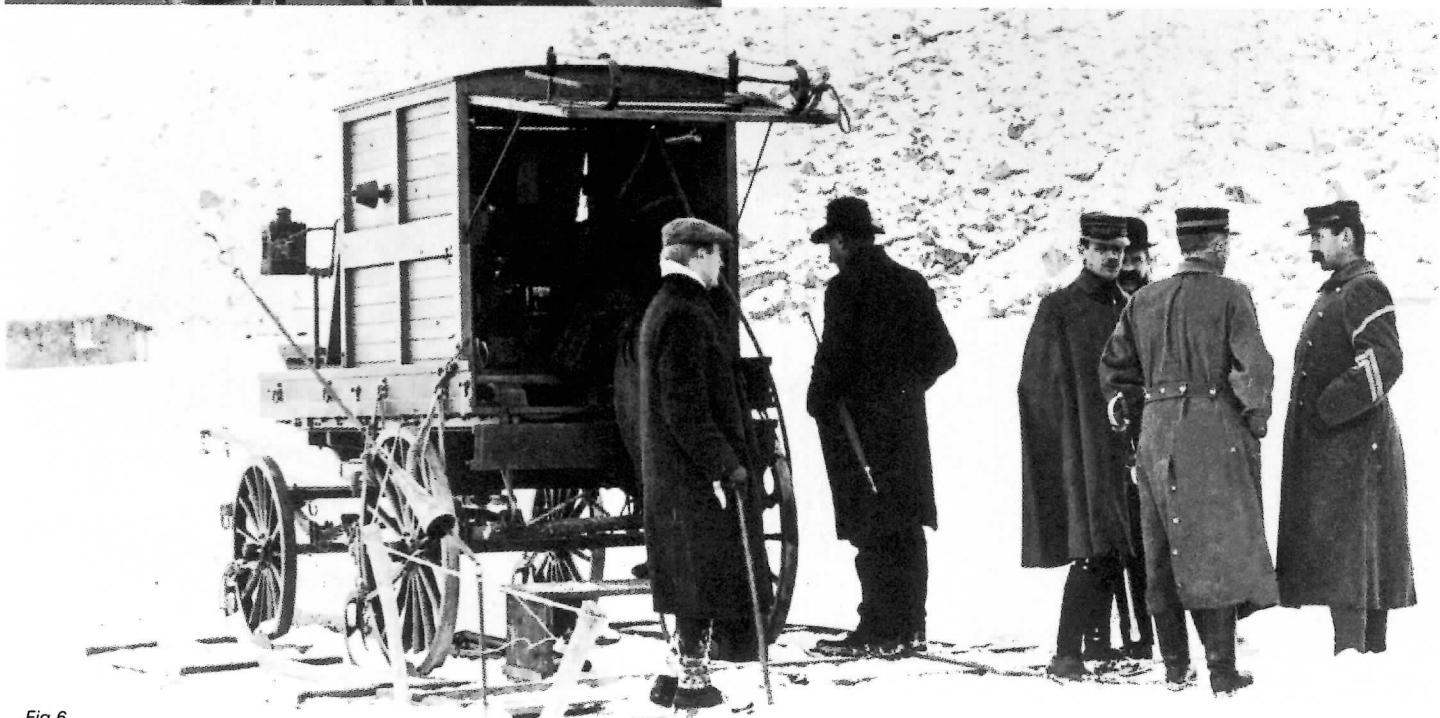


Fig 6

taken greatest pains to respond to its wishes'.

Meanwhile Telefunken had perfected the 'quenched spark system'¹ and demonstrated the superior performance of the first 2kW field station, thereby missing the main objective by just a small margin. In 1911, a purpose-built Telefunken 3 kW station — fitted with an improved antenna — finally met the military requirements for strategic W/T without the use of fixed relay stations. The Commission proposed the introduction of Wireless Telegraphy in the Swiss Army and the establishment of a Wireless company, which formally was approved in 1912.

However the intended procurement of mobile stations had to be postponed for budgetary reasons and the Army's first wireless operators were recruited only in 1914. When the Swiss Army was mobilised on 3 August 1914 the Wireless platoon had only two mobile stations acquired in 1906 and a few experimental portable stations of French origin. Otto Hilfiker, now in staff rank and acting as Army Chief Signals Officer, demonstrated that he was not only a good planner but also an excellent improviser; during the war days he found ways and means to acquire more material. When in 1916 four heavy Telefunken field stations² had arrived, he set up systematic range and wavelength trials. By May 1917 the Army Wireless Company was established, continu-

ing the trials. The experimental data were so extensive that the Chief Signal Officer had to call on Basle University to make a scientific evaluation. This was undertaken by Dr Edouard Banderet, who published the results in an excellent paper in 1919: the quest 'for the best wavelength' had found the long sought answer.

The Wireless Company was to prove its value during the General Strike of November 1918 when securing communications between Army High Command and the commanders of the intervention forces deployed in the major cities.

Commercial Wireless

By the end of the war, press circles proposed a National Radio Telegraph station and the Government responded. The Marconi Company, offering the most favourable conditions out of several bidders, was provisionally licensed in lieu of a company to be formed, provided that the station was operational for the League of Nations' 1920 Conference. Then a company called *Marconi Radio Station Berne* was formed in 1921 as a joint venture of the Swiss Confederation and the Marconi Company, taking over both the licence and the station. It was re-named *Radio Suisse Ltd* in 1927, the Swiss Confederation now becoming the major shareholder. The

intention behind the new Company name was to expand the existing activity in broadcasting — the Berne local transmitter — but unfortunately this would not materialise.

MF and HF Broadcasting

In 1922 the Broadcasting boom began in this country, first in French speaking Geneva and Lausanne, then in German speaking Zurich, Basle and Berne. First Aeronautical stations made use of the idle night hours for broadcasting, but it was not long before dedicated local broadcast transmitters took their place. In the early Thirties the PTT Administration assumed the responsibility for programme distribution and set up in 1931 the 60 kW medium wave National transmitters at *Beromuenster*, *Sottens* and later *Monte Ceneri*. The programmes were produced by three regional corporations in the German, French and Italian languages, with overall co-ordination by the semi-private Swiss Broadcasting Corporation.

The National Short Wave Centre at Schwarzenburg was commissioned in Summer 1939, just a few weeks before the war broke out. Built by Hasler AG, Berne, it served the dual purpose of overseas broadcasting and public overseas telephone services with the Middle East and the USA.

By the end of the Twenties a number of

Fig 8

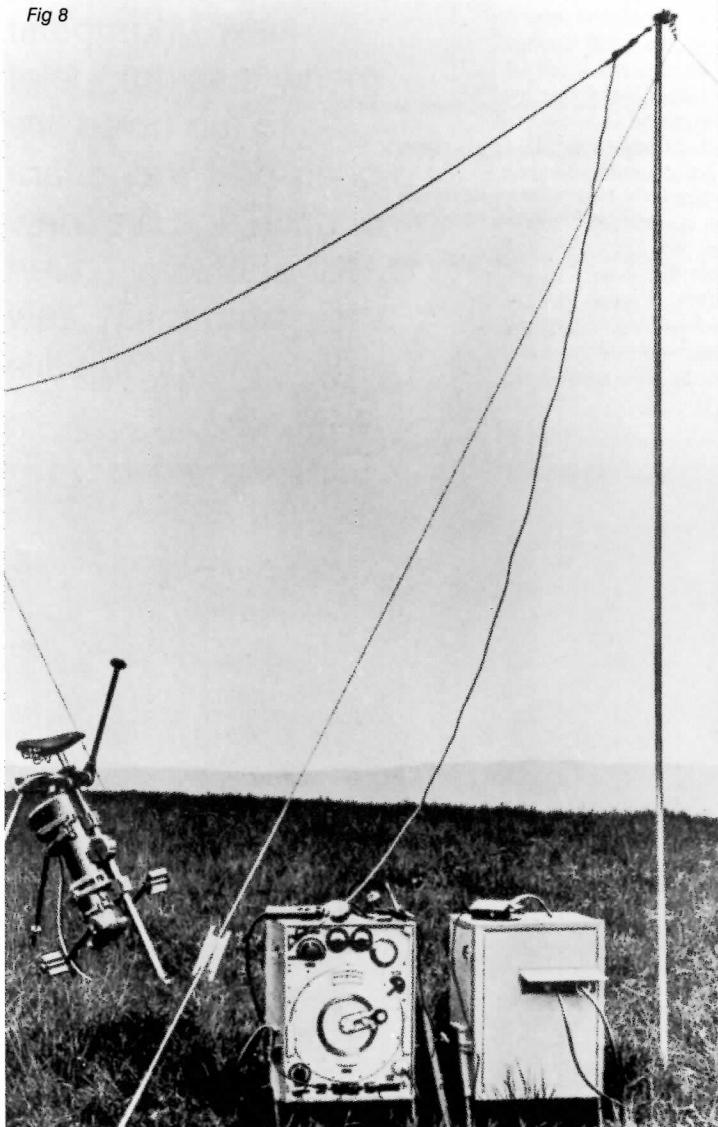


Fig 9

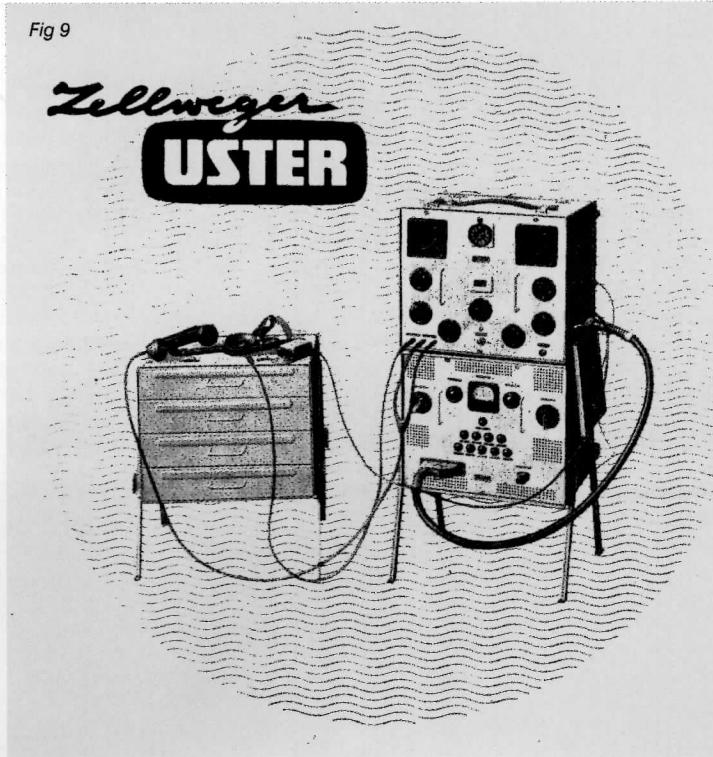


Fig 8: Stat 272 Bs (1933)

Fig 9: Zellweger SE222 100/200W SSB/RTTY S/W Transceiver (1954)

small companies had taken to building radio sets and by 1932 major companies like Autophon, Deso and Paillard joined in. By 1945 there were as many as 44 set building companies. Export trade was booming during and after the war, but foreign competition began to make business increasingly difficult. By the middle Fifties, most companies gave up, the more so as most of them had not anticipated the impact of VHF Broadcasting in time.

Short waves in the army

The utilisation of short waves in the Army was largely due to Swiss Radio Amateurs, who were already active during the famous transatlantic tests of 1922/23. The regulation of the Amateur status in 1926 much increased this activity. Systematic exploitation of the 40m, 80m and 160m bands demonstrated the possibility of reliable national short haul communication. Two scientifically educated Radio amateurs, Carl Keel HB9P and Rudolf Sluber HB9T who were both Signal Officers, published their findings in 1933⁴. The Engineer Corps was reluctant to accept the new fact; nevertheless Telefunken's new short wave transceiver Stat. 272 Bs won the current field trials and was selected for procurement. This was perhaps more for ease of operation and mobility and less for the use of the 60 to 100m waveband. The 77.5 kg equipment could be carried on the backs of three men. The set was introduced in 1935 as 'TL' station (*Tragbar Leicht*, for 'portable light'). It enjoyed enormous success as the mainstay of Divisional communications. Between 1935 and 1945 Telefunken Zurich supplied nearly 1400 locally built sets to Signal Corps and Artillery Corps Signals units.

New industrial activities

When Dr Franz Tank became a Professor at the Federal Institute of Technology in 1932, he lost no time in setting up the *Institute for High Frequency Techniques*. He was an ardent promoter of industrial activities. Brown Boveri & Co Ltd, Baden, Hasler AG, Berne, Zellweger AG, Uster and smaller companies followed his advice to exploit a new field. Tank's pupils, many of them postgraduates, carried his interest in short and very short waves to their industrial employers. This resulted in both commercially and technically successful developments for PTT and military applications during the Second World War.

