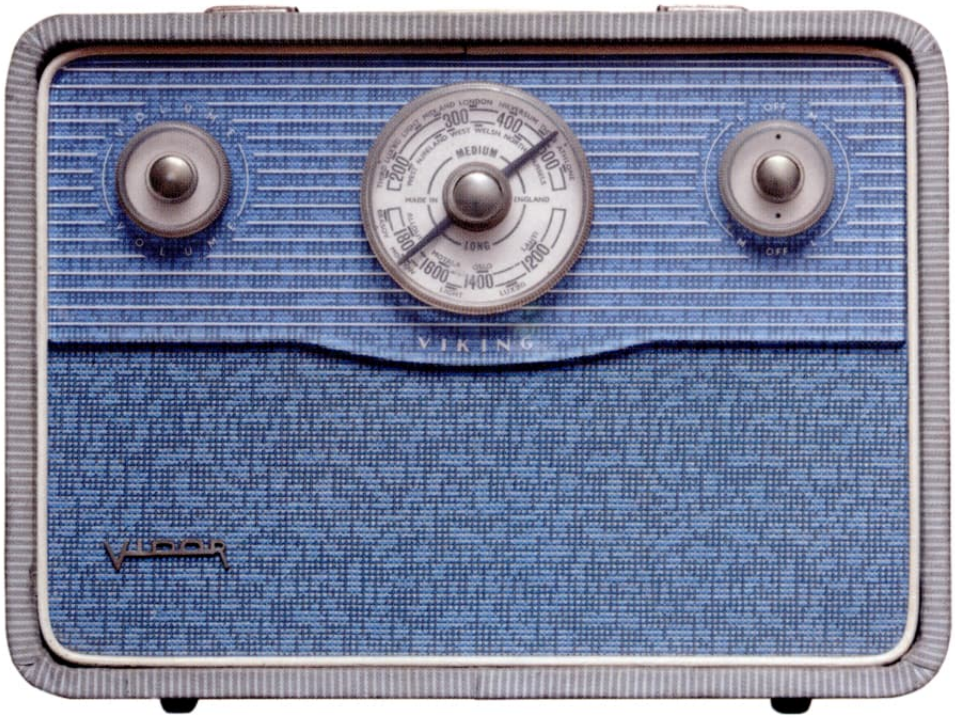
The Bulletin

ol. 39 no. 1 Spring 2014



The Bulletin of the British Vintage Wireless Society £5.00 | free to members ISSN 0955-9345

The BVWS Spares Dept

DeoxIT D5 contact cleaner / lubricant £15.00 aerosol can. Not cheap – just the BEST. Available at all BVWS events or by post for an additional £4.00

New manufacture high quality metallised polyester film capacitors to replace all old paper types in vintage equipment. Ideally sized for re-stuffing

All capacitors are 630 Volt working
All prices are for packs of 50 components and include postage and packing

Available in mix-and-match packs of 50 within price band by post.
Available in smaller quantities at all BVWS events.

0.001µF	Price band A	0.022µF	Price band B
0.003µF	Price band A	0.047µF	Price band B
0.0047µF	Price band A	0.1µF	Price band B
0.01µF	Price band A	0.22µF	Price band B

Price band A is £25.50 (inc postage)
Price band B is £29.00 (inc postage)

Electrolytic smoothing capacitors, standard 'old-fashioned' size, 500 Volt DC working

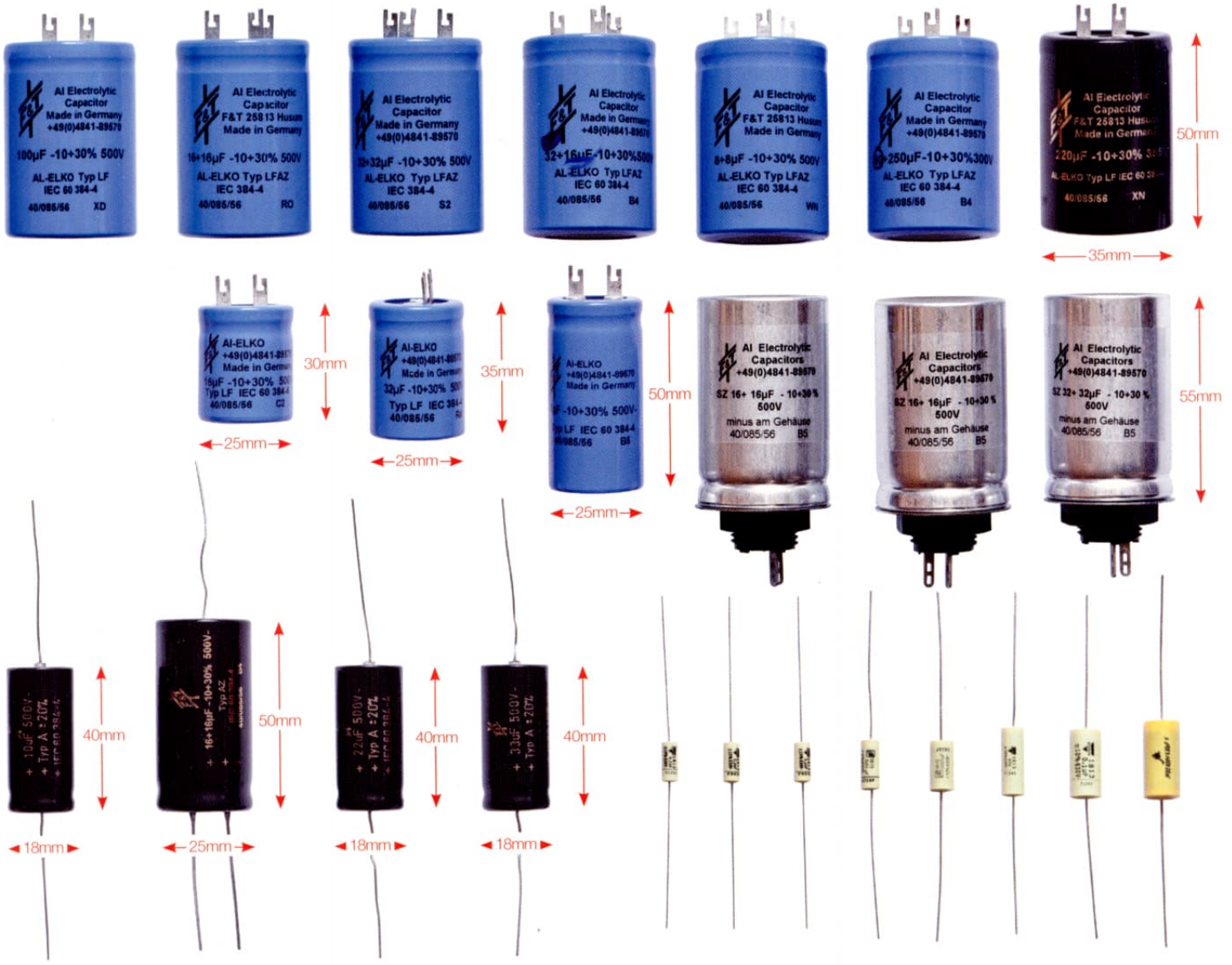
8/8µF, 16/16µF, 32/32µF, 50/50µF £7.00 each
16/32µF for DAC90A £9.00 each
100µF, 220µF £9.00 each
60/250µF for TV22 £9.00
8/8µF screw-type, 16/16µF screw-type, 32/32µF screw-type £9.00 each
16/16 µF tubular axial £6.50
10µF tubular axial £4.00
22µF tubular axial £4.00
33 µF tubular axial £4.00
47 µF tubular axial £4.50
70 µF tubular axial £4.50

NEW smaller 25mm can types for re-stuffing original single electrolytic capacitors

8µF, 16µF, 32µF, 500Volt DC working £5.00 each

Postage and packing 1 – 4 caps £3.00 5 – 8 caps £4.50

All prices quoted are for BVWS members



For non UK addresses, please contact Mike Barker for prices, (see below). All orders should be sent (with payment made out to BVWS) to: Mike Barker, Pound Cottage, Coate, Devizes, Wiltshire, SN10 3LG. Cheques payable to British Vintage Wireless Society. Please allow 14 days for processing, but usually quicker! The above capacitors are supplied as a BVWS member benefit. Anyone found to be reselling these items for profit will be expelled from the Society

Bulletin of the British Vintage Wireless Society
Incorporating 405 Alive
Volume 39 No.1 Spring 2014

www.bvws.org.uk

Separations and printing by Hastings Print

Front and rear cover: Post-war portable radios from the Ricard Taylor (2AF) room at The British Vintage Wireless and Television Museum, West Dulwich, London

Photographed by Carl Glover
Graphic design by Carl Glover and Christine Bone
Edited by Carl Glover. Sub-Edited by Ian Higginbottom
Proof-reading by Mike Barker and Steve Sidaway

Contents

HARPENDEN DATE CHANGED
Now 9th March 2014 (not 2nd March)

From the Chair

It is strange how one thing leads to another meaning that the simple jobs often take the longest time.

Back in early December we needed to get the roof insulation fitted into the Murphy Museum here, which is still just a shell of a building, but it is dry and secure. The roof joist depth is 9 inches as the span is over 6 metres, so some significant insulation was needed. We were able to secure a deal with a leading DIY chain which turned out to be even better than our local building merchant. Having made sure we purchased more than enough to do the job, we found that there was in fact enough to replace all of the insulation in the main part of the house loft. The Murphy building completed, we turned our attention to the house. We removed all of the old insulation installed in the early 1980's as it was very thin. The entire loft was hoovered as it was like a wild life colony up there.

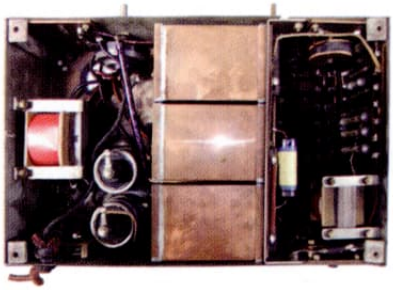
This allowed me to see all of the wiring clearly for the first time. Well it looked like someone had dumped the contents of many barrels of lighting cable everywhere. The whole lot from every light/wall light and switch, from every room came back to just two junction boxes at the centre of the house. This was going to need a re-wire. A week later and the whole lot had been done with a small mountain of cables to be disposed of. Now each separate room is wired in the modern standard way and the loft is a much tidier place. The next job was horrible. All the ancient timbers and Victorian replacements were thoroughly doused in wood preserver. We can now move the extra rolls of insulation out of our way and up into the house loft.

This will allow us to get on with the next job in the Murphy Museum.

It is a bit like the Bush model AC3 chassis that I currently have on the bench, where to get at some of the wiring which needs replacement, I have had to remove all of the under chassis coil cans and where the tapped HT feed resistor is missing from under the tuning gang, and has been for some years, the gang has to be removed. The actual fault with this set was found to be an intermittently open circuit volume control. Even the simple things can become very complicated...

At the last Committee meeting the subject of how we all got interested in this hobby came up. A very interesting conversation took place. It was thought that all members of the Society must have a story to tell and so we would like to hear from you! How did you become interested in Vintage Radio/TV/Audio etc. Please let us know and share your experiences with your fellow members. We are already busy booking trips to go and pick up radio collections for auction and it looks like we will have plenty for Harpenden and some ready for Golborne too.

Mike...



The Bush AC3 chassis before restoration

The Cossor 'Melody Maker' kit sets of 1933 by Roger Grant

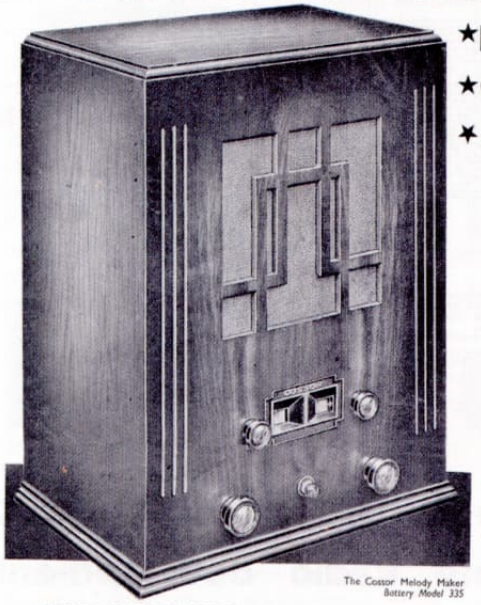
The Cossor Melody Maker kit sets of 1933 came in six varieties, three battery sets and three AC mains sets. The battery sets are model Numbers 333, 334 and 335. The 333 was just the chassis, the 334 the chassis in a short cabinet with no speaker, and the 335, the complete set in the full size cabinet with internal moving iron speaker. The AC mains sets are model numbers 336 short version, 337 full version with speaker and 338 just the chassis.

While sorting through some recently acquired books, manuals and general radio related paper work, I came across the instruction sheet to build the battery version of this Cossor Melody Maker. The instruction sheet was very tatty and an eight piece jigsaw puzzle, a bit like my old paper driving licence. The folds had worn away and there were several small pieces missing, but very interesting, this prompted me to drag out my AC mains version of this set for an airing and a re-visit.