Radio links and VHF broadcasting

Willy Klein, an engineer, a radio amateur and then an Infantry Lieutenant, became acquainted in 1942 with Colonel (GS) Walter Moesch, Army Chief Signals Officer, when commissioning a high power emergency broadcast transmitter; the Staff Colonel and the lowly

Lieutenant were not only discussing hard facts of the work in hand but also Klein's pet subject of radio links. The older man appreciated his point and began to develop his own ideas. Klein, having joined the PTT Research Establishment in 1943, persuaded his superiors to erect an experimental station on Mt. Chasseral at 1609m asl, dominating the major part of the Swiss plateau. Klein conducted a comprehensive series of propagation tests, first in view of a future VHF Broadcasting service and later extended to long distance telephone and television radio links.⁵ In 1947 a first experimental Zurich-Mt. Chasseral Geneva 24-channel telephone radio link was put into operation, using both Brown Boveri HKI FM and 15 cm IM23 PPM equipment. A major achievement was the crossing of the Bernese Alps chain via the Jungfraujoch in 1948. This was greatly facilitated by Colonel Moesch who supplied military manpower and portable decimeter 'TLD' Army sets.⁶ When more permanent facilities had given way to Army tents at Jungfraujoch the *Berne-Jungfraujoch-Mt. Generoso-Lugano* radio link was put in operation, again using Brown Boveri 1m FM equipment. Today, a much enlarged station serves as a national hub for a multitude of international telephone and television radio links to the surrounding countries.⁷

By 1948, Colonel Moesch proposed an overlay system securing the communication needs of the Government and the Army down to Corps Level, based on fixed radio links between elevated communication sites and mobile 'downhill' links to the respective commands. After the construction of the alpine sites, the system became operational in 1955 with the Brown Boveri 15 cm time-division multiplex equipment IM23b. A similar system was set up by the Aviation and Anti Aircraft command to satisfy its particular needs.

While the military planners were content with Brown Boveri 24/48 channel equipment, the PTT opted for the 7.5 cm high-capacity system of Standard Telephones & Cables Ltd, London. Today a vast grid of radio links overlays the national trunk cable network, the equipment being locally built and installed by Standard Telephone & Radio SA (now Alcatel STR SA) in Zurich.

In 1952 the PTT Administration erected the first VHF Broadcast transmitter; today there is a network of over 500 PTT and private transmitters, serving some 2.5 million listeners in a country about twice the size of Wales.

Secure radio teleprinting

In 1951 the Procurement Executive of the Ministry of Defence specified a new short wave set SE-220, intended to replace the good old 'TL' set of 1933. The sole bidder was awarded the development contract. Zellweger Uster — where single-sideband development had been in progress since 1948 — refrained

from bidding, but let the Procurement Executive know they preferred a private venture using a more advanced design than called for by the specification. By 1954 four prototypes of a very compact single-sideband set incorporating FSK radio-teletype operation were offered for trial. The teleprinter used was the small quasi-facsimile printer ETK 47 designed by Dr Edgar Gretener, which was provided with an on-line cypher attachment Telekryptogerät 53. Extensive field trials indicated that the 100 Watt CW/200 Watt PEP transceiver was capable of more than just the provision of divisional communications. The Federal Signals Office was quick to recognise the outstanding potential of this private venture and revised its current long-term procurement plan in favour of the Zellweger set, which was introduced as the SE-222 set. A pre-production batch was even ordered before prevailing synchronisation difficulties in cypher mode had been overcome by the introduction of the superior Krypto-Funkforschreiber 58 (cypher radio teleprinter). By 1959 all Divisional and Corps Wireless companies had been re-equipped, and by 1960 also the light Army wireless companies. Although at first there were disbelievers these were quick to appreciate the small set's capability to secure just any communication link in Switzerland. The frequency range of 1.5 to 3.5 MHz as specified by Procurement Executive in 1951 — perhaps more based on experience than on hard facts — is ideally suited to the short haul services required by the Swiss Army, although today one would prefer an upper limit of 8 to 12 MHz.

Notes

- 1 Georg Graf von Arco. *Das neue Telefunkensystem. Elektrotechnische Zeitschrift Heft 29. 1910.*
- 2 Schweres Feldstation 14, as used by the Imperial German Army.
- 3 Edouard Banderet. *Versuche über drahdose Telegraphie in den Alpen. Verhandlungen der Naturforschenden Gesellschaft in Basel Bd XXX (1919).* pp. 248-254.
- 4 Carl Keel HB9P, Rudolf Stuber HB9T. *Verwendbarkeit der Kurzwelle im Nahverkehr. PIONIER Jg IV, Zurich 1933.* Nr 1, S. 102-108 & Nr 2, pp. 139-144.
- 5 W. Klein, J. Dufour. *Rundspruchversuche mit frequenzmodulierten Ultrakurzwellen. Technische Mitteilungen PTT 1948,* Nr 1, pp. 1-21 & Nr 2, pp. 61-83.
- 6 W. Klein. *Richtstrahlversuche in den Alpen. Sonderdruck aus Technische Mitteilungen PTT 1949, Nr 2.*
- 7 U. Kofmehl, F. Heiniger. *Die hochalpine Richtstrahlstation Jungfraujoch der PTT. Bulletin des Schweiz. Elektrotechnischen Vereins 83 (1992), pp. 31-34.*



mystery object

Can anybody recognise this strange object illustrated on the left. It is made of black vulcanite and bears the legend 'H. Jacobi & Co. Burk Gasse 50 Wien XIII'.

The first person to correctly guess what this object is will win a years free membership, valid from the first of January 1998.

BVWS Web Site

Calling all Net heads! The BVWS is currently working towards an internet web site, which hopefully will be of the high standard to which you are now accustomed. This site will be the **official** BVWS web site, and consequently will be the only site which can use the BVWS logo.

It is hoped that the web site will be up and running some time this year. It will be interesting to see what attention this experiment will generate or for that matter, how many new members will we gain via the internet.



Figs 22 - 28 Seven from the 'LISTENIN'' Series published by Woolstone Bros. Of London in their Milton Comic Series and by Inter-Art Co. of Barnes, London, in their 'Comique' Series, probably drawn by Dudley Buxton. For details, see Appendix, item 7.

2. Exclusive Celeste Series published by the Photochrom Co. Ltd London and Tunbridge Wells has two series of 'Wireless terms illustrated', the first by L.C. MacBean, and the second by Christie. After years of collecting I have never progressed beyond the three of the second series listed below.

First Series

Oscillation	2261
A High Frequency Set (12/8/24)	2262
Broadcasting (23/ /26)	2263
A Rectifying Valve	2264
A Crystal Detector (12/8/24)	2265
A Crystal Receiver	2266

3.'Listening In' Series drawn by Albert Kaye for C.W. Faulkner & Co., Ltd of London. Individual cards are not numbered. Instead the two sets carry the Series numbers 1805 and 1810.

Series 1805

And they call this Wireless
Reception is better on one
pair of 'Phones
Silence is Golden -
Hubby's Best Investment
Wireless brings happiness
into the home
Listening in Vain (29/5/23)
At last! Hallo, America!

Second Series

Broadcasting	2318
A Short Circuit (6/9/32)	2319
The Wave Length	2320

4. A rather eccentric series of pictures have printed on the back, 'Series No. 489 Radio Comics 12 Designs', and are as follows:

Do you get this code?

I got station H.E.L.L last night!

I've been trying to get station Y.O.U can't you tune in? (12/2/32)

Bad conditions due to moisture

Last Night I picked up station O.U.K.I.D

General conditions unfavourable for receiving

This is what we got last night on our set! (No Series No. on back)

The animal chorus is good on our set! (No Series No. on back)

Incorporating in the line of the divided back is printed, 'MADE USA'.

5. 'National' Series of 'Listening In' post cards has according to its numbering two series which are as follows in my collection:

First Series

Listening in	2643
No Secret Safe	2646

Second Series

Sunday, - a fine excuse	2672
It's not all pleasure	2673
Everybody's doing it	2674
Saves a meal (1/9/24)	2675
It's good sport (30/ /24)	2676

My loud speaker is going day and night! (7/7/24)	2037	'Which do you like best Basil? The Saveloy Orphans or the Semolina Bands?' (M) 538	(5011)
Dutch version of above	2037	'Now girls - I'm going to tell you to-night how to keep that schoolgirl complexion!' (M) 539	(5012)
Was that your voice I heard on the wireless? (14/8/24)	2038	'dere Mr. Broadcaster: Will you like me to kum up and sing for you my young man says my voice is that eavenery that I ought to be on the pictures!' (540)	(C) 5013
Dutch version of above	2038	'Stand by one minute please, we are going to relay — the Nightingale!' (M) 541	(5014)
Our loud speaker is now out of order	2039	?	(542)
Dutch version (coming home late)	2040	?	(543)
Dutch version (listening to their sister kissing)	2041	'You've got them clothes lines a bit too 'igh Sir!' (M) 629	
'S.B.' (Simultaneous Broadcasting) (19/5/27)	2042	'Hi! Just broadcast to my Bill at the 'Crown and Anchor', that if 'e aint 'ome in ten minutes, there's trouble brewing!' (1/4/26)	(M) 630
7. By far the largest series is the 'Listenin'!' in the Milton Comic Series published by Woolstone Bros, London, E.C. (M), and in the 'COMIQUE' series by Inter-Art Co., Florence House, Barnes, S.W. (C). 'T.S.F' cards are the French version:			
'Evening everybody! My little chat to-night will be upon the art of keeping a youthful figure!' (17/7/26)	(M) 526	'How jolly to find when you've asked the folks round, The joys of your set to be sharing, That the Battery's battered, Condenser condensed. And the Aerial out for an airing.' (M) 631	
'That there's that time signal from Big Ben!' (M) 527	(C) 5000*	'In two minutes you will receive the local news! — Stand by please -there is no local news!' (9/7/25) (C) 5086	
'Sorry Felix, but dad told me to get another cat's whisker!' (528)	(C) 5001	T.S.F version (C) 5086	
'I wish I'd known all that twenty years ago!' (529)	(C) 5002	'Big Ben's clear as anything - an's only a crystal set!' (16/8/25) (C) 5087	
'God save the King!' (530)	(C) 5003	'Stand by one minute please, and you will hear the lions roar!' (4/8/25) (C) 5088	
'I'm sure that's meant for me!' (M) 531	(5004)	T.S.F. version (C) 5088	
'The weather will remain fine for the next twenty four hours - if there is no change!' (M) 532	(5005)	'Stand by everybody - you will now hear the familiar cry of the night Owl!' (632) (C) 5092	
'The lions at the Zoo'—Oh! Dear, 'ow that does remind me of poor departed 'Enery!' (3/8/26)	(M) 533	'Come to the party - but bring your own headphones!' (14/4/25) (M) 633	(5093)
'Mendelsohn's Spring Song' - how very beautiful and clear!' (M) 534	(5007)	'Stand by - it's only me!' (19/10/25) (M) 634	
'First result after two hours tickling the cat's whisker. All stations of the B.B.C. are now closing down, good night everybody - good night!' (M) 535	(5008)	T.S.F. version (635) (C) 5094	
'I haven't got America yet, but I often get 'chilly!'	(M) 536	'At three o'clock in the morning!' (M) 636	
'I have here an urgent message -	(M) 537	T.S.F. version (C) 5096	
'Will the gentleman who took the Ford car from outside Posh Mansions, call to-morrow - there are five more waiting for him!'	(M) 537	'Now I can 'listenin' peace!' (9/8/25) (M) 637	
		'Just a song at twilight!' (7/7/25) (638) (C) 5095	

Next to come: *The World of Wireless of Donald McGill.*

the Viseotelephone

by Ray Herbert

The provision of a two-way television system so that the participants in a telephone conversation could each see the other person speaking, had a novelty value guaranteed to produce good publicity. It appears that the first demonstration along these lines took place in 1929 at the Berlin Wireless Exhibition where two telephone booths were positioned at opposite ends of the Reichspostzentralamt (Post Office) stand. A single Nipkow disc performed the dual function of providing the scanning beam of light from the bottom holes and displaying the received image at the top.

Next on the scene were the Bell Telephone Laboratories in the USA. In April 1930 they demonstrated two-way televison over a distance of two miles using a definition of 72 lines. The flying spot system of scanning was employed and a neon lamp provided the modulated light source for reception.

Both of the above arrangements had the disadvantage that the bright scanning beam of light dazzled the person being televised who had great difficulty in seeing on his screen the caller at the other end of the telephone line. Baird-Nathan (established in Paris in 1932 to carry out television experiments) overcame the problem in an ingenious way. By adopting the techniques developed by J.L.Baird for his Noctovision work, they used an infra-red beam for scanning. Unusually, the scanning disc had only 24 holes instead of the standard 30. A 900 watt projection lamp and reflector were situated behind the disc which revolved at 750 rpm. A thin piece of ebonite placed in the scanning beam filtered out all of the visible light. Two groups of photocells having good sensitivity to the infra-red end of the spectrum, detected the reflected rays.