I had purchased this Cossor 337 from a junk shop in Hanwell West London, sometime in the early 80's. I was in the area visiting Willow Vale Electronics, a little shop behind the clock tower, but there was a sign in the window "back at 2 o'clock". I looked at my watch, 1:30, many curses, with half an hour to kill I decided I'd go for a walk. I usually park outside Willow Vale on the double yellow lines and keep an eye out for traffic wardens, just dash in and out as quickly as possible. On this occasion I had parked in a local pub car park with lots of spaces as the pub was closed for refurbishment.

At the bottom of the hill there's a good view of the Hanwell Viaduct, I'd previously only seen it from inside car whilst driving so I walked down to take in the view. Half way down the hill there's a small parade of shops, I'd driven by this parade many times in the past and none of the shops ever appeared to be open. In passing on foot I noticed one of shops was a junk shop, all very dark and dingy, with a multi-paned window with black paintwork, the windows very dirty and piled with junk I noticed a dim glimmer of light from inside and the shop appeared to be open, I opened the door and walked in, wow! what a surprise, the shop was more like a museum than a junk shop. It was full of antiques rather than junk, lots of oriental artefacts, old musical instruments including a player piano and a euphonium. After a very interesting several minutes taking a good look round, the proprietor appeared, an elderly gentleman with a long white beard and I half expected to be offered a small furry creature that I mustn't get wet (as in the film The Gremlins). Returning to reality I expressed my interest in vintage wireless and I was taken into a back room where this Cossor 337 was sitting on a sideboard. After a few minutes bartering the set was mine and I found myself struggling back up the hill with this relatively heavy and bulky new treasure. I fully intended to return

A MASTERPIECE OF RECEIVER DESIGN



The Cossor Melody Maker
Battery Model 335

★New All-metal Chassis Assembly
★Complete standardisation of parts
★As simple to build as Meccano!

EACH year the Cossor Melody Maker has been re-designed and brought up to date. Each year many tens of thousands have been bought and assembled by those who know little—and even nothing—about Radio. Each year Cossor has received thousands of appreciative letters from Melody Maker owners telling of the wonderful results they have had.

The new Cossor Melody Maker is far ahead of anything Cossor has yet achieved. Not only is it even simpler to build but—due to the use of an all-metal chassis and standardised parts—no one can fail to obtain the highly efficient results of which the Receiver is capable.

When assembled, the new Cossor Melody Maker has the same professional appearance as the most expensive factory-built Set. And the handsome cabinet, solidly built by expert cabinet makers, will harmonise with any furnishing scheme.

Meets to-day's Radio conditions

To-day's big Radio problem is selectivity. With so many high-powered stations pouring programmes into the ether, there is often acute difficulty in separating them. The owner of a new Cossor Melody Maker however, will find that tuning is exceptionally sharp. Station overlap has been practically eliminated.

Uses new Cossor Variable-Mu Valve

Due to the use of a Cossor Variable-mu Valve—in conjunction with specially designed coils—station after station can be tuned in upon a background of complete silence. Even the powerful transmission of a local station need cause no interference.

Simple to operate

This powerful, long-range Receiver is remarkably simple to use. Its two main tuning controls operate slow-motion dials which are conveniently viewed behind a handsome escucheon A simple coupled wave change switch selects the desired waveband. No matter where you live, the Cossor Melody Maker will bring you an unending fund of entertainment. And so up-to-date is its design that it will give many years of service. It is indeed a receiver that you will be proud to own.

TWO BATTERY-OPERATED TYPES

MODEL 334

Complete Kit for building the Cossor Melody Maker Receiver Model 334, including Cossor 220 V.S.G. Variable-mu Metallised Screened Grid, Cossor 210 H.L. Metallised Detector and Cossor 220 P. Output Valves; individually shielded Coils, Cossor L.F. Transformer; all-metal Panel and Chassis and all the Components; Bolts, Nuts and Screws necessary for the rapid assembly of the Receiver; handsome finished Cabinet. Provision is made for fitting gramophone pick-up socket and plug if required.

£5-15-0

Hire Purchase Terms: 15/- down and 9 monthly payments of 12/6.

BOTH TYPES HAVE THE SAME CHASSIS AND ARE IDENTICAL IN THEIR OUTSTANDING PERFORMANCE

Prices quoted do not apply in I.F.S. and are subject to alteration without notice.

MODEL 335 with self-contained Loud Speaker

Complete Kit for building the Cossor Melody Maker Receiver Model 335, including Cossor 220 V.S.G. Variable-mu Metallised Screened-grid, Cossor 210 H.L. Metallised Detector and Cossor 220 P. Output Valves; individually-shielded Coils, Cossor L.F. Transformer; all-metal Panel and Chassis, and all the Components, Bolts, Nuts and Screws necessary for the rapid assembly of the Receiver; handsome finished Cabinet and 10-in. Balanced-armature Loud Speaker. Provision for fitting gramophone pick-up socket and plug if required.

£6-17-6

Hire Purchase Terms: 17/6 down and 9 monthly payments of 15/-.

BACKED BY EXPERIENCE OF OVER 400,000 COSSOR MELODY MAKERS

When you buy a Cossor Melody Maker you purchase the results of the experience of producing over 400,000 Cossor Melody Makers. Five years ago the first Cossor Melody Maker was launched. It was an immediate and overwhelming success. It placed, for the first time, long range Radio within the reach of the man of moderate means.

COSSOR VALVES
The Secret of Melody Maker efficiency

Many thousands of the original Cossor Melody Makers are still giving good service to their satisfied owners. But, since those days, Broadcasting has developed. More and more high-power stations are being opened up. A high standard of performance is necessary to get full enjoyment from the Radio. And this performance—the exceptional selectivity—the enormous range and full, rich tone—is available in the new Cossor Melody Maker. It is the very last word in up-to-date Radio. No matter what you pay it is impossible to buy a more efficient 3-valve Screened Grid Receiver.

The New COSSOR MELODY MAKER
MODELS 334 & 335

AND IT'S DONE!

Money cannot buy a better 3-valve S.G. Set

THE performance of any Receiver is largely controlled by its Valves and its Coils. These are definitely "key" components—no matter which type of circuit is used. The long range of the new Cossor Melody Maker is due to the fact that its Coils (individually-screened) are specially designed to take advantage of the high efficiency of the Cossor Variable-mu Screened-grid Valve. This new Valve—owing to its minute self-capacity (of the order of 001 micro-micro-farads) permits a very high stage gain with complete stability. As a result, therefore, under normal conditions all the principal European Broadcasting Stations can be enjoyed. Not only are the Coils fully shielded, but both the Cossor S.G. Valve and the Cossor Detector Valve are supplied with metallised glass bulbs. This is an additional safeguard against inter-action and direct pick-up from powerful local transmissions. High quality of reproduction is assured by the use of a Cossor L.F. Transformer specially designed to suit the Cossor Detector Valve supplied with the Kit. The Power Valve is a Cossor 220 P which, in spite of its high undistorted output, is particularly economical in H.T. current consumption. All three Cossor Valves utilise the well-proved Mica Bridge principle of construction which ensures high efficiency and long service.

Examine carefully the illustrations of the new Cossor Melody Maker in this Chart and you cannot fail to be impressed with its compactness, and its workmanlike appearance. It is, indeed, a Receiver of the highest grade. Never before has any Radio manufacturer—not even Cossor—offered such wonderful value for money.

KINGS OF THE AIR

COSSOR MELODY MAKER

Models 333, 334 & 335 for Battery Operation

INDIVIDUALLY-SHIELDED COILS

Individually-shielded, high-efficiency coils with ganged wave-change switch are used in the new Cossor Melody Maker. These, in conjunction with metallised S.G. and Detector Valves, provide most effective and efficient screening and play an important part in providing the exceptional selectivity that is characteristic of this Receiver.

UNIT CHASSIS CONSTRUCTION

The chassis of the new Cossor Melody Maker is assembled as a complete unit independently of the cabinet. This method of construction greatly simplifies the building of the Receiver by enabling you to complete its assembly before fitting it to its cabinet.

BRITAIN'S GREATEST RADIO RECEIVER VALUE

COSSOR MELODY MAKER

MODELS 333, 334 & 335

OPERATING INSTRUCTIONS

After you have completed the assembly of the receiver, connect the batteries and accumulator, insert the valves, and attach the aerial and earth leads in accordance with the instructions supplied with every Kit. The Set is equipped with the following controls :—

On-off Switch
Tuning Condensers
Volume Control
Reaction
Wave-change Switch

The position of these can be seen by reference to the sketch below.

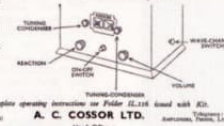
To operate the Receiver proceed as follows :—

1. Switch on (Pull out).

2. Adjust wave-change switch for wavelength to be explored : D1 for long Waves between 850 and 2,000 metres, OUT for short Waves between 200 and 550 metres.

3. Set Volume Control to maximum Reaction to zero. With both these knobs at maximum volume is approached by turning them clockwise.

4. Turn the Tuning Condensers slowly, keeping them approximately "in step" with one another; then adjust volume by means of the Volume Control.



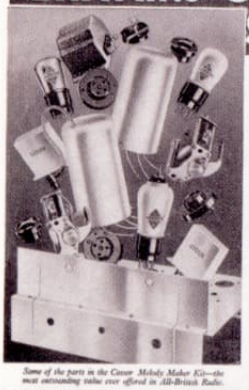
For complete operating instructions see Folder IL.216 issued with Kit.

A. C. COSSOR LTD.

Head Office :
COSSOR WORKS, HIGHBURY GROVE, LONDON, N.5

C.14.

BRITAIN'S GREATEST VALUE IN SCREENED GRID RECEIVERS



Some of the parts in the Cossor Melody Maker Kit—the most outstanding value ever offered in All-British Radio.

For the bare price of its parts you can own this powerful Set

IN 1927 Cossor produced the first Melody Maker and brought Radio within the reach of tens of thousands of homes. During each successive year, the Cossor Melody Maker has been vastly improved. Every worthwhile radio invention—as soon as perfected—has been incorporated. Screened-grid valves—shielded-coils—coupled wave-change switching—all these features, and many others, have been made available for Cossor Melody Maker owners, even before they have been incorporated in more expensive factory-built sets.

Money cannot buy a better 3-valve Receiver

During the past five years thousands of pounds have been spent by Cossor in research. A highly trained staff of radio technicians, physicists and chemists are continuously at work at the big Cossor Works at Highbury where Cossor Valves and Receivers are manufactured.

The results of this intensive research are now made available in a wonderful new Cossor Melody Maker. Indistinguishable in appearance and performance from factory-built sets costing very much more, this new Kit-Receiver represents a high-water mark in value for money. We say definitely—and without fear of contradiction—that no matter how much you pay you cannot obtain a better 3-valve S.G. Set.

Its low price is attained not by sacrificing efficiency—not by skimping workmanship—not by offering inferior cabinet work—but by designing the Receiver so that its assembly can be completed by anyone without previous electrical or radio knowledge.

You can obtain this magnificent Receiver at the bare cost of the parts, knowing that, when assembled, it is one you will be proud to own.

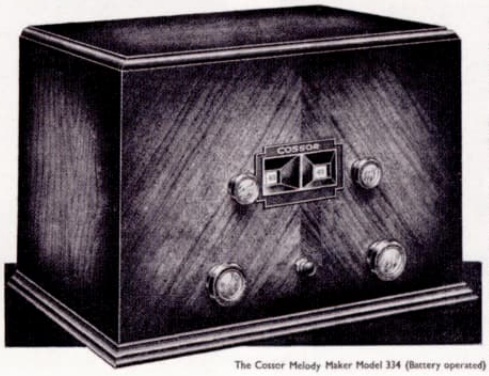
Novice or expert—success is certain

For the first time, Cossor now offers a self-contained all-metal chassis. This principle of construction—used in conjunction with standardised parts—not only simplifies assembly, but definitely ensures standardised results. Every Cossor Melody Maker must attain the same high level of efficiency. The novice building a Cossor Melody Maker for the first time obtains the same long range—the same remarkable selectivity—the same superb tone as the expert.