Baird Television built the equipment in London and one of their engineers, Richard Vince (seen in the photograph), went over to Paris in 1932 to arrange a demonstration of two-way television between the Galeries Lafayette and the offices of the newspaper, Le Matin, about a mile away. It took place on 19th May in the presence of M. Rollin, Minister of Posts and Telegraphs and members of the press. The Times reported 'At both ends there was a television transmitter (scanner) working by means of a spirally perforated revolving disc which turned at the rate of 750 revolutions a minute, giving twelve and a half complete images per second. An ebonite screen filters out all but the infra-red rays, so that the sitter is unaware that any light is playing upon him. The varying electrical impulses gathered by a photo-electric cell and conveyed in this instance by wire to the receiver, are faithfully reproduced by a neon light seen through a revolving disc (a mirror drum, in fact) and thrown upon a screen, building up an image corresponding to that transmitted. In today's experiment the receiving screen, some 10 in. long by 5 in. wide, showed the head and shoulders of the sitter. Although the image was fairly coarse the features of the sitter were clearly recognisable, while the movement of the lips could easily be followed. From the offices of Le Matin your Correspondent carried on a brief conversation with an engineer at the Galeries Lafayette. The whole play of expression on the face of the speaker was remarkably clear, and when he obeyed a request to put out his tongue the organ in question popped out from the face on the screen. It required a considerable effort to remember that one's face was appearing on the screen at the other end since, as has already been explained, the screening light from the transmitter had been deprived of all but the infra-red rays, which are invisible to the eye'.

A few weeks later, equally successful tests were carried out between Paris and a studio erected at the Lyons offices of the Galeries Lafayette, a distance of 250 miles.



There's music in the air

The story of Sudbury Radio Supply

by Patrick Hempell GOHUG

Dedicated to George Kemp, who served at Sudbury Radio Supply for forty years. He died on Boxing Day aged 88 years after a long illness.



We've all witnessed the rise of computer stores and video shops in our towns in recent living memory, to satisfy the insatiable appetite or so it seems in the eyes of the perpetrators, of the consumer for new-fangled gadgets. While some shoppers throw their hands up in horror at these 'blots on the landscape' to others they are the very elixir of modern life.

T'was ever thus, of course: and rarely more so than during the burgeoning years of wireless communication, the founding of the 'British Broadcasting Company' and of course, the listener. And to meet the needs of 'the listener' arose thousands of radio emporia up and down the nation, often managed by young, ambitious individuals eager to provide components and even complete equipment to those keen to pick messages and music out of the ether. Enter one such Suffolk-based entrepreneur, Terry Rudderham, who in 1923 aged eighteen established the 'Sudbury Radio Supply Co.'

His first premises were situated at No. 50 North Street, Sudbury, in what is now part of an Indian restaurant. In the early twenties it was a modest, single-fronted shop, the first of a row of one-storey, flat roofed commercial outlets on the edge of the shopping area of the town and a good quarter-mile from the thriving twice weekly market, a focus for inhabitants of outlying villages. Attached to the roof of his establishment was a tall aerial mast steadied by guy wires carrying the word 'wireless' to confirm his line of business,

which by all accounts soon became brisk. His main stock appears to have consisted of crystal and valve receivers, horn loudspeakers and to drive the sets — exide batteries; to deliver them he employed a young factotum named George Cole who rode a motorcycle and sidecar combination resembling a pirate's treasure chest with a trailer behind, both boldly advertising the company.

Shortly, like so many other wireless dealers of his time, he was to embark on manufacture of his own brand of receivers. Named 'Chieftain', he is known to have designed and made simple crystal radios using a flat, tapped coil and an enclosed galena and cat's whisker detector. The set was tuned simply by moving a wiper across the tappings of the coil, and the wooden cabinet, supplied by Terry's father-in-law who was an undertaker and joiner in nearby Acton Square, housed the ebonite-based chassis. A surviving example of this model tunes in happily to Radio 4 on Long Wave using a 40ft aerial and some deft manipulation of the detector.

Judging by the BBC stamp on existing valve receivers his foray into powered radios

Fig 3

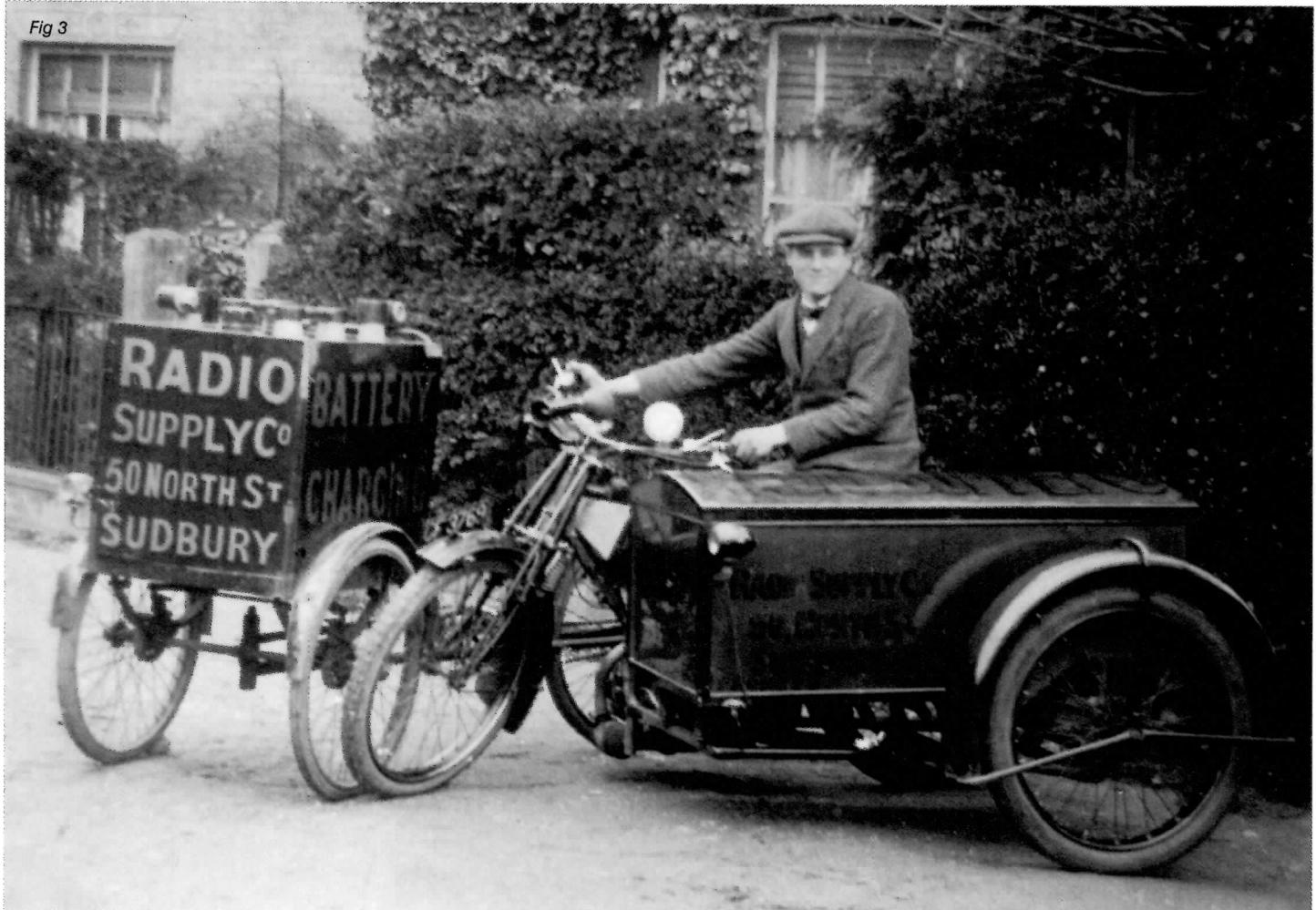


Fig 1: 50 North Street, Sudbury, 1923-27 and a young Terry Rudderham.

Fig 2: An early trade exhibition display, possibly at Sudbury Town Hall. Chieftain radios are much in evidence.

Fig 3: George Cole with a motorcycle / Sidecar / trailer combination in the mid- twenties. George stayed with the firm until he retired.

Fig 4: Beyond the bottom of North Street to Old Market Place, next to the Town Hall. Terry Rudderham and (possibly) Clifford Gates (1927- 1934).

Fig 4





Fig 5

Fig 6



followed soon after the crystal set, perhaps 1925. There are known to be two models of two-valve receivers, a 'Chieftain 2' which is completely enclosed with a hinged lid and controls on the top of the case and a 'Chieftain Super 2' whose valves sit atop the cabinet along with the operating knobs and multifarious terminals. Currently the Company's 'Chieftain Super 2' runs a pair of PM2 triodes and is of standard TRF design using an inter-valve transformer and Amplion horn speaker. Sadly little remains of the original enclosed two-valver which has since been recreated from parts not to mention a little detective work!

The final remaining 'Chieftain' radio is a three valve affair, similar to the '2' but with an extra amplifier stage. Although lacking its cabinet the works survive and have even recently performed in public, although suffer-

ing some instability. When new this would again have been of enclosed design.

Meanwhile now that Terry Rudderham was exhibiting at local trade shows he was outgrowing his premises, so in 1927 he moved to the bottom of North Street adjacent to the busy Market Hill and next door to the Town Hall. Again a single-fronted shop, this establishment nevertheless had plenty of depth for stock and an excellent outlook. His 'WIRELESS' logo was positioned over the door although, since there was a flat above, there was no room for the mast. By now in addition to his usual stock he was advertising 'Battery charging and repairing', and these premises provided the workshop facilities featured in an old photograph of rows of accumulators on wooden benches with a large window area beyond. Apparently, since these windows backed onto the rear of the

LISTENERS
OUR 'TAPER'
BATTERY
CHARGING
GIVES A
DOUBLE LIFE
TO YOUR
BATTERIES
RADIO SUPPLY CO.
SUDBURY

--RADIO--

Wonderful New 1935 Sets are out now. They are in stock ready for you to see and hear at RADIO SUPPLY Co.

Better Results and Greater :: Value than ever before. ::

Fill in the Coupon below and you will be delighted with what we have to offer you.



Part Exchange and Easy Terms.



Fig 7



Fig 5: Terry Rudderham demonstrates wireless 'al fresco'. Employee Clifford Gates could be man in centre of photograph



Fig 8

Town Hall they could not normally be opened to release the gases which otherwise wafted through the shop- but if the Town Hall was found to be unoccupied they were surreptitiously left ajar for added ventilation! On one occasion Sudbury Radio Supply found itself on the receiving end of a bill for damaged stock from the grocer next door- evidently battery acid had been spilt into the floor which saturated some vegetables, rendering them inedible.

In 1934 the 'Radio Supply Co.' shortened its title and changed its address, this time to No.3 North Street- the busy end. These premises were built of lath and plaster with plenty of internal beams in true Suffolk fashion, yet it had a fine double front with a recessed doorway so that the stock could be viewed almost sideways as well as from the street: a cellar for storing and charging batteries, now big business supplying both radio customers and the garage trade: further accommodation upstairs for stock and workshops and a useful yard to the side with frontal access for vehicles.

A rather more macabre feature of this shop was the skeleton of a cat which, in East Anglian tradition had been buried alive in the fabric of the building. Intended to bring luck, although presumably not for the cat, when it was removed many years later nothing would work in the repair shops until the unfortunate remains were duly and rapidly reinstated to ensure continuation of business.

Not content with a prime site in Sudbury, an advertisement soon appeared in the Suffolk & Essex Free Press announcing that 'Opening on Monday Next (Aug 27) a Branch Shop in Hall St., Long Melford... A large selection of Radio Receivers, Parts, Batteries etc...' and reassured readers by concluding that 'the shop is under capable management...'. This move to an adjacent village was no doubt designed to compete with another established dealer, Dudley's of Long Melford and Sudbury: however Radio Supply's Melford branch

Fig 6: 3 North Street, Sudbury 1934- present, pictured about 1939. From left to right are employees Miss Duce- Book keeper, Master Totman- a young helper, Lionel Bennington, Terry Rudderham, unknown, Chas Raymond, George Kemp and George Cole.

Fig 7: The short-lived television extension to 3 North Street, pictured around 1955.

Fig 8: 3 North Street, Sudbury today. The shop front is practically unchanged. the company altered its name to Rent-a-Vision in 1961.

Fig 9



Fig 10

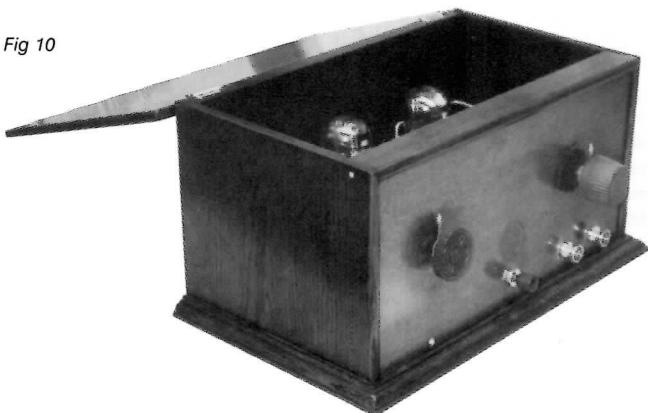


Fig 11



Fig 12

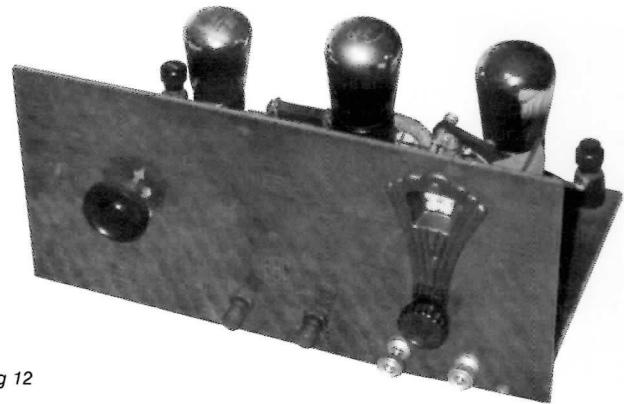


Fig 9: Chieftain crystal receiver, believed to be designed by Terry Rudderham. There is no BBC stamp although the set is thought to be one of his earliest.

Fig 10: The all-enclosed Chieftain 2 two valve receiver. The internals have been reconstructed although the case, front panel and controls are original.

Fig 11: Chieftain Super 2 two valve receiver. This set may have had a hinged lid and bright emitter valves when new. It is still in running order. It is attached to an Amplion Dragonfly horn loudspeaker.

Fig 12: The Chieftain 3 receiver. The dial is illuminated and the set incorporates an extra amplifier stage and heater rheostat, otherwise similar to the Chieftain 2.



RADIO SUPPLY CO. SUDBURY

CAR RADIO FITTING STATION

RADIO REPAIRS

BY
EXPERIENCED
ENGINEERS



We loan you a Set free of charge when we collect your Set for Repair.

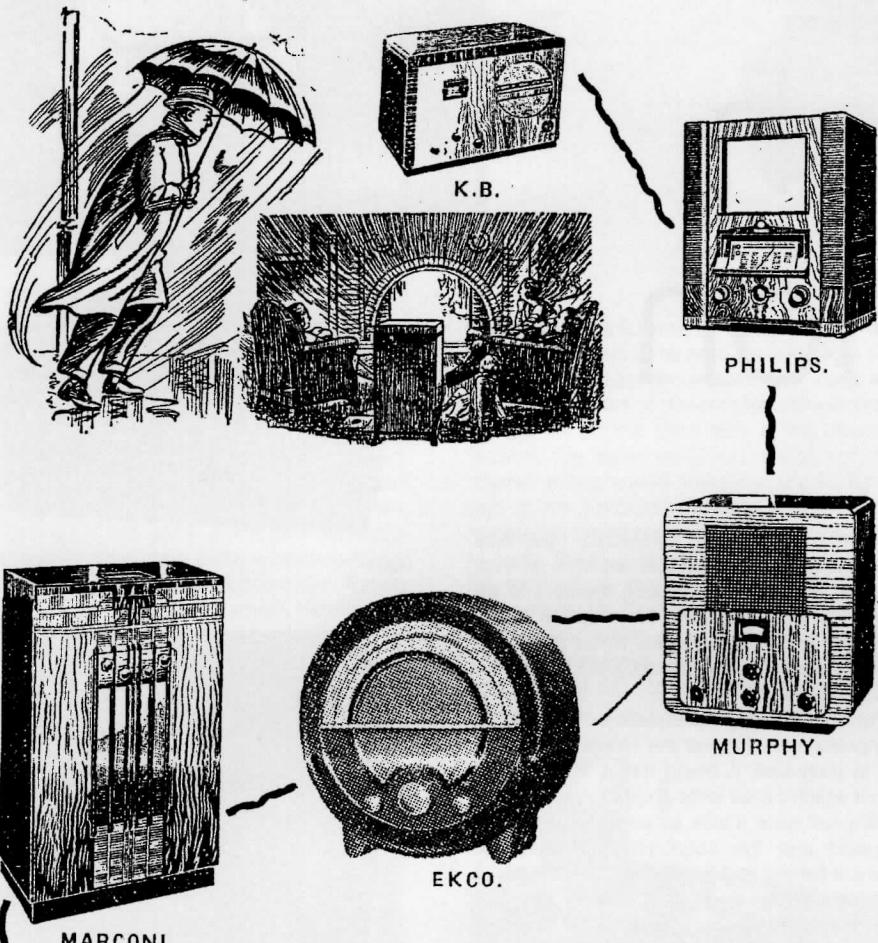
— ESTIMATES GLADLY GIVEN. —

RADIO SUPPLY CO. SUDBURY

Buy a modern Set now

and discover perfect

Fireside entertainment.



**And all other reliable makes
are in stock at**

**RADIO SUPPLY CO.
SUDSBURY**

and LONG MELFORD.

had closed by the outbreak of World War Two.

The power of the local media was ably exploited by Terry Rudderham. There was an insert in most weeks' issues of the Free press, be it at the top corner of an inside page or a large spread across the front. At this time the Radio Supply Co. could boast membership of the 'Radio Society of Great Britain and the Wireless League' as an 'Approved trader and repairer' proudly displaying its logo; early ads depicted line-drawn scenes of domestic, fireside bliss as the family unit snuggled round the latest wooden, fretwork wireless cabinet. Of course, ownership could be attained on the 'easiest of easy terms'- the vulgarity of money

being but a future indulgence! Also at that time he dealt in several makes including Murphy (later to be a revered dealership), Philips, Marconi, and KB. The famous Wells Coates round Ekco was featured abundantly in illustrations of the period; yet cheaper models such as 'Wizard' and 'Browning' radios were stocked, offering 'maximum results at minimum costs — the hyperbole flowed in torrents...

By 1938 television had reached Sudbury. The first dealer to demonstrate it was Dawsons of Friars Street, who had a set working in their window. A contemporary report adds that 'vision and sound were

extremely good, and proved such an attraction that the police requested its removal to avoid congestion of traffic'. Not to be outdone Sudbury Radio Supply had a forty-four guinea Pye model up and running hot on the heels of Dawson's demonstration set although, bearing in mind it had to receive signals from Alexandra Palace about 60 miles away, it apparently suffered rather from interference from motor cars in the street. As in all districts television did not take off in a big way before the war since the technology was out of the reach of most pockets, but Mr Rudderham was there from the beginning in a side of the business in which he eventually specialised.

Due to restricted wireless manufacture during hostilities, and then only for the forces, domestic retailers could no longer supply new radios to the public. Terry Rudderham, now with seven workers on his payroll, was forced to place an insert showing an elegantly stocked shop front but underneath the picture admitting 'no sets for sale- but still a first class accumulator charging and set repair service'. No doubt he did brisk business charging batteries for consumers who had yet to connect up to the mains electricity supply, still unavailable in some surrounding villages even after the war. But while most customers would use accumulators for radio receivers, one user had a less conventional application for recharged batteries. An ex-engineer, George Kemp, now in his late eighties, tells the story that he had the job of supplying fresh accumulators to one Harry Price, the official ghost-hunter at Borley Rectory, England's most haunted house. For some months Price famously maintained a round-the-clock vigil in the hope of capturing sounds or other ghostly evidence with his sensitive detection equipment; it is unclear whether he succeeded but shortly afterwards Borley Rectory was burned to the ground in mysterious circumstances.

Meanwhile, by 1946 supplies of new receivers resumed; television transmissions, closed down in September 1939, were back on air and the Radio Supply Co. could serve the needs of the public. By 1952 regular ads appeared that the company was 'fully equipped for the efficient and rapid servicing of Television'; amongst all the publicity for the forthcoming Coronation appeared advice to order early as supplies of televisions were limited — of course this was the very bonanza the manufacturers had been waiting for, and were only too happy to oblige. More televisions were sold in Coronation year, 1953 than ever before. It can hardly be coincidence that Terry Rudderham announced an extension to the North Street shop — he took over the butcher's next door during that July, nor that he was leaning towards the highly lucrative television market.

Up until 1961 Radio Supply Co. continued to sell radios, televisions and offer repair facilities, but another angle was being profitably developed — television rental. Not wishing to be burdened with heavy repayments and expensive repair costs, many customers were willing to rent a television in exchange for rapid free service, repairs and the facility to upgrade when they desired. There was little local competition and a substantial, loyal customer base. The workshop facilities could easily be geared to repair stock sets quickly, the work shared between three or four engineers and as many drivers. To this end Radio Supply Co. became the self-explanatory 'Rent-a-Vision', dispensing altogether with sales as well as with radios in order to concen-

rate on the burgeoning viewing market. Terry Rudderham never retired, maintaining his autocracy until his death at the age of 82 when his son Tony took over the business a few years ago.

Older residents of Sudbury still think of Rent-a-Vision as 'Radio Supply Co.', yet few

can remember its origins. Even Terry Rudderham could not have predicted the explosion of television, video recorders or satellite decoders in almost every home when he opened his little shop at 50 North Street over seventy years ago, nor his considerable contribution towards it.

The author would like to thank Tony Rudderham, George Kemp and Len Palmer for their assistance in the preparation of this article and the supply of photographs and advertisements.

A French Collection

by Harold Page

It was said that a true music lover was a person who, upon hearing a soprano voice coming from the bathroom, put their ear to the keyhole! During a visit to the Toulouse area of France, I quite unexpectedly emulated the 'music lover'

Touring with our caravan, we were told of a stylish restaurant with good food and wine. The table was booked, we arrived on time. In the entrance hall there stood two almost life size statues of scantily clad beautiful ladies. Also there stood a Philips 3V + R model 2531 with octagonal speaker. Confusion time. I took a picture of the radio! How is that for devotion to the BVWS? Less flatteringly my wife was unimpressed, claiming my diverted enthusiasm to be due to my age.

The frontispiece in the foyer was part of a small but interesting collection of French radios, neatly displayed around the restaurant. Mine host, Albert Bentaboulet, possessed a somewhat unusual attitude to his collection. Each model was exactly as he discovered it. He could not accept any attempt at restoration, technical or cosmetic. If the model was found with a broken scale or a chipped cabinet — that was how he wanted it to remain. Having said that, every model was spotlessly clean; careful dusting and polishing was obviously a daily routine.

The jewel in the crown residing in the entrance hall was in working order; connected to a good antenna it was able to bring in Radio 4 long wave on a good day. The

medium wave was crowded, perhaps overcrowded, with programmes from all over Europe. A tablet on the back stated it to be 'imported from Holland'. No surprise there, but a joy to see and operate whilst giving the two ladies a sideways glance, just to be polite, you understand.

Perhaps one day the Bulletin will organise a competition to discover the oldest instrument still in daily use. A friend has a 1930's HMV about which I shall write another article.

Why not have a look for yourself? The food is good and the countryside picturesque. There is fishing and boating on the lake and it is good walking and riding country too. The lake and complex is southeast of Toulouse and almost due west of Carcassonne. La Ferme de Champreux Montgeard, Telephone 61 81 33 13. Some English is spoken if your French is a bit rusty. Mr Albert and his staff will welcome you. Hands off the two ladies please!

Figure 1: Philips 2531 circa 1930. 3V + R AC. MLW in 'Philite' cabinet feeding a Philips octagonal speaker

Figure 2: Triumph? mains radio

Figure 3: Clarville mains radio

Figure 4: Philips 3121 loudspeaker

Figure 5: Radia Mains radio

Figure 6: Inovat; looks like a self-assembly model

Figure 5

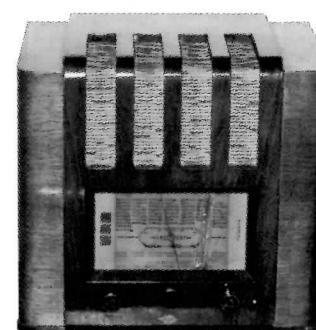


Figure 4

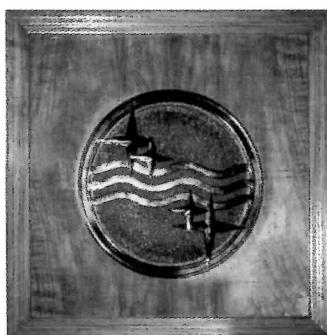


Figure 1

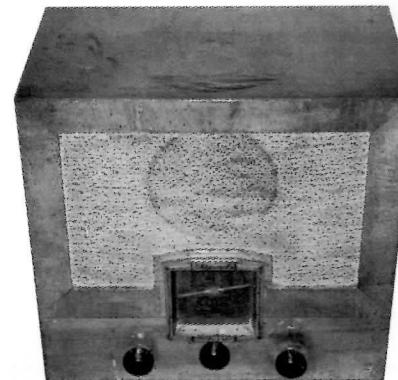


Figure 2

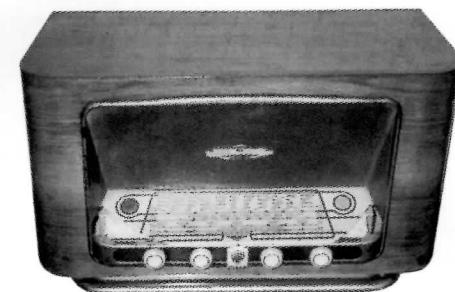


Figure 3

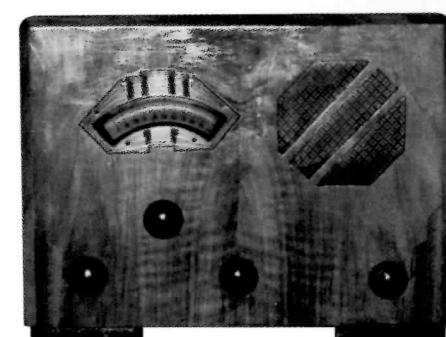


Figure 6 (below)

THE FEDERAL 110

An American Loss-Leader

by Pat Leggatt

I like to have representative foreign equipment in my collection, and so far, in addition to the UK, I have sets from Belgium, Denmark, Finland, France, Germany, Holland, Sweden and the U.S.A. A fairly recent acquisition from America is the Federal 110, which I call a 'loss-leader' in two senses; first that it was introduced in September 1923 as a simpler and cheaper item in the Federal range; and second that it is a rather poor electrical design with several features leading to signal loss. But as long as a set has interesting individual characteristics, who cares if it doesn't perform very well!