The New COSSOR MELODY MAKER

MODELS 334 & 335

Incorporates all the most up-to-date Radio developments

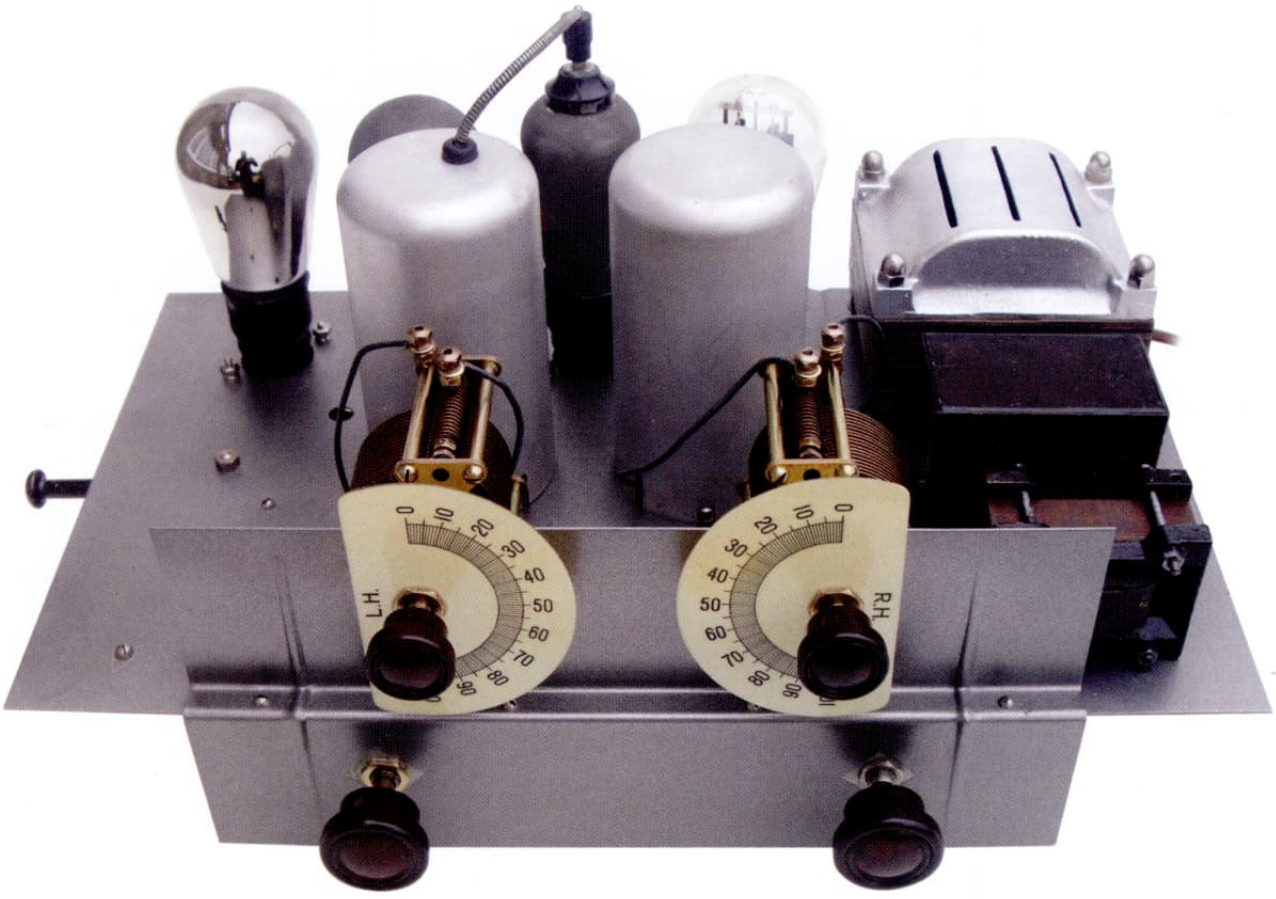


The Cossor Melody Maker Model 334 (Battery operated)

Included in the many advanced features of this high-efficiency Receiver are :

COSSOR VARIABLE-MU SCREENED-GRID VALVE (METALLISED)

In the H.F. stage of the new Cossor Melody Maker, a Cossor Variable-mu Metallised Screened-grid Valve is used. This special Valve ensures a degree of selectivity higher than has ever before been attained in a Three-valve Receiver. In addition, its graded potentiometer control enables you to vary volume at will—from the merest whisper to full loud speaker strength.



to this very interesting shop as I suspected there might have been a few more treasures lurking in dark corners but with parking in the area a big problem, it was some time before I returned. When I eventually did, the shop had gone, completely modernised and now something else, much to my disappointment.

Although the chassis was quite rusty the rest of the set seemed to be in reasonable condition and restorable. The set still had its original Cossor valves and a basic restoration was done at this time.
The rubber in the mains lead was perished and crumbling, this was replaced with a length of modern plastic mains lead. The speaker cloth was a bit ripped and fragile, so after cleaning in a photographic developer tray, drying and ironing flat, I used some of the "Iron on" backing to give it a bit more strength. You could still see some of the tears so it would have to do until I could find some similar speaker cloth to replace it with. After a few checks, the set was run up and as I remember it worked reasonably well for a regenerative set using a moving iron speaker, and it eventually joined the rest of my collection where it remained until now.

On removing the plywood back it was obvious this set has a lot of very interesting features not fully appreciated the first time round. Firstly most of the set's components are of the 1920's type designed to be screwed to a breadboard. These all have screw terminals rather than solder tags and in this case the valve holders bolted through holes punched in the sheet steel chassis. The 10" moving iron speaker is a little unusual, the drive unit is mounted on a purpose made conical frame housing the cone making it completely self contained, similar to the later moving coil types.

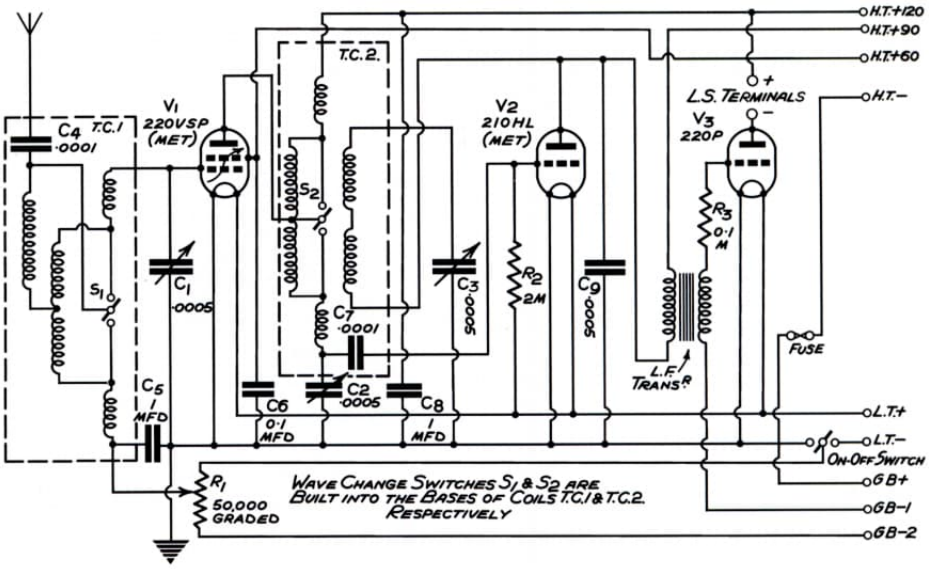
This TRF set still has separate tuning capacitors for grid and anode tuning, with screw terminals. These are in lacquered brass with ball races and with quite elaborate slow motion drives.The set has conventional regenerative feedback using a solid dielectric capacitor, the volume control, a wire wound pot, is in the cathode bias circuit of the vari-mu screened grid RF valve (MVSG). The set is in need of a more in depth re-work than the first time round, the chassis is quite rusty and requires treating and a much better job making of the speaker cloth.

I started with the chassis, the rear of which contains the aerial, earth and speaker terminals and is still exposed when the wooden back is fitted. This is quite unsightly and definitely required a rework.

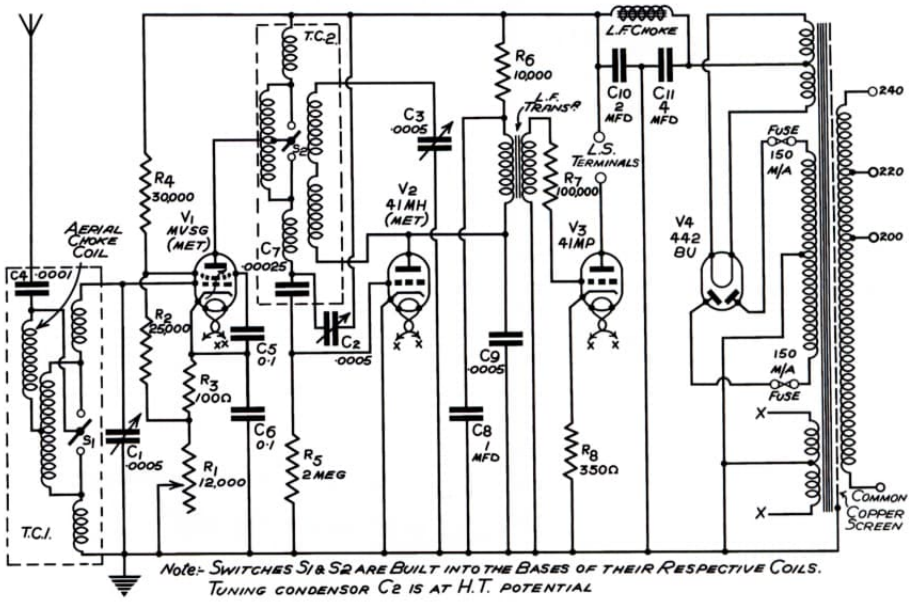
I disconnected the speaker, removed the four knobs held on with grub screws, removed the two retaining screws and the chassis pulled clear. All of the rubber wiring had the rubber crumbling off, exposing the bare wires and needed replacing. All of the nickel plated terminal screws were black with oxidation.

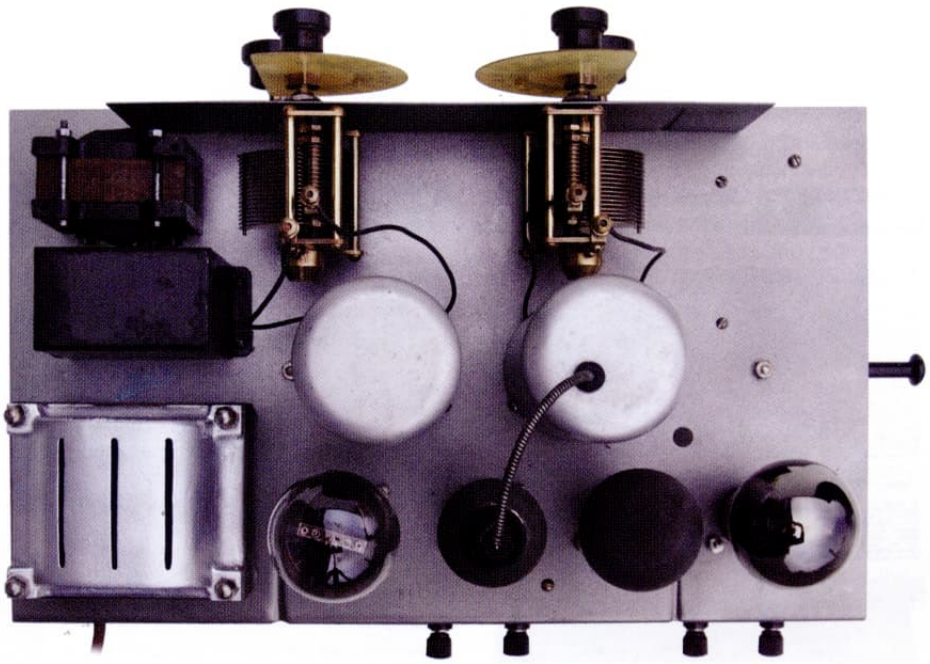
I drew a map and took some digital photographs of the wiring then removed all of the wires one by one, numbering them with masking tape tags and marking them on the map as I went. This was quite easy as there are no solder joints in the construction of this set. I then removed all of the components

THEORETICAL CIRCUIT DIAGRAM COSSOR MODELS 333, 334 & 335



THEORETICAL CIRCUIT DIAGRAM COSSOR MODELS 336, 337 & 338





COSSOR MELODY MAKER

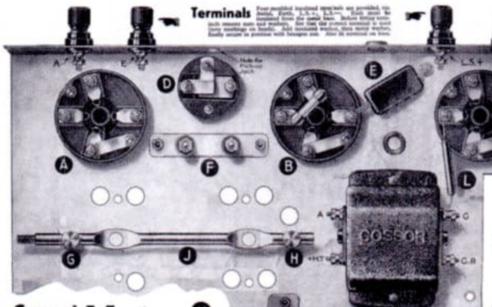
HOW TO ASSEMBLE IT IN 8 SIMPLE STAGES

MODELS 333, 334 & 335 (Battery operated)

Stage 1 Mounting Components on underside of Base

By following the instructions given below and by carrying out the assembly stage by stage you will find that the construction of this powerful Receiver is extremely simple. Do not, however, be tempted to deviate from the order of assembly that we have set out. If you do you are liable to make mistakes. This chart has been very carefully planned to eliminate every possibility of error and to permit rapid and accurate assembly without previous radio experience.

In accordance with modern radio practice the chassis is of all-metal construction and the majority of the components are mounted below the metal base plate. This base is supplied drilled and slotted and the first stage is to mount the necessary components on the underside of the base with the nuts and bolts provided. Proceed as follows:—



Valve Holders A, B & C

The three valve holders are identical. It is immaterial, therefore, in which position each is fitted. **Three black valve holder insulating discs are provided (contained in envelope). It is imperative that they be slipped on the valve holders, prior to mounting, so that they come between the underside of metal chassis and the valve holder base.** It is essential that each valve holder should be mounted so that its terminals are in the position indicated in the photograph. The metal connecting strip in each valve holder should be at the furthest point from the turned-up edge of the metal base. The valve holders are attached to the metal base from below and each is held in position by two hexagon nuts and bolts already in valve holders.

Fuse Holder D

Insert fuse-holder through hole in metal base and bolt in position with long bolts. See that its two terminals correspond in position to the photograph.

Condenser E

This small strip condenser is fitted with two metal lugs. One is to be connected to the anode terminal on Valve Holder B. The other is connected to the metal base by means of a short bolt and nut. A hole for this purpose is provided in the metal base in close proximity to terminal L.S.+.

Condenser F

This condenser projects through the slot provided for it in the metal base-plate. It is secured in position by means of two short bolts and nuts provided.

Switch Posts G & H and Switch Rod J

Unscrew knob from switch rod J and fit the two posts at each end of the switch rod as shown. Insert the threaded portions of the switch posts through the two holes provided in the metal base. See that the threaded end of the switch rod is towards the edge of the base. Bolt switch posts in position using washers and nuts provided. When tightening up see that switch rod moves freely within the switch posts and that nuts are tight.

Cossor L.F. Transformer K

It is important that this transformer is mounted with its four terminals corresponding to the photograph. The designation of each terminal will be found on the mouldings on the case. Use long bolts.

Resistance L

One end of this 1 meg. Resistance must be attached to the Grid terminal of Valve Holder C, whilst the other is connected to Terminal G on Cossor Transformer K.

Condenser M

This consists of two condensers connected in series in one container. It is fitted with three terminals. The condenser projects through the slot provided for it in the metal base and is secured in position by means of the bolts and nuts provided.

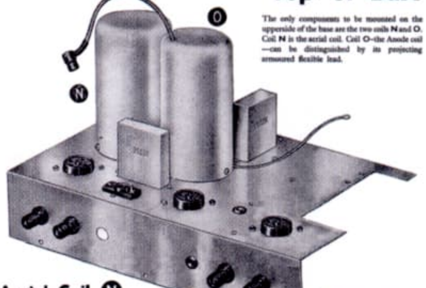
Grid Leak

This component (here illustrated):—

must be mounted on Valve Holder B as shown in the large illustration.

Stage 2 Mounting Components on Top of Base

The only components to be mounted on the upperside of the base are the two coils N and O. Coil N is the aerial coil. Coil O—the Anode coil—can be distinguished by its projecting armoured flexible lead.



Aerial Coil N

Three flexible leads project through the underside of this coil. It should be mounted on the metal base so that its three holes line up with their respective holes on the metal base. The three flexible leads should be brought through the metal base ready for connection to their respective components. One lead on the side of each coil (above the base) is to be left until later (see Stage 6 Wires 20 and 21) for attachment to its respective variable condenser. Each coil is secured in position by means of the two hexagon nuts provided.

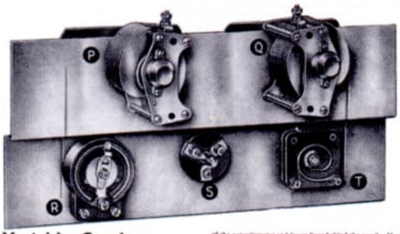
IMPORTANT NOTE. Remove only top nut on each screw, on no account touch others.

Anode Coil O

The five flexible leads should be brought through the holes provided for them in the metal base. As with coil N see that all holes are in alignment with those in the base. Each flexible lead must be brought through its correct hole.

Note.—The heads of the switches (incorporated in the coils) must be pushed through the holes provided in the switch rod. The two flat portions of the switch rod are slightly offset and before finally securing the coils in position see that the flat portions of the switch rod are nearest to the metal base.

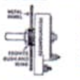
Stage 3 Mounting Components on Panel



Variable Condensers P & Q

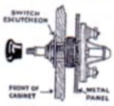
These two condensers work in opposite directions and it is essential that each should be mounted so that its moving vanes are on the right when the panel is viewed from the back. This will bring the terminal of the condenser uppermost. After locking the condenser in the position indicated in the photograph by means of its hexagon nut its slow-motion dial must be fitted. This is marked L.H. It is secured to the condenser shaft by means of two hexagon nuts, the thicker of which should be screwed on first. The dial should then be slipped into position and locked by means of the thinner nut. It should be fitted so that the straight portion of the dial is horizontal above the shaft (that is, with the scale downwards) when the moving vanes are out of mesh with the fixed vanes. If on fitting the chassis into its cabinet (see Stage 8) the dials are too far away from the escutcheon they can be brought forward by adjusting these two hexagon nuts. Variable Condenser P is fitted in precisely the same manner.

Potentiometer R



It is essential for the potentiometer to be insulated from the metal panel with the ebonite bush and ring provided. Fit the ebonite ring around the threaded metal portion of the potentiometer and insert from behind the panel. Now fit the ebonite bush, and lock in position with the nut, the terminals being downwards as shown.

Three-point Switch S



The shaft is fitted with two flats which engage in a slot when the switch is depressed. This prevents the spindle from rotating when unscrewing the knob. Remove nuts and secure the switch to the panel, by means of the large circular nut, in the position shown in the photograph. The contact which is not fitted with a terminal should be downwards.

Reaction Condenser T

This condenser should be mounted on the panel by means of its nut with its two terminals downwards as in the illustration.

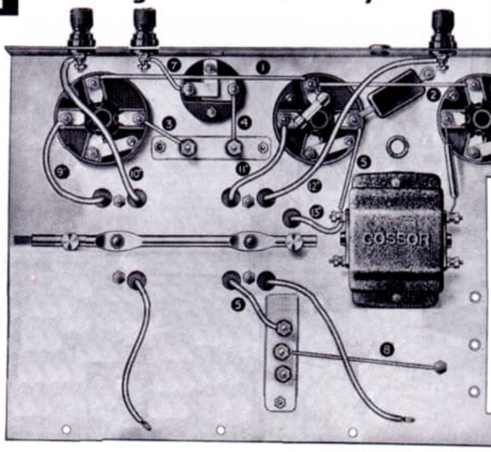
Stage 4 Wiring the Base—only 14 wires to connect!

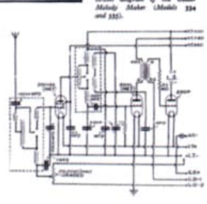
Point-to-Point Connections

IMPORTANT. All wires (both in this Stage and Stage 6) excepting those marked * (which are permanently attached to the coils) must be insulated by means of the systoflex sleeving provided. After cutting each wire to its correct length, slip the sleeving over it leaving sufficient bare wire at each end to form a loop for attachment to terminal.

1. From Filament terminal on valve holder **A** to Filament terminal on valve holder **B**.
2. From Filament terminal on valve holder **B** to Filament terminal on valve holder **C**.
3. From Anode terminal on valve holder **A** to terminal on Cossor Condenser **F**.
4. From terminal on fuse holder **D** to terminal on Cossor Condenser **F**.
5. From Anode terminal on valve holder **B** to terminal **A** on Cossor Transformer **K**.
6. From terminal **L.S.**— to Anode terminal on valve holder **C**.
7. From Earth terminal (marked "E") to terminal on fuse holder **D**.
8. From centre terminal on Cossor Condenser **M** to terminal on metal base.
9. Flexible lead from Aerial coil **N** to grid terminal on valve holder **A**.
10.* Flexible lead from Aerial coil **N** to Aerial terminal.
11. Flexible lead from Anode Coil **O** to Grid terminal on valve holder **B**.
12.* Flexible lead from Anode coil **O** to terminal **L.S.**+.
13.* Flexible lead from Anode coil **O** to terminal **A** on Cossor Transformer **K**.
14.* Flexible lead from Anode coil **O** to terminal on Cossor Condenser **M**.

*All wires marked with an asterisk are flexible leads permanently attached to the coils.



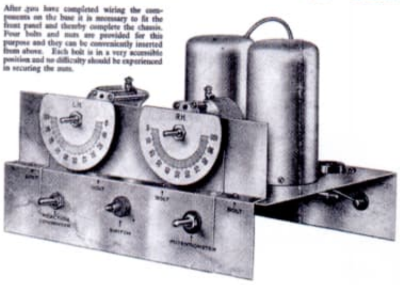


Below is shown the theoretical circuit diagram of the Cossor Melody Maker (Models 334 and 335).

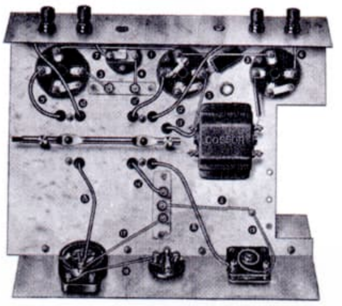
WE RESERVE THE RIGHT TO VARY THIS SPECIFICATION AND TO SUPPLY ALTERNATIVE COMPONENTS IF NECESSARY

Stage 5 Mounting Panel on Base

After you have completed wiring the components on the base it is necessary to fit the front panel and thereby complete the chassis. Four bolts and nuts are provided for this purpose and they can be conveniently inserted from above. Each bolt is in a very accessible position and no difficulty should be experienced in securing the nuts.



Stage 6 Wiring Panel to Base—only 7 connections!



*All wires marked with an asterisk are flexible leads permanently attached to the coils.

BELOW BASE

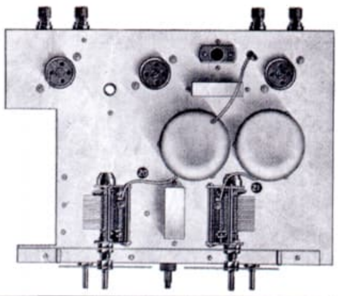
15.* Flexible lead on Aerial coil **N** to centre terminal on Potentiometer **R**.
16.* Flexible lead from Anode coil **O** to terminal on Reaction condenser **T**.
17. From centre terminal on Potentiometer **R** to terminal on Cossor condenser **M**.
18. From terminal on Potentiometer **R** to terminal on three-point switch **S**.
19. From terminal on Reaction condenser **T** to terminal on metal base.

ABOVE BASE

20.* Flexible lead from Anode coil **O** to Variable condenser **Q**.
21.* Flexible lead from Aerial coil **N** to Variable condenser **P**.

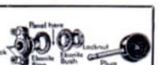
Loud Speaker Connections (Model 335 only)

Two Terminals on the metal chassis marked L.S.+ and L.S.— are for use with an external Loud Speaker. Two lengths of rubber-covered wire about 14 inches long should be connected to the back of these two terminals and brought through the insulated hole situated in the metal base between Valve Holders B and C. The other ends of this flex are to be connected to the Loud Speaker after it is fitted to the cabinet as described in Stage 8. These instructions, of course, do not apply to Model 334.

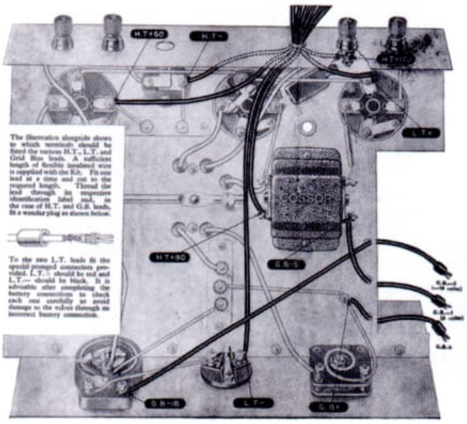


How to fit a Gramophone Pick-up

A hole is provided at the back of the chassis for fitting a Cossor Pick-Up Jack and Plug, Cat. No. 3316 which can be obtained through your Radio Retailer if required. The Jack is insulated from the chassis as shown in the diagram. Its two terminals are connected as follows: one terminal is connected to the grid terminal of the valve holder B (the terminal to which flexible lead No. 11 is connected). To the other terminal of the Jack is connected a length of flex to the end of which is fitted a wander plug. This wander plug is to be inserted into the socket marked "—1½ volts" on the grid bias battery.



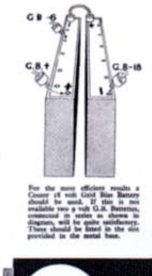
Stage 7 Attaching the Battery Leads



The illustration alongside shows to which terminals should be fitted the various H.T., L.T. and Grid Bias leads. A sufficient length of flexible insulated wire is supplied with the Kit. Fit one lead at a time and cut to the required length. Thread the lead through its respective identification label and, in the case of H.T. and G.B. leads, fit a wander plug as shown below.

To the two L.T. leads fit the special pronged connectors provided. L.T.+ should be red and L.T.— should be black. It is advisable after completing the battery connections to check each one carefully to avoid damage to the valves through an incorrect battery connection.

Stage 8 Fitting Chassis in Cabinet



For the most efficient results a Cossor 18 volt Grid Bias Battery should be used. If this is not available two 9 volt G.B. Batteries, connected in series as shown in diagram, will be quite satisfactory. These should be fitted in the slot provided in the metal base.

The first step in completing the assembly of Model 335 is to mount the Loud Speaker in position. Before inserting the chassis in the cabinet the Loud Speaker must be screwed (with four large screws) to the cabinet by its metal rim which supports the diaphragm. It should be mounted as close to the top of the cabinet as possible. The remainder of the instructions given below apply equally to both Models 334 and 335 except where stated.