The Federal Telephone and Telegraph Company was based in Buffalo in New York State near Niagara Falls. It was formed in 1908 and later diversified into radio components, then selling its first complete receiver in October 1922. The Company had a fairly short life in the radio field, finally going under in the Wall Street crash of 1929.

Federal were not altogether fortunate in their Chief Engineer Larry Horle, a dedicated engineer who insisted on the highest standards of mechanical construction but with too little recognition of the economic implications. As a result the receivers were beautifully made and splendid to look at; but manufacturing costs, and hence selling prices, were uncompetitively high. The 110 model which I have dates from September 1923 and is a simple 3-valve set designed to sell at less than half the price of the contemporary more elaborate models: hence my description of it as a loss-leader, although it was probably not actually sold at a loss.

The mechanical construction is indeed a pleasure to see, even incorporating chromium plating on the connecting strips and screws in the anti-vibration assembly carrying the three 01-A triode valves. All the components are of Federal's own manufacture and are of generally good quality.

However the electrical side is a rather different story, making this and other Federal sets poor performers in terms of sensitivity and selectivity. Figure 1 shows the circuit of the HF and detector stages, omitting for simplicity the conventional transformer-coupled output stage and the two jack sockets which give headphone access either to the output stage, or to the detector while cutting the output valve filament supply.

Inspection of the diagram reveals several interesting, if undesirable, features. There is only one tuned circuit, the detector input being untuned. There is no reaction, since Federal were not licensed to use Armstrong's regeneration patent. The HF stage is not neutralised and would break into self-oscillation were it not for the application of positive grid bias to produce grid current damping of the input tuned circuit: this damping of course reduces the selectivity of the only tuned circuit in the set. On the other hand, the bias control can be adjusted such that the HF stage is almost, but not quite, oscillating which gives some sort of reaction effect. This did not contravene Armstrong's patent since the positive feedback through the anode/grid capacitance could conveniently be regarded

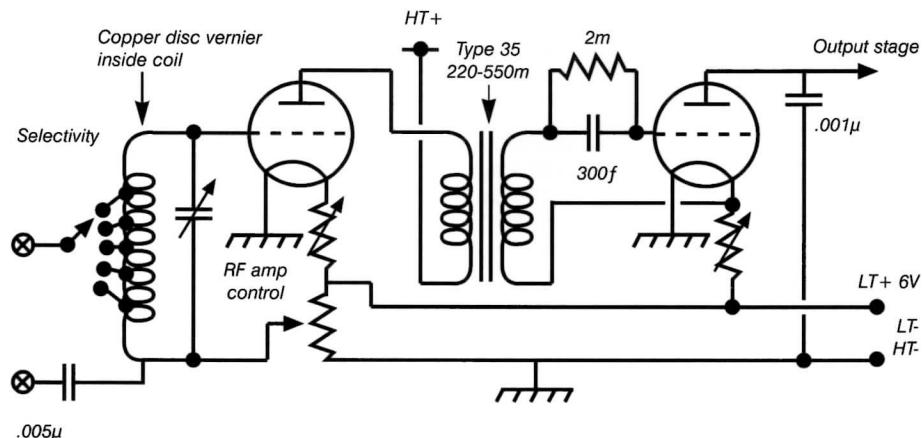
as 'accidental' rather than deliberately introduced.

To add one more little damping burden on the tuned circuit, a vernier tuning control is provided in the shape of a copper disc inside the coil which can be rotated by a panel control. With the disc axis at right angles to



the coil axis, no effect is produced; but when the disc is co-axial with the coil then the inductance is reduced by eddy current effects. Thus we find an American echo of the lossy 'spade tuning' of the English Marconiphone V2 and other sets.

Another point of considerable interest is the



detector input RF transformer (see Figure 2). An internal connection in this component had come adrift and I had to open it up to effect a cure. Imagine my surprise when I found that the transformer had a laminated iron core, not of course of the ferrite iron dust variety, but consisting of laminations in the fashion of an audio transformer. Some 1923 Atwater Kent breadboard receivers also included iron-cored RF transformers but few, if any, other manufacturers adopted this design for the very good reason that it is certainly most unsuitable for radio-frequency work and contributes further to the relatively poor sensitivity of the receivers, particularly at the high-frequency end of the broadcast band.

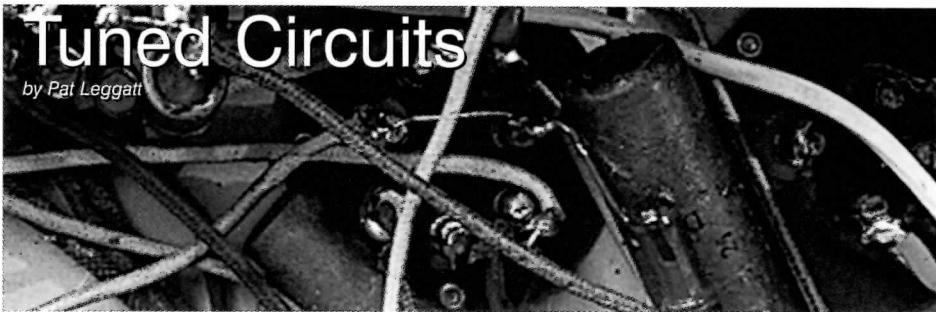
The background to the Federal iron-cored RF transformer is interesting. Apparently it was devised towards the end of World War I by Larry Horle and Professor Hazeltine - later of Neutrodyne fame - collaborating on a receiver design for the US Navy. When Horle joined Federal after the War he embodied the iron-cored RF transformer in all their receivers (apart from a crystal set) right up to 1925. Federal called this 'broadpass amplification' and made versions for four different wavebands between 175 and 3000 metres, marketing them also as separate components for home constructors. The version used in the ready-made domestic receivers, including my 110, was the No.35 to cover the range 220-550 metres. In view of their designation for specific wavebands, one presumes that the units exhibited some fairly flat resonance determined by the number of turns and their self-capacitance. But they must all be very lossy at radio frequencies, hence my use of 'loss-leader' in its other sense!

Two last titbits concerning this intriguing but rather curious company are first that Federal were very proud of their interstage audio transformer. To assist in its design they mounted trials "to determine what parts of the music of a good orchestra could be omitted without serious loss of the pleasure of listening by the average observer". Having thus decided what could safely be jettisoned, they announced that in a system using their transformers "The notes of the bass viol, the kettle drum and the piano bass are carried through with a completeness and roundness that is amazing".

Finally there was the horn loudspeaker they marketed in 1923. Scorning the language of ordinary men, they called it a "Pleionphone". For anyone whose schooldays are rather in the past, the name is derived from the Greek 'pleion' meaning 'more'; so a Pleionphone gave you 'more' sound than headphones. Such an educated lot, these Americans!

Tuned Circuits

by Pat Leggatt



Tuned circuits

Inductance and capacitance acting together will form a tuned circuit. In a radio set this usually takes the form of a coil and capacitor connected in parallel, the capacitor being variable where tuning is to be controlled, or fixed for a fixed-tuned circuit such as a superhet IF transformer.

Frequency

When dealing with tuned circuits it is best to think in terms of frequency rather than wavelength. Frequency is defined as the number of times an oscillation repeats itself in a second, and used to be measured in 'cycles per second (c/s)': but the modern term is 'hertz (Hz)' after the German physicist Heinrich Hertz who first demonstrated radio waves. One hertz is the frequency of an oscillation going through one complete cycle (positive to negative and back to positive) in a second, so that 1Hz is the same as 1c/s. Audio frequencies range from a few tens of hertz to about 20,000 hertz (20 kilohertz, written as 20kHz); while radio frequencies cover 10kHz through megahertz (millions of hertz, MHz) up to 300 gigahertz (300,000 megahertz, 300GHz).

Wavelengths

Radio waves travel through space at a speed of about 300,000 kilometres per second. Consider a wave with a frequency of 1MHz, which will repeat itself every millionth of a second: during this millionth of a second the wave will have travelled 300 metres. So 300 metres is the distance between successive crests of the wave, and we say the wavelength is 300 metres.

In general we can convert frequency to wavelength in metres by dividing 300,000 by the frequency in kHz: for example a frequency of 30 MHz (30,000kHz) is equivalent to a wavelength of $30,000/30,000 = 10$ metres. The reverse conversion from wavelength to frequency can be done by dividing 300,000 by the wavelength in metres to get the frequency in kHz.

Resonance

Many things in nature resonate at a particular frequency. Strike middle C on a piano and the string will oscillate at what is called its 'resonant frequency' of about 262Hz. Columns of air in organ pipes, and bells in a church tower exhibit similar behaviour. So a rather more formal name for an inductance/capacitance combination is a 'resonant circuit' and it is this, as depicted in Figure 4, that we must now consider.

If a fairly low-frequency signal is applied across A-B, the reactance of the inductance L will be quite low and the reactance of the

capacitor C quite high. Accordingly a comparatively large signal current will flow down the L leg. A high-frequency signal will have the opposite effect, and a large current will flow down the low-reactance C leg. There must be some frequency in between where the reactances of L and C are equal, so that equal currents flow down each leg, and this is the 'resonant frequency'.

You will remember that current in an inductance lags the voltage, while current in a capacitor leads the voltage. The fact that the resonant frequency current in one leg of Figure 4 is lagging while that in the other leg is leading, means that although the currents are equal in magnitude, they are opposite in polarity: when the current in one leg is at its positive peak, the current in the other leg is at its negative peak, and the currents are said to be 'out of phase' or 'in antiphase'.

Now the total current I flowing into the circuit must be the sum of the currents in the two legs: but since the two currents are equal in magnitude but opposite in phase, they cancel out and the sum of the two is zero. Although we are applying a signal voltage to the circuit, no current is drawn and the reactance of the circuit at the resonant frequency is infinite.

In practice, of course, this ideal state of affairs does not occur. The coil L cannot be a pure inductance, due to the resistance of the wire from which it is wound. The capacitor C will have some leakage through its dielectric, however small, and will not therefore be pure capacitance. The result of these departures from the ideal is that the reactance of the circuit at its resonant frequency is not infinite, but is some high value less than infinity. At this point it is worth mentioning that when resistance is mixed up with inductance or capacitance, the 'resistance' to alternating signals is known as the 'impedance' rather than pure reactance.

To sum up then, the resonant circuit of Figure 4 will shunt away unwanted lower frequencies through the L leg, and will shunt away unwanted higher frequencies through the C leg. But at the resonant frequency in between, the circuit impedance is very high, very little shunting away occurs, and signals at the resonant frequency appear strongly. By making L or C variable, the circuit can be tuned to give its strong resonant response at the frequency of whatever station is wanted, or at the intermediate frequency (IF) in a superhet receiver.

As a final point here, the lower is the resistance of the coil winding, the greater is the response at resonance and the faster the response drops off at frequencies on either side of resonance. This means that the tuned circuit will be very 'selective', responding strongly to the wanted frequency to which it is tuned and rejecting other frequencies nearby. A good quality coil with very little resistance is said to have a high Q'.

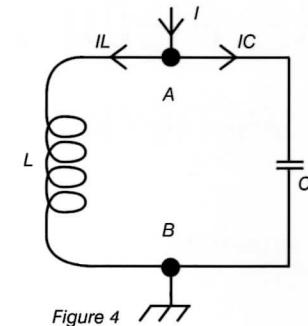


Figure 4

Calculation of resonant frequency

As noted above, the tuned circuit will be at resonance when the reactances of the two legs are equal in magnitude.

$$2\pi f L = 1/2\pi f C$$

With a little algebra shuffling this becomes:

$$4\pi^2 f^2 LC = 1$$

$$\text{so } f^2 = 1/4\pi^2 LC$$

and the resonant frequency $f = 1/2\pi\sqrt{LC}$

From this we can see that the larger the inductance or capacitance, the lower will be the resonant frequency.

We can also see from this why a 500pF variable capacitor is generally used for tuning over the medium wave band. The minimum capacitance of the tuning capacitor will be about 50pF, giving an overall capacitance range of 10:1. Because it is the square root of C which determines the resonant frequency, our tuning capacitor will give a tuning frequency range of $\sqrt{10}$, which is about 3:1. So with a suitable coil we can tune over the band from 1650kHz (182 metres) to about one third of this frequency, that is to 550kHz (545 metres).

Tuned oscillators

Finally we should note the use of a tuned circuit in an oscillator, such as the local oscillator in a superhet. Figure 5 shows a valve oscillator with a tuned grid circuit.