It will be more convenient to add the Grid Bias Battery when chassis has been fitted to cabinet. Before sliding chassis into the cabinet see that the straight edges of the two dials are in a horizontal position (that is with scales downwards). The controls should project through the holes provided in the cabinet. Fit the switch escutcheon around the shaft of the switch and lock in position by means of the hexagon nut provided. The rectangular slot in the cabinet has been made large enough to permit the main escutcheon to be adjusted to the two dials. After positioning escutcheon secure in position with smallest screws. If as explained in Stage 3, the dials are too far behind the escutcheon plate they can be brought forward by adjusting the nuts which hold them in position. Each knob (with the exception of the switch knob) is secured to its shaft by means of a small grub screw. Depress the switch so that the two flats on its shaft engage with the slot, then screw on the knob. This prevents the shaft from rotating while the knob is being fitted.

In the case of the Loud Speaker Model 335, connect the two loud speaker leads (previously attached to terminals L.S.+ and L.S.— and brought through the insulated bush provided in the base)—to the two terminals on the loud speaker unit. (This of course, does not apply to Models 333 and 334.) It is immaterial to which of these terminals either lead is attached.

Next fit the wave-change switch knob at the side of the cabinet. By means of the screws provided, secure the rear of the chassis to the cabinet. The valves should not actually be fitted at this stage. The sequence in which they must be inserted is given in the Instructions for Use. After the Set has been tried out the back of the cabinet should be screwed in position.

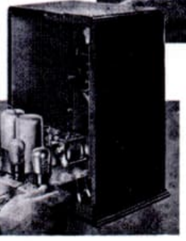
MODEL 334

Above is shown the final stage in the assembly of the Cossor Melody Maker Model 334. The valves are here shown inserted in their holder to assist you in determining their position. Actually, however, they should not be fitted until the chassis has been inserted into the cabinet and the batteries connected (see Instructions for Use).

COSSOR MELODY MAKER

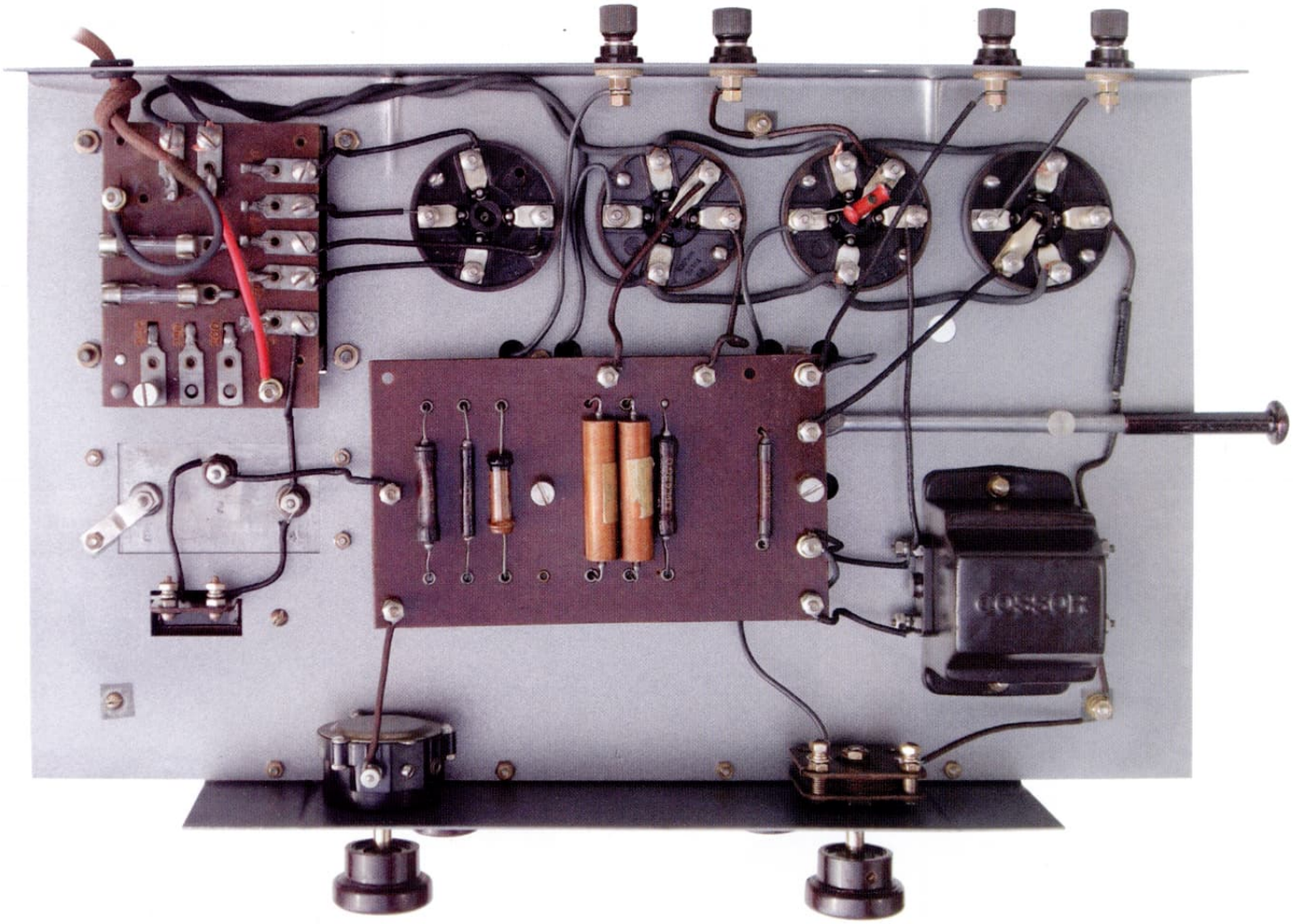
Battery Operated Models 333, 334 and 335

LOUD SPEAKER LEADS



MODEL 335

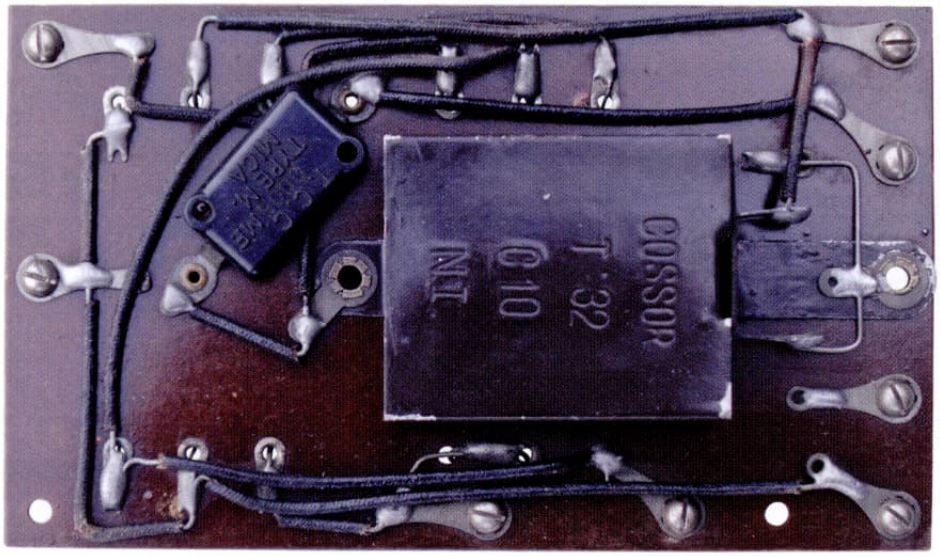
On the left Model 335 is being completed. Note the Loud Speaker Leads which must be connected to the terminals on the back of the L.S. Unit as described in the text. Do not fit valves at this stage (see remarks under illustration of Model 334 above).

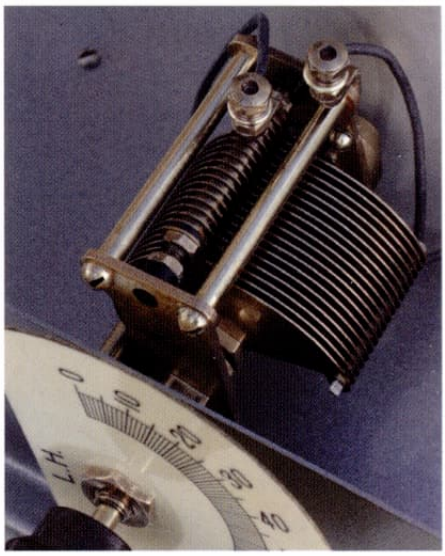


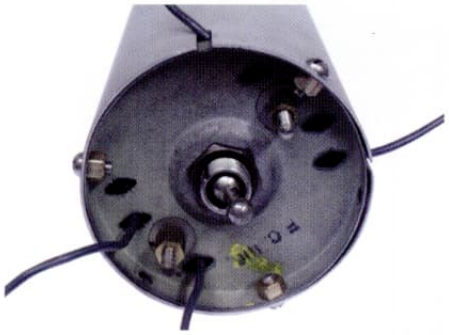
leaving a completely empty chassis.
The chassis is in two parts, the main part with folded rear panel housing the components and terminals, and a vertical front panel housing the front panel controls. These two parts are bolted together with four 4BA bolts.

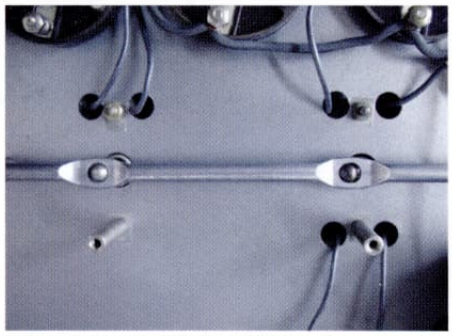
The underside of the chassis and the front panel still has most of its original cadmium flashing, heavily oxidised and discoloured, mostly a dark metallic matt grey. I scrubbed off the rust with some coarse emery cloth, and cut a key in the remaining cadmium plating. This was done outside with a vacuum cleaner running and wearing a mask as I wouldn't want to ingest any nasty very toxic cadmium oxide dust. I then wiped away any remaining dust and de-greased with a cloth wetted with solvent (lighter fuel), then lightly sprayed the chassis with grey primer. The chassis now looks new, too new as the grey primer is quite light, so this was toned down with a thin coat of "steel grey metalic" an aerosol paint obtained from a hobby shop. The metallic grey colour was now about right, so this had its new glossiness toned down with a final thin coat of matt lacquer bringing it back to something similar to the original oxidised cadmium flashing without the paint being too thick and obvious.

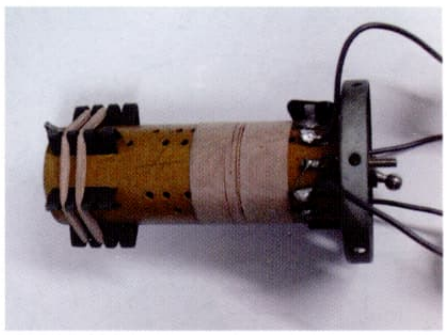
All of the components needed a thorough cleaning, so I started with a good vacuum–clean, especially inside the mains transformer terminal panel and paxolin component board. The valve holders were stripped of all their nuts, bolts and contacts,











and these were placed in a recently acquired Maplins ultrasonic cleaner. The bakelite bodies along with the component board, were scrubbed in warm water and Fairy liquid, and the ultra sonic cleaner did its job assisted by a drop of vinegar in the water and Fairy liquid solution. I then worked through the rest of the components in the same way one by one, cleaning and testing them and placing back in the chassis as I went. The mains transformer shroud was showing signs of corrosion so this was removed and re-sprayed with aluminium paint as original, and while the transformer was out of the chassis its terminal panel was scrubbed in situ with a stiff brush and Fairy liquid solution.

The volume control was dismantled and the wire wound track checked and found to be open circuit in several places. I unwound the first few turns and as I did this the wire just broke up and fell off most of the way along. According to the circuit this control is 12k, a bit of an unusual value,and the closest I could find was a Colvern wire wound pot of 10k. When tested it was found to read nearer 12k using the complete length of the track, just the job. The track card of this more modern pot was the same diameter as the Cossor control, but about 3mm less deep. The new track fitted nicely into the original Cossor body and just needed some paxolin packing washers under it to take up the missing 3mm. These were manufactured and fitted and the finished control placed back in the chassis.

The reaction capacitor, a solid dielectric type, is riveted together,and as the paxolin end cheeks were in good condition the only work required was to clean the rivet heads and control shaft. This was easily achieved with a drop of Brasso on a soft cloth as they are quite accessible.

The smoothing choke cast Iron side frames had lost most of their brown paint and were very rusty, so these were removed, wire brushed and re-spayed with Ford Rio Brown aerosol paint from Halfords. This was an almost perfect colour match, the smoothing block was the same colour but this only needed touching in. I sprayed some of the aerosol paint into the plastic lid of the can and applied it with a fine artists paint brush after letting it thicken for several minutes.

The smoothing block, containing two capacitors, 2mfd and 4mfd was checked for leakage and capacity, both checked ok, but I'll re-assess the situation when I power it up as I did fit an extra capacitor the last time it was powered up twenty odd years ago. The aerial, earth and speaker terminals from the back panel were cleaned and the splines cleaned out with a soft brass wire brush. One of them had the bakelite terminal top missing leaving just the knurled captured nut, fortunately I had one very similar in stock. The actual terminal fitting was different but the bakelite terminal top exactly the same, even the same maroon sort of colour. I warmed up the terminal shaft with a soldering Iron and the terminal top pulled free. This was fitted to the Cossor terminal held in place by friction and assisted with a drop of super glue. The inter-stage audio transformer tested ok, it just needed its terminals cleaning.

The large tuning coils are quite unique being completely self contained in their cans, even including the wave change switches. These are ordinary toggle switches mounted in the base of the can and protruding through the chassis to a common actuating rod across the middle of the chassis.

The manufacturer has made every effort to simplify the construction of this kit set, even the flying leads connecting the coils to the tuning capacitors have brass eyelets fitted to their ends for ease of construction. The tuning coils were removed from their cans as they required their crumbling rubber flying leads replacing, at the same time they were checked for continuity and all were ok.

The aluminium cans were quite dirty, the matt aluminium finish seemed to have absorbed a lot of dirty marks especially on the top and the first inch or so down the sides. I tried several cleaners on these to no avail, nothing seemed to touch this ingrained dirt. I even tried several solvents, the only way is to use an abrasive cleaner. Brasso is my usual choice but I've found this not so good on aluminium as it tends to generate a lot of black oxide, makes the aluminium too shiny and the end result looks horrible. As the aluminium cans are a quite matt finish, (this can be seen inside the cans and the lesser soiled lower area of the can), a coarser abrasive might do the job. A scouring powder came to mind and I remembered Vim and Ajax cleaners being banned from the house after having a new bathroom suite fitted as they abrade the shine off the surface so these could be just what I'm looking for.

The large supermarkets I looked in no longer seem to stock these products and I was beginning to think they were no longer available. I found a small independent hardware shop locally and which stocked both of these products. problem solved,

this shop also stocked the brass eyelets and crimping pliers required for the flying leads. I already had some in stock but took advantage of the situation and purchased a lot more while still available. The tub of Vim did the job perfectly, cleaning the aluminium cans and leaving a very nice matt finish. The completed tuning coils were duly re-assembled and re-installed in the chassis. The wave-change connecting bar was re-fitted followed by the rest of the smaller components after cleaning and checking. The interconnecting wires were cleaned and fitted one-by-one removing the labels and checking their location on the map.

The tuning capacitors were treated as individual restorations as they are quite complex using ball bearings and ball bearing slow motion drives. They are constructed using nuts and bolts and can be completely dismantled.

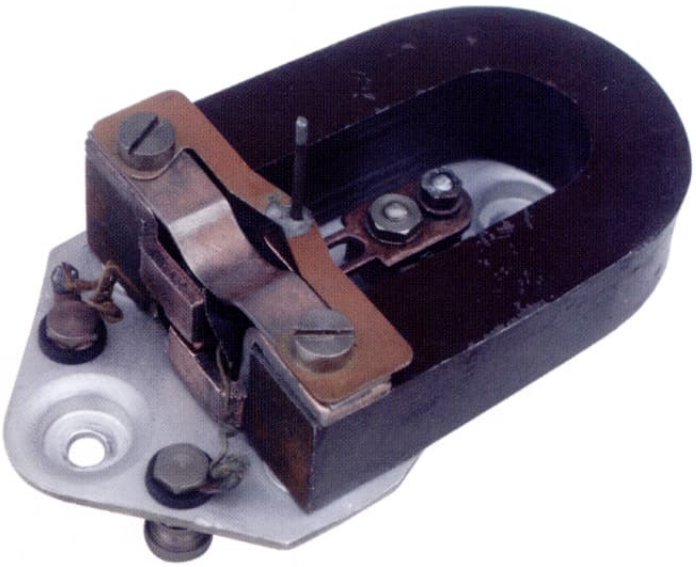
The remaining lacquer was stripped with Nitromors paint and varnish stripper, then de-oxidised and cleaned in the ultrasonic cleaner. They were then very lightly re-lacquered as they are completely made of brass and need protecting from re-oxidation, making sure any part requiring electrical connection was masked off to remain free of lacquer. The ball track and slow motion drive balls were re-greased, the vane gap was then centralised and locked and slow motion drive checked for torque and smoothness, this was a quite lengthy process.

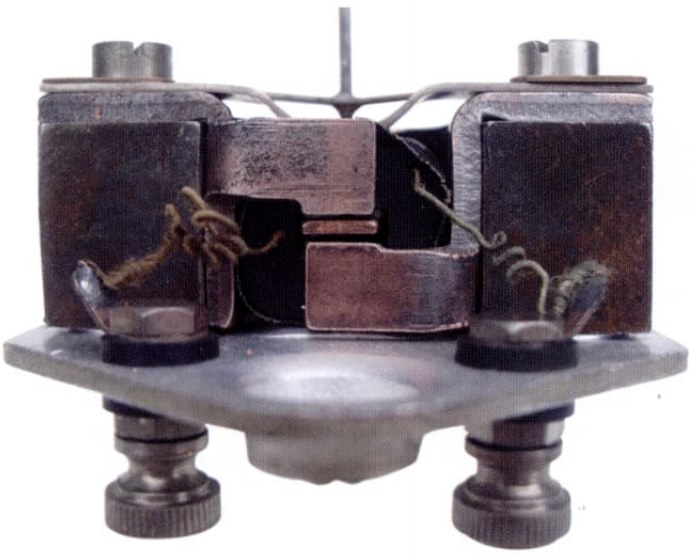
The central component paxolin panel was retrieved from the airing cupboard where it was drying after its washing and scrubbing. The terminal nuts and bolts previously removed for cleaning, were refitted after de-oxidising in the ultra sonic cleaner, the components were checked for spec and surprisingly all within a reasonable tolerance. Most of the paint had fallen off the carbon resistor R3 100 Ohms, so this was repainted with modelling paints. The paxolin panel was the last component to go back in the chassis.

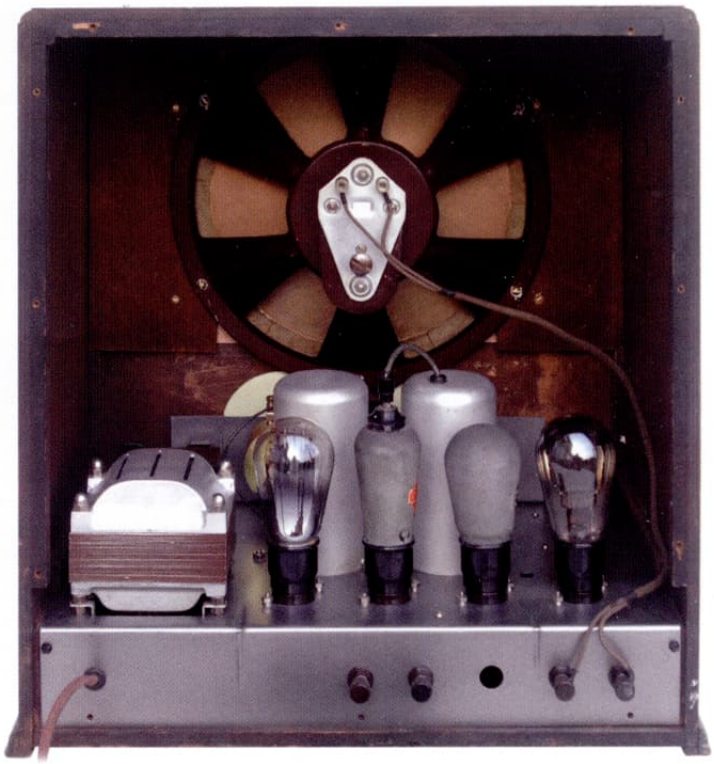
The last component for rework, the speaker. This was left in the cabinet while the chassis was being worked on, the best way to avoid accidental damage. On removal the buff coloured cone just needed dusting with a soft brush. The cone is connected to the drive unit via a pin that is soldered to a hollow tinned brass rivet retaining the aluminium cone cups, finishing the apex of the cone. These drive unit pins are usually connected to the cone using an adjustable clamp. In this case the speaker is a finished component and factory set up and just soldered. This pin was de-soldered and the drive unit removed, the paint work on the main frame and horseshoe magnet was in reasonable condition. The moving iron and magnet pole pieces were copper plated, these needed cleaning, there were odd spots of rust where the plating had broken down. These were wire brushed and given a light dusting of lacquer to prevent re-occurrence. The moving iron reed is pivoted on two very small ball bearings, these were re-greased after cleaning on re-assembly.

The digital photographs taken during dismantling came in handy on reassembly as the orientation and order of the many bushes, spacers and washers wasn't obvious. The finished speaker was placed back in the cabinet, tested and the moving iron bias set up, then connected to the chassis with a couple of yards of jumper wire. I was now ready for the pre-power up cold checks.

First, I tested all four valves in the valve tester. The rectifier is a 442BU which read open circuit heater, a shame as this sets valves appear original. I vaguely remember replacing the rectifier for the run up last time, the output valve, a 41MP read exactly to spec in emission and gm, the RF vari-mu







screen grid, a MVSG and the 41MH audio triode were both a little low, I replaced these valves with equivalents for the run up and to play with, but will put the originals back when complete, as this set is not one that you would use to listen to, and it would be nice to preserve the originals if only to look at. The smoothing capacitors had been reforming while I dealt with the speaker, 60 volts for about 2 hours, all ok, then another couple of hours at about 150 volts, still ok.

Remembering a note of caution in the manufacturers service manual, I made sure that the insulated control knobs are fitted to their spindles as the tuning capacitor C2 (left from the front) is at HT potential. I applied mains, switched on at the outlet as there's no on/off switch on the set, and after a few seconds the speaker came to life with some crackle, hiss and low level mains hum, nothing like a full house! I left it running for a few minutes then switched off and checked for anything getting hot and all was ok, back on again this time with an aerial and earth connected. My aerial is a 75ft garden aerial from the eaves of the house to a tree at the end of the garden and a mains earth. The water pipe earth is not a lot of use these days as it's now a blue plastic pipe. After several seconds I could hear a French radio program faintly in the background, adjusting the tuning and it came in a bit louder. Tuning in other stations on this band, obviously long wave, the light mains hum had gradually reduced and had now gone. Medium wave was even louder and livelier. The next couple of hours disappeared while I tuned around the bands getting used to the controls. Tracking the two tuning capacitors is a bit of a pain, more so than some of the other early sets I've played with, but by careful adjustment of these with the reaction control brought in some quite distant stations with reasonably good station separation (exactly as it says in the instructions).

I got the impression that the bands were a bit short, so a run through with the signal generator was in order, and this turned out to be quite interesting, Medium wave tunes between 1400 kc/s and 500 kc/s (215 to

600m) and Long wave 340kc/s and 500kc/s (600 to 900m), a little short and I also found that the two tuning capacitors didn't track in a very linear way. The best spot on the second tuning capacitor was not necessarily near the same scale number or where you would expect to find it. If you wanted to find the same station again you would need to have made notes on all four settings, as the two tuning capacitors, reaction and RF volume control were all very inter-reactive, although this interaction was a very useful tool for separating stations, not a lot of use for an inexperienced operator. It did cross my mind that this may have had something to do with the re-work of the tuning capacitor. To check, I disconnected them from the set and connected them to a MW coil to hand and, with the signal generator and scope. I plotted the frequency of both of them one at a time. About every 10 degrees and both tracked the same, bearing in mind some of the earlier sets were fitted with cards for making notes on dial settings, this suggesting this may be the norm.

I tried the set on a short indoor aerial, a few yards of wire strung up around the workshop, and it proved to be a bit deaf, only receiving one or two strong stations. With fully screened tuning coils and only one RF valve this was not surprising.

Now for the final part of this restoration, the cabinet. The cabinet is cheaply constructed from 3/16th plywood for the front panel and 3/8th plywood for the sides, top and base. The cabinet is sprayed with a semi-matt lacquer, typical of a kit set, no sign of any veneer here, not even polished. There's some decorative vertical lines roughly routed into the front panel and in-filled with a very dark brown matt paint, the edges and corners are sprayed with a darker more opaque lacquer. This to hide the filled plywood end joins and filled nail heads,

It's a bit tatty in places with a few digs and scratches, there's a small piece dinged out of the front top left corner and the lacquer is lightly crazed in places with light damp ingress, this is worst on the top. Rather than lose its original finish, I decided to touch in and repair rather than strip and

re-finish as this would be very difficult to get right without the right kind of lacquer, spray equipment and the skill to use it. First job is to remove the speaker on its baffle board for safe keeping, next deal with the ding out of the corner. The lifted ply was re-glued back down with PVA glue and clamped overnight, then the small piece of ply missing filled in with Holts P38 car filler. This was then sanded flush and touched in with brown matt model paint as an undercoat for the final touch–in of satin lacquer, the larger scratches touched in with a similar matt lacquer and flattened with some 1200 grade cutting paper.