Any small current in the inductance L1 - arising from random movement of electrons - will generate a magnetic field. This field will soon collapse and in doing so induce a voltage across the coil. This voltage will charge the capacitor C which then discharges back through the coil setting up a current and associated magnetic field once again. The process repeats at the resonant frequency of the tuned circuit, energy oscillating to and fro

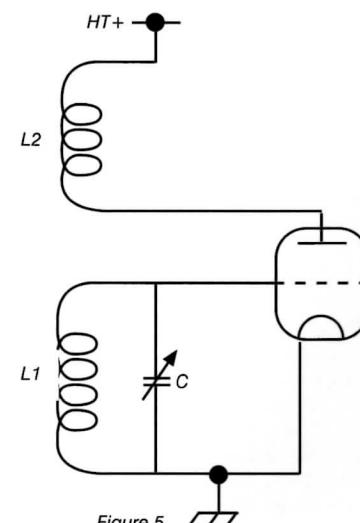


Figure 5

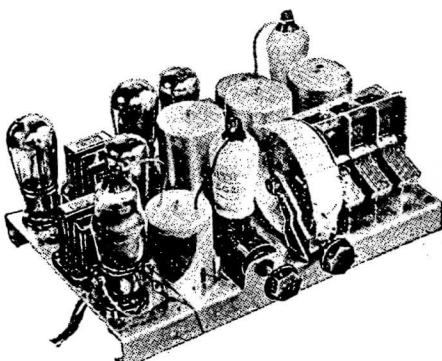
between the inductance and the capacitor. Of course this oscillation would soon die away due to resistance in the tuned circuit, but via

the feedback winding L2 the valve tops up the energy lost in each cycle and maintains steady oscillation.

Since the capacitor is variable, the oscillation frequency can be tuned to whatever is required for reception in the superhet receiver.

The Lissen 'Skyscraper Seven'

by Geoffrey Dixon-Nuttall



Lissen superheterodyne kit set.

In 1933 Lissen had ideas of their own. In previous years they had produced kits for the 'Skyscraper 3' and 'Skyscraper 4', which the Wireless World reviewed, but the 'Seven' was something else. It featured a special valve, the A.V.C.2, which as can be seen, looked like nothing else. It is a diode-pentode, with a top cap and two side connections. The top cap is grid one, the side connections are surprisingly grids two and three. It is important that the leads to these are made of different lengths, so they cannot be crossed over. Whether the set was designed to sell the valve or the valve designed to the whim of the set designer, who knows. (There was also a mains version of this valve, but as far as can be ascertained, this sank without trace).

The 'Seven' is a seven valve superhet, with bandpass input and A.V.C.. To get over a basic problem the I.F. transformers were delivered ready aligned, to 126 kHz. (in fact there is no way of altering them). The kit came with an assembly instruction sheet about three feet by four, which is fine except that it leaves no room on the kitchen table. It is all very well organised and easy to put together.

The circuit uses a screen grid mixer with a separate oscillator, followed by a screen grid I.F. amplifier. Surprisingly, the pentode of the

A.V.C.2 is used as a leaky grid detector, and the residual R.F. at its anode feeds the diode, which supplies A.V.C. to the mixer and I.F. stage. They claimed that this arrangement gave amplified A.V.C., but I am not sure about this. The audio end is conventional, with a Class 'B' output.

It seems that this set had not worked for a long time. The spaghetti resistors were all O/C - they always are - and so was the volume control. The paper capacitors leaked. The A.V.C.2 was missing, but, amazingly, one turned up soon after.

Switching on produced the most deafening noises. These were traced to the oscillator, which squeaked badly. Reducing the grid leak to 9k cured that. It then went very well, although I'm not too keen on the sound of the Class 'B'. Whoever spent £8 17s 6d on the kit must have been most disappointed. There was a cabinet available, but he didn't think it was worth it. This cabinet, incidentally, came as a 'flat pack', which was an idea ahead of its time.

Either this kit frightened people or it was too expensive, but it apparently didn't sell, and next year Lissen started selling it ready made. It still didn't do all that well, as this is the only one I have ever seen or heard of. If they all had squeaking oscillators, I'm not surprised!

A Roberts Story

by A. Gates

My mother always complained that she couldn't get the stations she wanted on her small transistor radio, Radio 4 or the 'Home Service' as she preferred it. I finally gave in, the small radio was difficult to tune and most times was always off tune; time to replace it I thought. The year was 1971, there was a wide range of radios to choose from — Hacker and Roberts to name just two. I settled for the Roberts R600 with Long, Medium and VHF, large tuning and volume controls with a red rexine cabinet. The price, I think was seventeen pounds. The Roberts proved to be an ideal choice, with its clean full sound.

It remained in continuous daily use giving no trouble and much pleasure for the next 11 years; sadly my mother died in 1982. I used the Roberts in the kitchen, for the travel news. After visiting my Aunt I realised she needed a radio, so the Roberts went to her for another four years. Sadly my Aunt passed on. My cousin returned the Roberts and it was looking the worse for wear — the handle was

broken and the case discoloured but the aerial was still intact.

The year was 1987 and the Roberts had been going around for 16 years. I put it back in its box and stored it in the loft with some other radios.

I moved from the flat in 1987 and passed many sets to Gerry Wells for the museum. I had far too many to keep, but I kept the Roberts for sentimental reasons.

I was using a Ferguson 621U covering Long, Medium and VHF in the kitchen for travel, news and music until Melody Radio and LBC came along. The VHF coverage on the 621 was 88 - 101 MHz, not bad but not good enough. Melody was on 104 MHz as well as many new stations.

After much thought I decided to buy a new radio. The radio had a well known name on the front, but didn't reflect the past workmanship or quality associated with this name, (I wonder if he is referring to Bush? - curious Editor) every time you pushed the preset tuning the station would change or go

completely off, it drifted more than a man in a boat in the North Sea!

One of the office girls at work had also bought one of these sets and had the same problems. She took it back and exchanged it but the second set was the same.

I brought the Roberts down from the loft; it was working fine, but needed cleaning. I removed the chassis from the case, I took off the volume and tuning knobs and carefully removed the dial. I cleaned the case with soap and water and washed the dial under clean, cold water.

With the Roberts reassembled, it looked like its old self and still had a nice sound. That's the Roberts story. Not bad after 25 years and still in use.

Radio! Radio! (third edition)

by Jonathan Hill, reviewed by Carl Glover

To say that Radio! Radio! when it first came out all those years ago was an important book is in itself an understatement. To many it is the book. In fact your Editor would never have

collected wirelesses if it were not for this worthy tome.

Now, Jonathan Hill has published the third and final edition of Radio! Radio! The book now extends all the way up to 1970 — the year the Wireless licence ended. It also includes special features on the PAM 710 (as featured

in the last Bulletin), the Regency TR1, the Horophone, an Edwardian Amateur station and a directory of stations and wavelengths. With over 1,000 photos and 320 pages can you afford to be without this book? I can't.

For further details see advertisement on inside back page of this Bulletin.

Letters

Dear Editor

May I offer very sincere thanks to Tony Constable and Willem Hackmann for their messages of sympathy on the recent loss of my wife; and to our Editor for finding space for them.

Such kindness from friends and colleagues in the Society is certainly a comfort at a sad time.

Yours sincerely
Pat Leggatt

Dear Editor

I was most interested in the article by Jonathan Hill / Mick Carter in the Winter Bulletin on the PAM 710. I remember vividly as a child being taken with great excitement round the Pye radio works (sadly now largely demolished) by my late father who worked there. I remember meeting Dr Lax and Amal Roy who were regular visitors to our home. We helped Amal overhaul the engine of his Morris 10/4 in our garage!

My father had been involved during 1954 in the development of a Pye underwater television camera and grab attachment, which was used to locate and salvage wreckage of the De-Haviland Comet 'Yoke Peter' which had crashed off the coast of Elba in the Mediterranean. I still have much archive material of this period and possess a disc recording of his interview with Gerald Priestland on 'Radio Newsreel' on March the second 1954. He had been a long term radio enthusiast, and at the age of 21 had bought a new RGD 1202 radio-gramophone, which was subsequently replaced by a Dynatron 'Merlin' console after the war, the RGD being given to his sister. I still treasure the Merlin, but sadly the RGD (with which he had made and fitted a square art-deco style clock in the top section) has long gone. Thanks to Clive Mason in Stourbridge, I have obtained a perfect 1202, and am presently restoring a 1201.

Although having only recently joined the BVWS, I have always been interested in early radio, especially Pye equipment. Throughout my childhood the kitchen table was seemingly always occupied by friends' sets being repaired. I remember in the late 50's seeing a Pye P152PQ personal transistor set with deluxe leather case in the local radio shop, and desperately wanted one. For Christmas 1959, aged 10, I finally got a cream and red plastic cased P160PQ. As the article stated, it is hard nowadays to realise just how expensive they were, and to my parents 14 Guineas was out of the question. I was offered a 'jewel case' at £10, but no, it had to be transistor set. A compromise was reached where I sold my entire mint/boxed 'Dinky toy' fleet of one hundred odd cars for £5 to subsidise it. The demand for the sets obviously exceeded supply at this time as it was impossible to obtain one through the staff discount scheme at £10-19-6d. It was finally obtained from Andrew McCulloch of Arbury Court, Cambridge. The firm is still going strong to this day and so is my much-travelled P160PQ: 37 years and no repairs, a lasting tribute to

those Pye made transistors. I recently acquired an earlier leather cased version, not pre-tuned at 1500 metres. I am looking out for the colour variants of red / black and the rather peculiar sea green. I agree with Mick on the style of the 710, but to me the P160Q is a timeless classic, as stylish for the time as the M78F 10 years earlier.

The final hurdle is to find a Chinese lacquer 'Black Box'. I remember playing Bill Haley 78's on one in the Pye social club in St Andrews at top volume - I was on cloud nine!

Yours sincerely
Roger Coleman

Dear Editor

Some years ago I acquired from a former serviceman an assortment of valves which included a few curiosities: Mullard type-names in Mullard boxes but which, from the shape of the glass bulb, were clearly made by Cossor. There were HF pentodes type VP4B, with yellowy gold metallising instead of the more coppery Mullard hue; they had clearly started life as Cossor MVSPenB. Likewise there were output pentodes labelled Mullard Pen4VA, but with the much-more-voluminous envelope of the Cossor MPPen; they did not have the usual Cossor 'C' embossed onto the anode.

I am familiar with the badge engineering that went on with imported American valve-types, but did not realise that such shenanigans happened among British valve-makers. Does anyone know why Stanley Mullard acquired valves from A.C. Cossor and had his own name put on them?

Or was there an anonymous manufacturer who made valves regularly for Cossor but only occasionally for Mullard?

This re-badging makes nonsense of the dire warnings about the effects on a customer's warranty of not replacing valves with the specified manufacturers type.

Barrie Land

Dear Editor

The Bulletin has improved so much lately that it seems churlish to complain. However, I must point out that two of the circuit diagrams in 21/4 do not make sense. The bottom two rectifiers on page 22 are reversed; if anybody tries to use this circuit as drawn the mains transformer will not last very long.

The BM20 diagram on page 38 is more interesting; as drawn there is no return for the grid of V2. The easiest way of providing this is to short out the capacitor marked 0.02*. The volume control will then vary the AC signal, but not the DC which seems to be the intention.

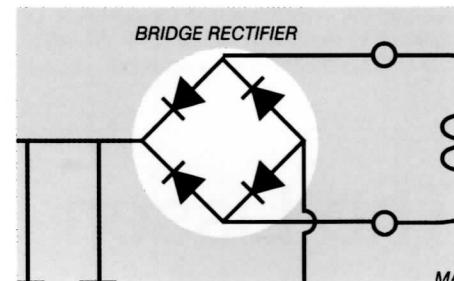
The beautiful photos of 'Cathedrals' make me wonder were they really this splendid colour? Surely most radio cabinets were walnut, not mahogany?

Yours sincerely
Geoffrey Dixon-Nuttall

Dear Editor

With reference to my article 'The amateur repairer' in the Winter 1996 BVWS Bulletin, I would like it to be known that I am not 84 years old, which I would be if I took early retirement 31 years ago! No, just a misprint of some three and a half years.

What I am really writing about however, is the misrepresentation of the bridge rectifier in



the diagram. I am not sure what would occur in the diagram as printed in the previous Bulletin, but I am sure more knowledgeable members could tell me! (see Geoffrey Dixon-Nuttall's letter) The diagram should be as shown above.

Congratulations to all concerned for the continuing excellence of the Bulletin.

Yours sincerely
Tony Voysey

Dear Editor

With reference to John Ounsted's modified BM20 circuit diagram at the top of page 38 in the Winter Bulletin. The 6B8 valve is shown to have an open grid and not likely to work as explained in his previous article, unless of course, the 0.02 μ F AF coupler from the volume control slider has a considerable leakage of about 2Ω . C11 would also be suspect especially if its a reused tubular.

I recommend John to study the 'screen reflex' diagram on page 1145 of Langford-Smith's 'Radio Designers Handbook' 4th edition.

I used a similar circuit with a 6B8 reflex in a midget receiver in the mid- 1950's and it worked very well. I cannot vouch much for the sausages though, as I didn't have a scope.

Yours sincerely
Reg Poole

Correction: One Capacitor too many!

In the 'improved' circuit for the KB BM20 (p.38, Vol. 21, No 4) an extra, unwanted capacitor has wormed its way in. The correct circuit should, of course, have the slider of the volume control R8 connected to the top of C11 and thence to L7 and C4. V2 thus receives the full AGC potential as bias, but only a reduced portion of the full audio swing, set by R8. The starred 0.02 μ F capacitor is not needed. Sorry about the slip.

John Ounsted

Dear Editor

May I first congratulate you on yet another BVWS Bulletin. It is always a pleasure to receive — I particularly love the high quality photos of the excellently designed cabinets.

My real reason for writing whilst I have some spare time over the Christmas break to make a suggestion to the BVWS which I suspect many have not considered before. I have been to see Gerry Wells' magnificent collection at Dulwich and suggest that every effort be made to ensure that it is handed on to posterity in the best venue possible. To that end may I suggest that an application be made by the BVWS to the National Lottery fund for a permanent display venue with the best possible support possibilities. I was quite amazed at Gerry's collection and have taken a couple on later occasions who have been similarly impressed. It would be a great move forward if it could be seen by more people —

of all years — and if Gerry could get further support to assist in showing this superb piece of history to a wider audience. A well presented request to the lottery fund seems to be worthwhile to further the BVWS aims. Has this been thought of to date?

Yours sincerely Mr D.G. Long

Dear Editor

Further to my letter concerning Jukeboxes as my addiction to them.

This does not as you felt detract from my love of radios, I still have a collection (see photographs below) I also have a Belmont (1946) 6D111, a home made (approx 1923) Gecophone type with Fallon tuning condenser with original batteries dated as stamped by Norwich shop. Also Marconiphone 'super power II' type 24b, Philips 830A, EKCO AC74, McMichael Superhet mains transportable (1934) — A wedding present to my parents, EKCO AC86, Maestro 1939, Emerson 547A.

I only sold some to make space and buy better looking radios.

I could never move away from the Wireless but jukeboxes have powerful amplifiers etc.

John Wickham

Dear Editor

The indirectly heated valves made by the Austrian firm of Ostar Ganz were unique in that the heaters were rated at full mains voltage.

I have in my possession a triode type A520 for use on 220V mains. The electrodes are mounted horizontally. The cathode is a rod of refractory material pierced lengthwise by three holes through which the heater is threaded. A helical grid is surrounded by a cylindrical wire mesh anode. The electrodes

are not concentric, being set at a slight angle to each other. Was this a deliberate feature of the design or accidental in manufacture?

The valve is mounted on the five pin base familiar to us in the UK. The grid pin is partially surrounded by a semi circular slot cut through the material of the base. Presumably this was to increase the leakage path between the grid pin and the high voltage heater pins.

Leakage and hum from the heater must always have been a problem and no doubt led to the demise of this type of valve, otherwise the idea was attractive, eliminating the need for transformers or dropper resistors.

A copper ring is fitted where bulb and base join. This must have been for the attachment of the wire mesh screen sometimes fitted. The ring is not connected to a pin on the base, so a special holder must have been necessary to earth the screen.

According to Keith Thrower's 'History of the British Radio Valve to 1940' Ostar Ganz were represented in the UK by Eugen Forbat of Farnham, Surrey (later of Southampton Street, London WC2) and also Nivalight Ltd, Roseberry Avenue, London EC1.

I would be interested to hear if anyone has encountered a receiver using Ostar Ganz valves.

Dave Morris

Dear Sir

It will be apparent to most valve enthusiasts that the short life of tuning indicators is due to the decay of phosphors coating on the target and not in any way to loss of emission from the cathode. A look at screen burn on a monitor where a sustained bright display leaves a permanent change on the tube's face is a case in point. Could a possible source of extra income not be forthcoming to a small tube regunning plant who could recoat the

target and then evacuate the valve? We also would have the interesting prospect of different colour phosphors being used, I would love an orange or red magic-eye to play with!

Could any of the readership with access to TV tube plant possibly comment and cost such an idea? I have many sad dim indicators, as do most enthusiasts, which could be used for trials.

Yours sincerely
Roger Chacksfield

**The Priority on Wireless Telegraphy:
Oliver Lodge in 1894 or Guglielmo Marconi in 1895?**

Dear Editor,

In Bulletin no. 21/2, 1996 [1], Peter Rowlands replied to my short article in no. 21/2 [2] which addressed the priority on wireless telegraphy by quoting from findings Sungook Hong published in a lengthy, substantial paper of 1994 [3]. There Hong comes to the conclusion that Lodge's priority had been merely 'constructed' as the years passed by.

Maintaining the contrary, namely that Lodge no doubt deserves the priority, Rowlands cites the booklet on Oliver Lodge he and J. P. Wilson, as editors, published in commemoration of the 100th anniversary of Lodge's demonstration at Oxford in 1894 [4]. I must concede that I was unaware of this book at the time of writing my article. Meanwhile I have caught up on it, and I was surprised already when reading the Preface. There the editors claim: 'On 14 August 1894... Oliver Lodge... gave the first public demonstration of the transmission of information by radio using Morse code. Though this fact is no longer seriously in dispute, its exact significance in the history of radio technology is yet to be established.' This is an astonishing statement since numerous historians doubt the Morse-code transmission in 1894. For example, Charles Süsskind strongly denied the claim for Lodge and wrote in his lengthy and in-depth essay on the early history of electronics [5]: 'Lodge's principal contribution to radio-telegraphy, a method of resonant tuning, would have been sufficient to ensure him a lasting place in the history of electronics; he need not have attempted to carve out a greater niche for himself.'

In fact I cannot find any new evidence in the Rowlands-Wilson book, nor in Rowlands' letter, which would support the claim for the Lodge priority. Rather the old statements are repeated. The remark that Lodge himself, before he expressed claims in public (from 1916 onward), already was putting forward claims for wireless telegraphy privately, in correspondence to friends, does not help much. As a more recent principal witness in favour of Lodge the authority Hugh Aitken, with his influential book on early wireless [6], is cited by Rowlands (on p. 219 of [4]) as having been 'quite clear about Lodge's title'. But, actually, Aitken wrote somewhat hesitantly with respect to Lodge's 1894 Oxford experiments, stating (p. 118/119): 'Lodge later [1930] nevertheless insisted, not only that Morse code signals could be sent by these means, but that at the Oxford meeting [in 1894] they actually had been... On the face of it, this seems conclusive evidence' And further (p. 120): 'The reporter for *The Electrician*, for example, who commented [when writing about Lodge's lecture in Oxford] at considerable length on Lodge's theory of the retina, had not one word to tell his readers about any

Below: Some of John Wickham's collection



exchange of signals in Morse code.

The final judgement in Aitken's book [6] turns out reservedly affirmative for Lodge, after having considered the facts that (a) a definite circuit diagram of Lodge's receiving apparatus was in 1933 presented by W. H. Eccles [7] and (b) that in 1937 J. A. Fleming credited Lodge with the priority when delivering the Marconi Memorial lecture, with also Fleming, by now, referring to Eccles' diagram. Meanwhile, however we know from A. Constable [8] that Eccles used his imagination in producing the circuit diagram, and, that Fleming, forty-three years after the event, had totally changed his mind as against his earlier conviction [3] [2]. As for Aitken, it might have been interesting to ask him what his judgement would be today, after new facts have come to light. But unfortunately this is now too late since, regrettably, Hugh Aitken died about a year ago. Anyway he did have the opportunity to read and comment on Hong's script in which the 'construction' of Lodge's priority claim is presented, and Aitken raised no objections to the view of his young colleague [9].

Even statements of the contemporary admirers of Lodge are not always straightforward in their evidence but leave room for interpretation. For example, Silvanus P. Thompson, the close friend of Lodge and fierce supporter, wrote in 1900 when reviewing the patent situation: 'They [Marconi's patent claims] were evidently purposely drafted as wide as possible to cover all possible extensions to telegraphy, explosion of mines, and the like... They are not patents

for telegraphy, but for the transmission by Hertz waves of signals or impulses of any kind... In this sense beyond all question Lodge was using Hertz waves for a wireless 'telegraph' in 1894' [10]. Eye-catching are the quotation marks in the last sentence giving 'telegraph' a special flavour. Is it far-fetched to see Thompson's argumentation hypothetically running as follows: 'Marconi claimed quite general means of signalling through space, specified as widely as possible, and this he calls a wireless telegraph. And, without doubt, Lodge demonstrated a general wireless signalling method in 1894. So, why not reverse the argument and call Lodges' method a 'telegraphic system'?

But, is the whole priority dispute on 'Lodge or Marconi' in the end not futile? Not only since today, yet today better than in previous times, we know that other inventing experimenters achieved 'signalling through space' before Marconi and Lodge, and even before Hertz's 1888 revolutionary findings. To be named are here for most men like Mahlon Loomis (1866/72), Thomas A. Edison (1875/85), Elihu Thomson (1875), David Hughes (1879), and Amos Dolbear (1882) [11] [12] [13]. Of them Loomis, Edison, and Dolbear used Morse-code transmission, as also did — at least before Marconi — Ferdinand Schneider in March of 1895 [14]. Naturally, Lodge and Marconi, the latter primarily and almost obsessively, turned their and others' findings into commercial use whereas their predecessors failed in this respect and might not even have recognized the significance of their observations. Well, what really is now the conclusion in the Morse-code priority case? That Lodge and Marconi were relative latecomers, and that Marconi has more traceable 'hard' evidence in the tradition so as to present him with the (second-hand) laurel, whereas the claim for Lodge still remains putative, notwithstanding

Lodge's numerous other merits? So it appears to me at least.

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- 2 B.G. Bosch, Title as above, *Ibid.* Vol 21 No. 1, pp. 28-29.
- 3 S. Hong, *Marconi and the Maxwellians: The Origins of Wireless Telegraphy Revisited. Technology and Culture*, vol. 35, 1994, no. 4 (Oct.), pp. 717-749.
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- 5 C. Süsskind, *The Early History of Electrics - III. Prehistory of Radio Telegraphy*. IEEE Spectrum, vol. 6, 1969, no. 4, pp. 69-74.
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- 11 J.J. Fahie, *A History of Wireless Telegraphy*. Edinburgh and London, 1899; reprinted 1971.
- 12 As [5], however: I. *Electromagnetics before Hertz*, vol. 5, 1968, pp. 90-98.
- 13 L. Knight, *Radio before Hertz and Marconi. Radio Bygones*, no. 36, Aug./Sept. 1995, pp. 17-20; and no. 41, June/July 1996, pp. 18-19 & 23.
- 14 Fuldaer Kreisblatt, no. 36/1895, 23 Mar. 1895, On Schneider's wireless demonstrations. And: H. Mielert, *Ferdinand Schneider - Ein unbekannter Erfinder in der Frühzeit der Elektrotechnik*. Kultur & Technik, vol. 5, 1981, no. 2, pp. 88-91.

Yours sincerely
Berthold G. Bosch

Dear Editor

This year it would be nice to see the odd article on electronic television between 1936 & 1950 in the BVWS Bulletin.

I've been a member of the BVWS now for over 7 years and cannot ever remember seeing anything on electronic television between those dates.

You've done so much on Baird and mechanical television it's untrue.

Surely there can't be that many people interested in mechanical TV than there are who collect electronic televisions. I will be honest, I was disappointed with Ray Herbert's Baird supplement sent out before Christmas last year. It could have been a lot more into pre war and post war electronic sets with the Baird name on instead of spending so much time on the early days.

Only one picture was shown of a pre war electronic set and no pictures at all of post war models except the big colour set he invented.

More pictures of electronic sets would have been very nice. Overall I think a good opportunity was missed in not including the things I've mentioned and I know a lot of fellow collectors would agree with me.

Getting back to the Bulletin, I know you'll say the club is mainly for radio and we cannot please everyone, but I would say to that, there is a heck of a lot of electronic TV collectors in the BVWS and I think its about time they were given something interesting to read in the Bulletin.

Yours Sincerely
Robin Howells

Editor replies

Contrary to what you may think about electronic TV coverage in the Bulletin, I will

publish **any** article I am sent on the subject. The sad fact is that nobody has sent an article of this nature to the Bulletin. If anybody out there wants to write a piece on electronic TV send it to me and it will end up in the Bulletin.

One of my main reasons in taking the editorship of the BVWS Bulletin was in appealing to the broad church that our membership contains- your articles are always welcome.

Ray Herbert's television supplement was in fact intended for sale in museums and is used as a historical publication. The fact that it was used as a BVWS supplement was merely a result of Ray's own kindness in asking the Society if we wanted to include it with last year's Bulletins. I enjoyed it!

I'm sure it could be argued that all the supplements issued free with the Bulletin are of limited appeal, but if we (the BVWS Committee) are offered supplements we are unlikely to refuse. Finally if you want to see Electronic TV articles in the Bulletin please send them in.

Carl Glover

When sorting out subscriptions to the Society, Mike Barker noticed that quite a few members had included letters with their applications. here are a small selection of them:

Thankyou for the interesting well-produced greeting cards you sent- together with these, the Bulletin and the efficient service what a lot we get for £15. Best wishes for the New Year.

Norman Newson

On behalf of AWA and the Electronic-Communication Museum, I want to thank you for exchanging publications. The BVWS Journal is an excellent paper and is read by local members and filed in the library. It is frequently used for reference.

Next... the Marconi Centenary card/painting mailed with the most recent issue is great! We have already framed one to hang in the Museum.