The speaker cloth was replaced with a similar cloth salvaged from a wrecked set, I had a choice of three or four of these second hand speaker cloths in stock, and this one was from an un-recognisable 1930's set obtained from a car boot fair some time ago. This was a scruffy empty cabinet that had been fitted with some very badly made storage drawers, this came for £1 at the end of the day, I removed the speaker cloth and disposed of the rest of the set as there was nothing else of any use. This square piece of cloth was in nice condition considering its provenance, a very good match and fitted very nicely, I glued it to the speaker baffle board held in tension with drawing pins until the glue had set.

Restoring the instruction sheet was almost a bigger job than the set itself. It was about A1 in size (23" wide 33" deep) in eight tatty pieces with worn and frayed edges with several small pieces missing, and also very discoloured. Advertising material, operating instructions and basic construction details on the front and detailed construction instructions on the back. I found this very interesting reading, too tatty to keep and too interesting to discard so I entered a new field of restoration.

On all eight pieces, both sides were scanned into my PC as photo's in the jpg format, using photo manipulating software (Photoshop). The contrast ratio was adjusted first, this resolved most of the discolouration problems and allowed adjustment so all the general background colour was the same. The eight pieces were put back together matching the edges as best possible. Where bits were missing, I copied and pasted small areas of similar bits from elsewhere in the sheet. Where there was a crease or fold, typically in the illustrations of the cabinet, chassis or speaker grille, I copied and pasted a narrow strip from and adjacent area, this blended in very well. Fortunately, where there was text along the worn out joins, the top or bottom half of the words could still be read. These were replaced by copying and pasting from elsewhere in the text, a whole word at a time. In best cases three or four word lines where they were repeated, worst cases the words had to be made up from single letters. Where there was severe discolouration I copied and pasted chunks of background. Finely detailed bits of cabinet and chassis were copied in very small parts, then rotated and manipulated and pasted together like pieces of a jig-saw, and these finally blended in very nicely. This took quite a lot of time especially filling in between words and lines where there were rust stains and dirty marks. This was achieved over several months whenever I had a few minutes to spare. This lengthy operation paid off in the end as I now have a clean clear easily readable copy that will also make a good poster.

Before placing the set back with the rest of my collection, I re-ran the set with its original valves, the low MVSG and 41MH, this didn't make much difference to its performance. Finally the open circuit heater original rectifier was re-fitted just to keep the set as original as possible.

The instructions and ads make very interesting reading and the "Meccano" style of build made this set great fun to dismantle and put back together. Anyone purchasing one of these kits would have as much fun building it as listening to it. Despite the mediocre performance and quality due to it being a kit set and the repainted chassis, this set with its original valves is a nice example of one of these 1930's kit sets.

L.L. Williams 1931 – 2013

Sadly, Bill, to his friends, passed away on the 28th November last year.

As I understand it, not many members will have met Bill as due to illness he hadn't attended any meetings for many years. I never met him either and only talked on the phone or exchanged letters as he didn't do Email.

We first communicated after he wrote a letter, to the Bulletin, politely criticizing one of my articles. His comment was that a circuit I had included wasn't an autodyne oscillator. I replied that the title did say it was taken from the book Radio Designers Handbook, by F. Langford Smith, that giant of radio theory, and that it was a pity he wasn't still around to take it up with him. I like to think now that somewhere in radio heaven that they will meet up and discuss it fully.

From that start we had chats about radio circuitry and techniques and it was always good to hear Bill's Brummie tone (a Birmingham accent for our overseas readers). It was obvious that he had a solid grounding in theory and that was always borne out in his well written articles. One of my favourites was his restoration of the rare 1925 McMichael Superhet, see Bulletin 2009, Summer. Very generously, and just before going into hospital for the last time, he donated this quite valuable radio to the Museum who have a McMichael room but didn't have that particular set. This was collected by our Chairman who must be one of the last BVWS people to have met him.

Bill did tell me a little about his career and fortunately I obtained a copy of his Eulogy, which filled in gaps in my memory. Upon completion of his apprenticeship, in mechanical engineering, with the Lucas Company, Bill 'jumped ship' into the wonders of electrical and electronic gadgetry which fascinated him. He moved to the newly formed Lucas Gas Turbine Equipment Company at a time when control systems were rapidly evolving for the jet engine age. As a competent man will do, he moved up in the organisation representing the company on technical matters to suppliers and customers at home and abroad.

Bill never married and so friends, hobbies and organisations were very important to him. He worked for the Birmingham Fellowship of the Handicapped as a volunteer driver in the late 50's. By the time he retired from it he had put in 50 years of service and held various positions rising to Chairman or as he called it "Captain of the Ship". When handing over to the new incumbent his advice was "Upset anybody you like but not the tea lady".

His hobbies included walking and a love of the countryside and plants and animals but he was also a radio 'ham'. His particular interest was designing and building his own equipment. He was a member of Raynet, an organisation that supports emergency services by providing communications when required.

So, farewell Bill, it was a pleasure to have known you and thanks for all the knowledge that you passed on to me. I'm sure many members in the Society will echo that from the fine articles you wrote.

Gary Tempest.

Audiojumble!

photographed by Carl Glover

SME tone arm kit

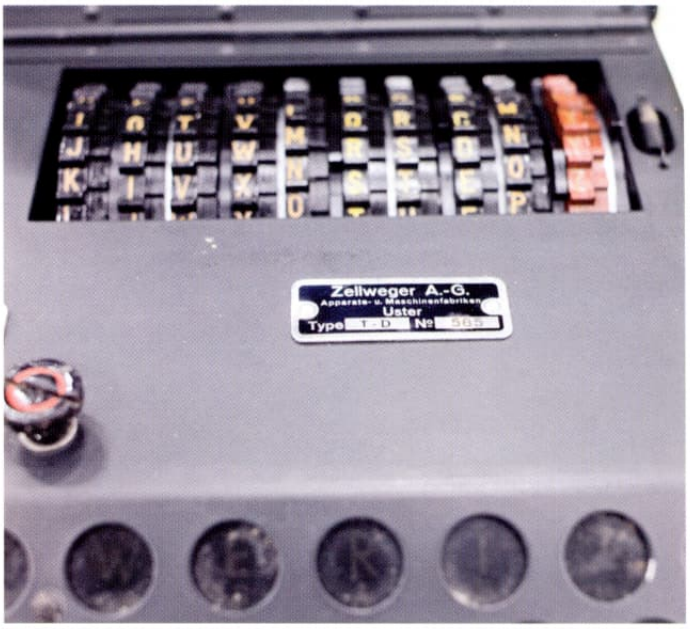
Ariston RD80 turntable

Quad II's and a Leak amplifier

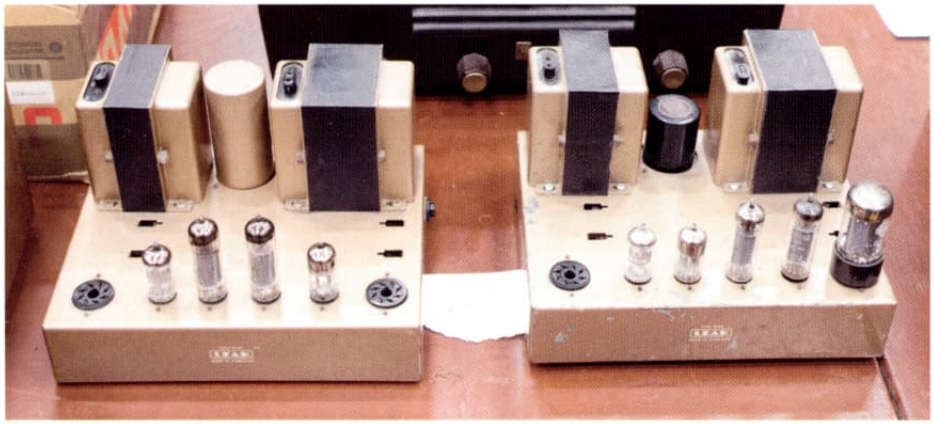
For the serious tape enthusiast!

Sony, Akai open reel and Ghetto Blaster

Postwar Enigma machine



Sugden amplifier



A bunch of Leaks!

Jon Weller and Ken Tythacott

Caveat Emptor!

Serious Nordmende!

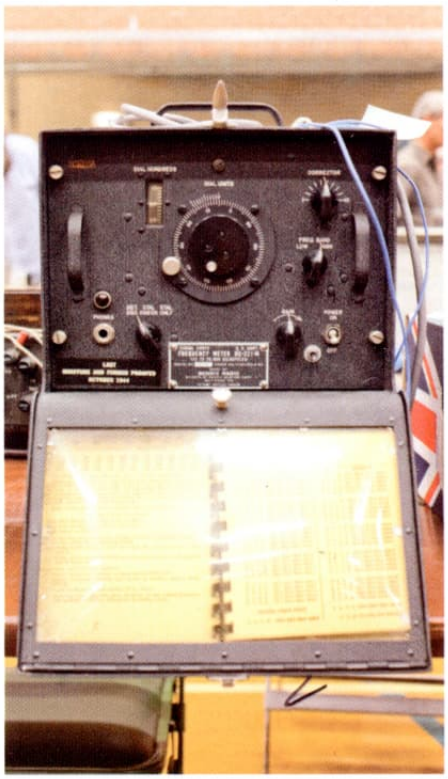
Sharp vertical track music centre

Disc recorder

Philips chassis

Pilot 1930's console

Assorted styli



Some serious vintage valve kit

Radio as well as audio!

Revox reel-to-reel

Leak 'Point One' stereo pre-amp and Troughline tuner

A rarely found Uher

A Tefifon player

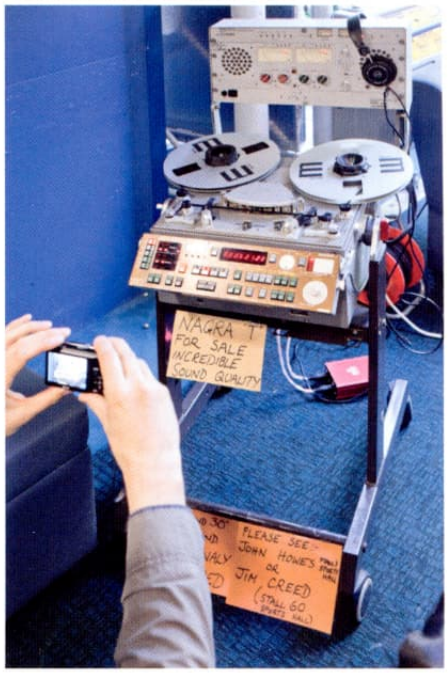
Philips, Emerson, Deutsche Kleinempfanger, Silvertone sets

A Northern Electric mantle set

Chan Sunderan smiling as always

Capacitor bridge

Pye 'Chinese' Black Box



Philips model EL3300/00, the world's first cassette machine

John Sully and Chris Gilbee

A 1920's 'Swinging Coil' set

Another Marconi 561 Radio by Gary Tempest

I didn't think that I would work on another one of these and actually I only did a little to it. The majority of the restoration was done by relatively new BVWS member Bill Taylor who doesn't have a background in electronics but told me that he has restored juke boxes in the past. He is a second generation thatcher by trade and I have included a picture of him at his day job. I was surprised that anyone without extensive radio knowledge would take on such a complex set as a first restoration. But, to his credit, the work he has done is to a high standard and the result is excellent considering the poor state the radio was in when he started.

We first communicated about reproducing a new dial for these radios as his, like most, was what Gerry Wells calls 'papadom dials'. They are on what would have been Paxolin that over the years has aged to a dark brown making the silk screening largely illegible. I was impressed with Bill's determination that there must be a way of doing it hopefully without the large outlay required for silk screening.

A little about the radio

I have included this as some readers may not have Bulletin Summer 2005. This includes a restoration article by me of this radio.

The 561 was introduced in 1937 and there is an HMV version (model number 650). It is an 11 valve two chassis design. There is a tuned RF stage prior to a frequency changer with separate oscillator. This is followed by two IF amplifiers with the first two transformers having variable selectivity by means of tertiary windings. After the IF stages comes a D63 double diode for detection and delayed AVC. The audio output goes to an amplifier (a triode connected KTZ63) driving an inter-stage transformer. This has separate secondary's supplying the grids of KT63's in push pull. These and the full wave rectifier are on a separate power chassis.