Bruce Lewis Kelley, W2ICE
Director-Curator
AWA Electronic Communication Museum
Bloomfield
New York
USA

Just a short note to tell you how much I enjoy the new style Bulletin. The Society has certainly improved. The Wootton Bassett meeting in December was also most enjoyable. Keep up the good work! All the best wishes for 1997.

Anthony Goddard

Thank you for making the time available to help the BVWS provide the fine services to members world wide.

Robert Lozier
Monroe, NC 28112
USA

Sir, Thank you for the Bulletin (very good quality).

Bruno Ruiz
La Voulte
France

BVWS minutes

Apologies for absence: Terry Martini, David Read (gridlocked on A406).

Minutes & Matters Arising: Minutes from the meeting of 8/10/96 were agreed correct.

The question of protecting the BVWS logo was raised and is to be discussed by David Read with a team of patent agents known to him. The procedure at present used for confirming new memberships was agreed to be slow and David Read queried how it could be speeded. A membership sub-committee might be considered.

Feedback from recent events: Ken Tythacott tabled a financial statement (provisional) for the Harpenden Swapmeet on 24/11/96 which, including the proceeds of the mini-auction, showed a credit balance to BVWS funds of £300. The complimentary GEC-Marconi commemorative Christmas cards were being reprinted because of a typographical error and this would necessitate a delay of a few days in posting the December Bulletin.

Constitution: Guy Peskett tabled a draft voting form for acceptance of the new constitution. This was amended in order to ask any members disagreeing to state their reasons. The draft Constitution was then reviewed and some amendments adopted. A reference to the non-refunding of subscriptions in certain cases was added to clause 3.8 although the Committee agreed that membership was not a constitutional issue. The issue of a membership list (to be called a 'member's contact list') was discussed under this item. Application forms will be amended to allow for members' agreement to their contact details being circulated. It was agreed that the names of all Honorary Members will be listed annually in the Spring Bulletin. Clause 3.7 of the draft Constitution was amended to provide for 'exceptional circumstances' in cases where membership would otherwise be forfeited due to late renewal. A processing fee (to be

determined) will be imposed for all new members and lapsed but rejoining members. From clause 5.2(ii) the words 'and approve' would be removed. The remainder of the draft constitution was approved and Guy Peskett will arrange for its printing.

Membership cards: Mike Barker described the 1997 membership cards which will have the BVWS objectives printed on the back. Names will be written in by the individual members.

1997 Renewal forms: These will remain essentially as before except as necessary to allow for a membership list option.

Nomination Form for Postal Ballot: Mike Barker tabled Committee nomination forms and enquired of the Committee who would be standing for re-election. It was then realised that a new constitution clause was needed to the effect that nominations for Chairman, Treasurer and Editor should be restricted to those having previous experience on the BVWS Committee. Nomination papers will go out in January.

Internet: The Committee thanked Bob and Lee Smallbone for offering to demonstrate this to the Committee. Unfortunately the demonstration was frustrated by a last-minute equipment failure. Mike Barker thought the BVWS should have a web page. Bob Smallbone said that he had a vacant space on his web site and Guy Peskett offered to investigate the possibility of free access via Oxford University. A simple 'billboard' was proposed as the first stage, giving a PO box no. rather than a private address. It was agreed that Mike Barker would offer a suitable text panel to Bob Smallbone and that Guy Peskett would also design one, both to be tabled at the next committee meeting in January. It was asked whether publicity on the Internet could have the effect of generating an unmanageable number of not necessarily appropriate new membership applications. Perhaps the watchword is 'festina lente'!

1997 Calendar of Events: Ken Tythacott said that the Harpenden dates are fixed and the complete year's programme will also be circulated in January along with the circular for the auction on March 2nd. He added that Alex Woolliams now wishes his Portishead meetings to come under the aegis of the BVWS.

New Members: The Committee welcomed the following: Walter Blanchard, David Simmons, Brian Rayner, Stanley Wood, Peter Thelwall, Chan Sunderham, Edward Williams, Jonathan Cheshire, John Shorter, Colin Tebb, Kevin Ramsey, Alastair Ross, Eric Parvin, Melvin Taylor, Barry Stitch, British Sound Archives. The last-named is a former complimentary member enquiring why no publications have been received since 1994. It was agreed to resume sending complimentary Bulletins. Guy Peskett proposed that we should consider other possible candidates for complimentary copies at our next meeting and this was agreed.

Framing of Society's Bye-laws: This item was deferred to the next meeting.

Committee Travelling Expenses: Since some Committee members travel long distances to attend, it was proposed that the BVWS should formally recognise their entitlement to a mileage allowance of 15p/mile or reimbursement of public transport fares. This was accepted.

Any Other business: There being no further items the meeting concluded at 23.45.

Date of Next Meeting: Tuesday 7 January 1997 at 23 Rosendale Road.

(These Minutes were compiled by Ian Higginbottom in Terry Martini's absence)

The following BVWS Bulletin back numbers are currently available.



Vol 10 Number 2 Inc. The KB Masterpiece, Extinct Species "A Monster Defiant".

Vol 11 Number 2,3,4 Inc. BTH VR3 (1924) receiver, Marconi's 1897 Salisbury plain tests, Origin of the term 'Radio', Baird or Jenkins first with TV?

Vol 12 Number 2,3,4 Inc. the Emor Globe, The Fultograph, Ekco Coloured Cabinets.

Vol 13 Number 1,2,3 Inc. Direct action tuning, The Philips 2514, Noctovision.

Vol 14 Number 1,2,3 Inc. Cable broadcasting in the 1930's, The story of the Screen Grid.

Vol 15 Number 1,2,3,4 Inc. The wartime Civilian Receiver, Coherers

in action, Vintage Vision.

Vol 16 Number 1,2,3,4 Inc. The Stenode, The Philips 2511, Inside the Round Ekco's.

Vol 17 Number 3,4,5 Inc. Wattless Mains Droppers, The First Philips set, Receiver Techniques.

Vol 18 Number 3,4,5 Inc. The First Transistor radio, The AVO Valve tester, The way it was.

Vol 19 Number 1,2,3,4,5,6 Inc. The Birth of the Transistor, Super Inductance and all that, reflex circuits, A Murphy Radio display, restoration.

Vol 20 Numbers 3, 4, 5, 6

Vol 21 Numbers 1, 2, 3, 4

Supplements:

1 "Just a Few Lines" The Birth and Infant years of BBC Television.

2 "Metro-Vick 1922-1928", "Early Television in the UK", "Industrial aspects of the Valve before 1925"

Brown Brothers 1925/26 Component Catalogue re-print SOLD OUT!

All Bulletins and supplements are priced at £2.00 each + postage. Bulletins from volume 21 onwards are priced at £2.50 each. + postage.

Postage:

for individual bulletins add 50p, for 2-5 bulletins add £1, for 6 or more add an extra 20p each.

All requests for back numbers, should be sent to the Membership Secretary (Mike Barker) whose address can be found in the inside-front page of this bulletin.

1997 Harpenden meetings

More dates for your diary - mark them in now! The following meetings are all swapmeets with extra attractions and they are: **Sunday 8th June, Sunday 7th September and the 30th of November.**

Gerald Wells' garden party

Gerry Wells will be having a garden party on Saturday **7th June** at the Vintage Wireless Museum, 23 Rosendale Road, West Dulwich, London SE21 8DS. Telephone 0181 670 3667

Other meetings

13th April: Shifnal (Radiophile's concourse)

4th May: National Vintage Communications Fair at the NEC

13th July: Wootton Bassett

27th July: Audiojumble at the Angel Centre (new venue)

27th July: Sambrook (Radiophile's Summer Special Auction)

21st September: Portishead

12th October: Southborough Radiomeet

12th October: Shifnal (Radiophile Swapmeet)

7th December: Wootton Bassett

1998 Harpenden meetings

It might seem early but since the dates are already booked, 1998 begins (for the BVWS) with a swapmeet on **Sunday 1st of March**. Sunday the **7th June** hosts an auction, a restoration contest and the AGM. Autumn is heralded with a swapmeet on **6th September**, and the year finishes with a swapmeet on the **29th of November**.

This is Two Emma Toc. Writtle Calling!

A play for radio by Tim Wander.

At 8 o'clock in the evening of St. Valentine's Day 1922, five young men wait nervously. In a wooden hut on the edge of Writtle village in Essex the Marconi wireless engineers prepare to launch Britain's first regular radio broadcasting station. Its callsign 2MT or 'Two Emma Toc' was to become famous. The success of the first night, and the subsequent broadcasts led directly to the formation of the BBC and broadcasting as we know it today.

Station 2MT at Writtle was to break new frontiers in radio, writing the rule book and then tearing it up again for all broadcasters who followed in its footsteps. The technical excellence of the Writtle Wireless station was combined with a unique sense of humour, innovation and sheer fun that bubbled over the airwaves - quite exceptional for the world of 1922.

The new radio play tells the Writtle story of 1922 from the closedown of Chelmsford's high power tests to the formation of the British Broadcasting Company.

The play recreates broadcasts from radio station Two Emma Toc in part drawing on the actual script of programmes that went out 70 years ago and are still fresh and alive today. The very first nervous evening didn't go very well, but later, with Peter Eckersley in full flow, the flavour, fun and outlandish humour of Two Emma Toc will be heard again.

The play is sixty minutes - Cassette copies available for £6.95 including postage and packing. Cheques payable to "SSC", c/o PO BX 2562, Earls Colne, Essex, CO6 2TA.

Bulletin Index

The Bulletin Index is currently available up to issue 21/4 and is a complete cross reference of authors, subject matter and main articles back to the beginning of the Society. Please send an A4 SAE with a 31pence stamp and a cheque for £2 payable to Pat Leggatt at 28 High Park Road, Farnham, Surrey, GU9 7JL. His telephone number is 01252 719081.

New Articles

If you have anything interesting to say concerning Wireless, Television, Broadcasting, Collecting etc. please send it to the Editor for future publication in the BVWS Bulletin, as the Bulletin is only as interesting as the articles that comprise it. We welcome all suggestions and comments regarding the new appearance of the Bulletin and hope that it is catering towards your needs as a collector / enthusiast / historian. Your article can be just a few paragraphs long as long as you think it conveys its message across to your fellow members.

Also if you have any photographic material that would look good in the bulletin, don't hesitate to post it to the Editor. The chances are that I will definitely use it!

Please send all articles hand written, typed, and / or on floppy disc to:
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Eddystone Communications Receiver Data 1950-1970. A facsimile reprint of the circuit diagrams, general description and some service notes for sets from 1950-1970. 50 pages £9.75 incl p&p

Radar. PS. Hall (et al). An absorbing and informative study by authors from The Royal Military College of Science. Covers the origin, development and operation of military radar from Chain Home to Patriot etc. Numerous photos and illustrations of equipment and its principles of operation. 170pp. Published by Brassey's Weapon Technology series at £25. Our Price £7.50. p&p £2.50

AR88D Communications Receiver Manual. A facsimile reprint of circuits and data. Includes maintenance and alignment procedure. 25 pages. Large format £9.25 incl. p&p

Wireless Set (Canadian) No 19 MK III Technical Manual. Facsimile copy contains detailed description, layouts, circuits operating instructions, etc. 62 pages. Large format. £12.50 incl. p&p

Communications Receiver type CR100. Complete handbook, 56 pages, full circuits, layout and alignment notes. Large format. £9.25 incl. p&p

HRO Communications Receiver Data. A facsimile reprint of circuits and data for models HRO, HRO 5, HRO JR, HRO-5T, HRO-5R, HRO.M, HRI.MX, HRO.M-RR, HRO-TM, HR-SR. 35 pages. Large format £9.25 incl. p&p

Early Wireless by Anthony Constable. This excellent book retraces the paths of history which culminated in the final appearance of the wireless set. Much information for the collector. 167 pages. Hardback. £8.50 p&p £2.50

Radio, Radio by Jonathan Hill. 3rd edition. 320 pages. Hardback. The vintage radio enthusiasts bible. £35 p&p £2.50



RADIO DAYS

A large exhibition at the museum of Farnham in Surrey to commemorate 100 years of radio

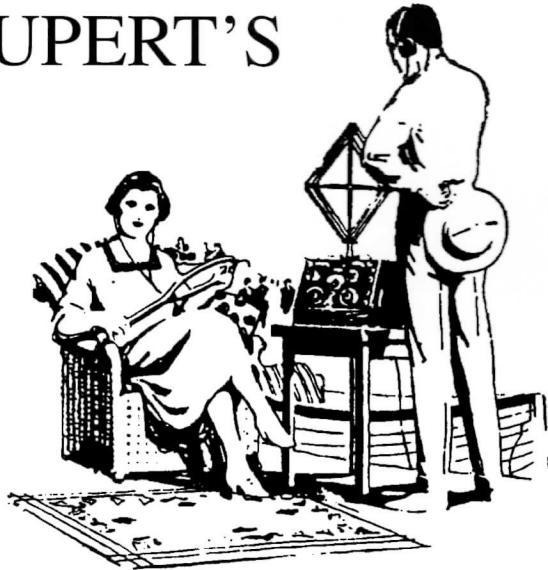
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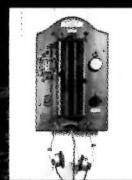
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