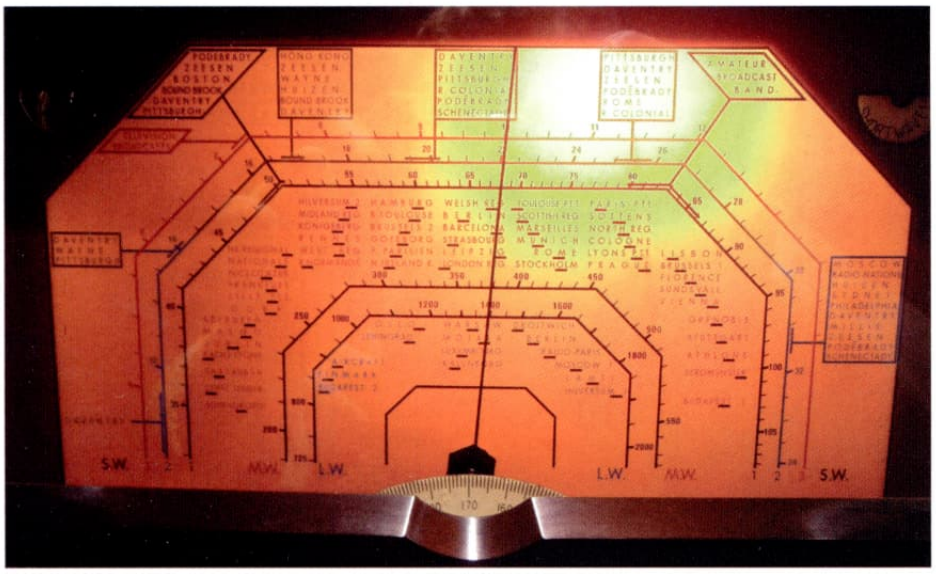
The dials

Radio Daze (RD) in the US (www.radiodaze.com) offered to make a small quantity (5+), including doing the artwork, for about $50 each which compared to the silk screening route is very reasonable and without a large initial outlay. This is possible for them as they have a computer connected printer that can print directly to glass or in this case phenolic sheet. Eventually, after discussion about the most suitable

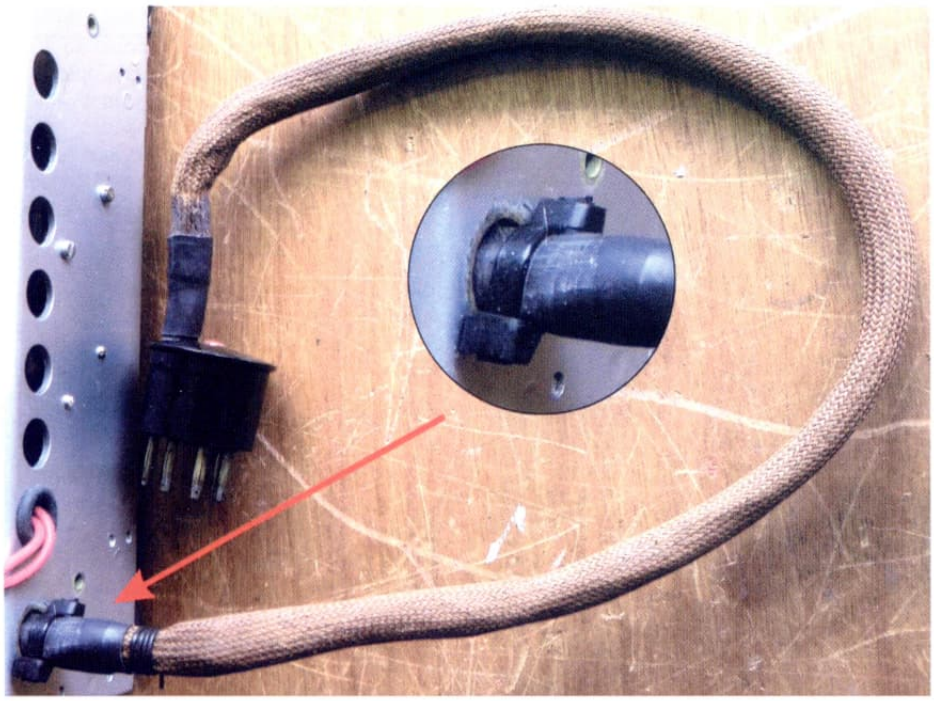
Bill and Sailor at work

A rusty start

Rust as far as the eye can see



The lit dial



Repaired cable form

colours, the prototype dial arrived and was given to me for evaluation in my 561.

It was of very good quality with flawless material, excellent printing and accurate colour reproduction, as far as could be seen from the original dial. It is double sided being printed on the reverse with the correct masking. Alignment is perfect as are the dimensions and cut outs, laid on top of the original. To me it transformed the radio making it go from dull and not in keeping with a restored cabinet to looking vibrant, and that was when the set was switched off. Turn the radio on and it had a beautiful uniform glow with very clear printing, and probably looked like the radio did when new. It is hard to photograph and the flare shown at the top is from the camera and not there in practice. The lamp used behind it is a 25w torpedo bulb that is run on the 195-223V tapping, auto-transformer style, consuming about 18w.

25W torpedo bulbs in SBC can be bought from Lampspecs: (www.lampspecs.co.uk/Light-Bulbs-Tubes/25W-Tubular/Tubular-Lamp-25-Watt-SBC-B15d-Cap-Clear-20mm-x-80mm).

The chassis

Obviously a lot of dedication and patience was needed to deal with the extensive rust prior to spray can painting. All large items were removed or masked off. The valve screening cans were re-plated in dull nickel.

It had been worked on by someone in the past with all the original wax paper capacitors replaced with the 'yellow perils'. I suggested that a way around not being able to find originals, to re-stuff, would be to use styrene tubing, available from model shops, covered with repro paper labels. This as can be seen turned out very well with the ends being filled with car body filler before painting a wax brown colour.

On the power chassis, as usual, it was necessary to put in new electrolytics in period cans and replace a few other suspect components.

Before alignment

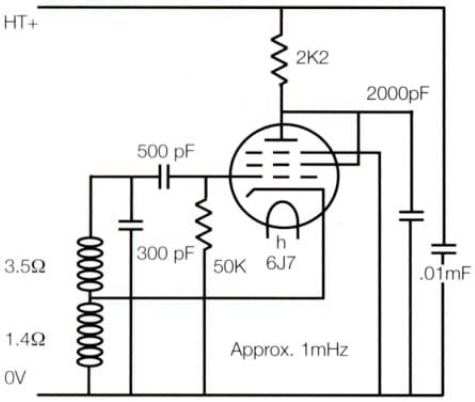
Being experienced in this, having done three previous chassis (two for the HMV 650 version), I offered to do this. But as is sometimes the case it wasn't straight forward.

Cable-form

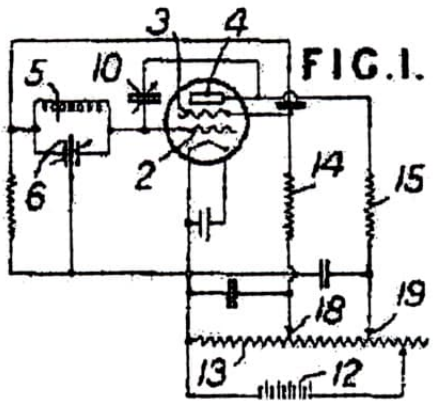
The first thing I came across was that when I moved the cable-form, carrying mains live via the bass / on /off switch on the main chassis, to the transformer on the power chassis, the valve heaters would occasionally go out. I had already removed the pilot lamp as it's best to work without this: they do not take kindly to the chassis being moved about when lit.

Unusually the break was in one wire about in the middle of the cable-form with no sign of damage to the outer cotton sheath. Perhaps the weakness was there from when the set was made and has taken all these years to surface with strands slowly breaking. The two live wires are run in an earthed screen to shield them from the audio input from the main chassis. Owners of these sets will be pleased to know that the wire insulation, not exposed to UV light, is still excellent.

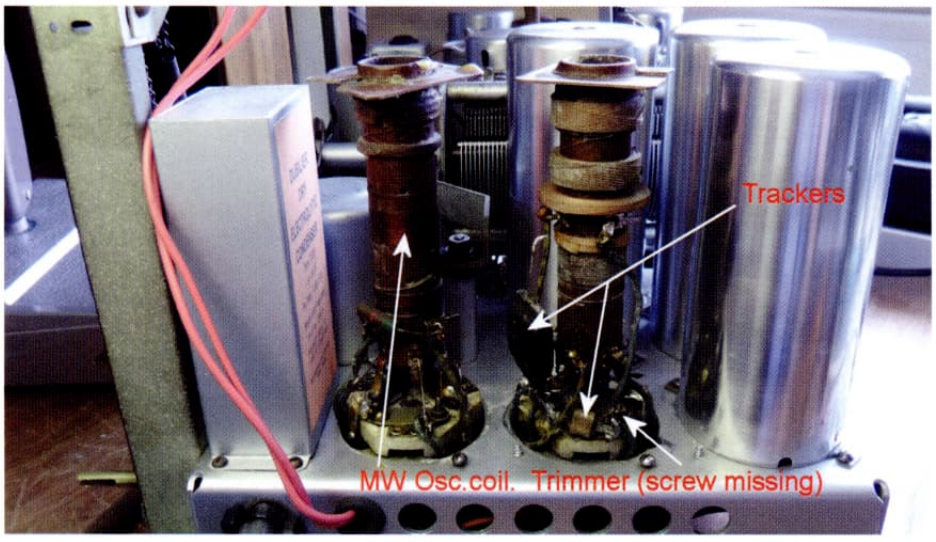
The wire was replaced and heat-shrink sleeving was used instead of the cotton wrapping of the original on the cable-form sheath. Two large cable ties one through the other makes a good retaining device; I used this on the inside of the chassis as well.



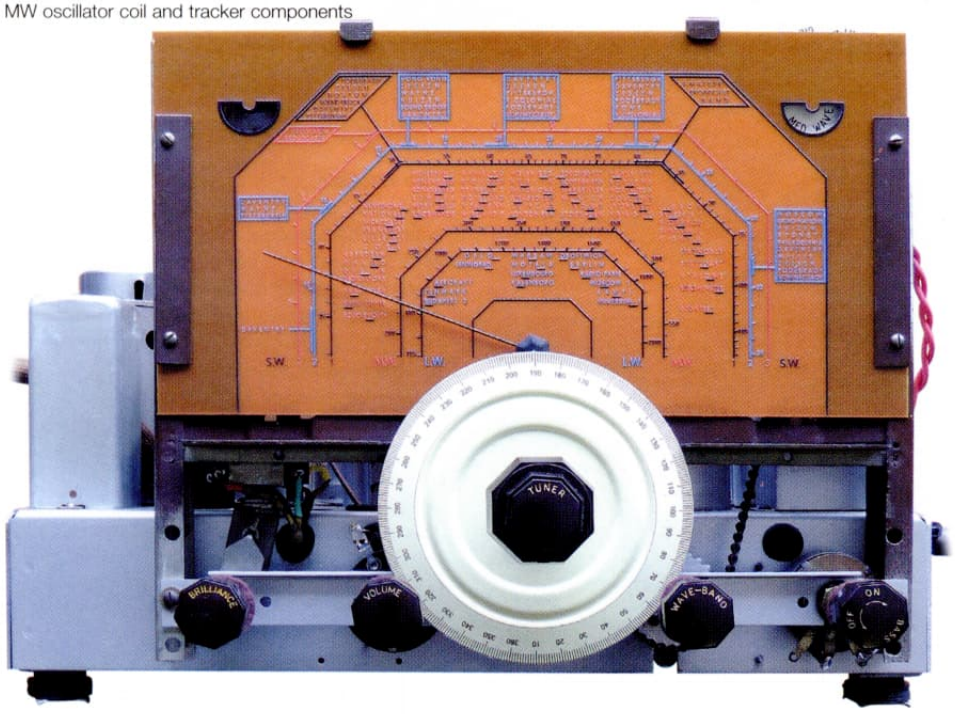
Circuit 1. Lash-up oscillator circuit



Circuit 2



MW oscillator coil and tracker components



Finished main chassis

MW oscillator intermittent

At first I thought that the problem was loose pins in the valve base as after tightening and cleaning the set worked perfectly but only for half a day. But of course why would this only have affected MW.

This problem had obviously occurred before as the tracking components had been unsoldered and the screw was missing from the trimmer. The coil was checked for resistance and all switch connections were repeatedly measured with nothing amiss. The capacitors were a little out in value but had no leakage including the trimmers to 500V (unsoldering connections where required in order to do this). But no fault was found and none could be seen with the wiring under a bench magnifying lamp. Sometimes the insulation has run back and so I looked for a strand of wire making an intermittent earth.

It was time to remove the coil for closer inspection and it was suggested to me that discharging a 16mF capacitor charged to a few hundred volts might show up something but to no avail.

I wasn't going to put the coil back again without soak testing it in a bench 'hook up' for a week or so and left on continuously at full HT voltage. So using a spare valve the circuit shown was used (circuit 1).

I was surprised at the voltage range the oscillator worked over being stable, on the 'scope, at a frequency of just less than 1 mHz, from 15V (the minimum of the bench supply) to 300V. From 50V to 300V the frequency change was only 0.1%. From 300V to 250V the change was + 0.014% (130 Hz).

As it performed reliably all I could do was rebuild it into the chassis but I did replace all the passive components around it with new items and sleeved all connection wires. Once back, then the radio was run for extended periods: I have never listened to so much R4 and Capital Gold for years and it didn't fail and hasn't since.

The Dow oscillator

According to the EMI service data this oscillator is called a Dow and is a modified Hartley type. It set me thinking what the modification was and who was Dow.

Member Peter Lankshear, by e-mail, had this to say about the circuit:

"The Dow oscillator was the early name for the electron coupled oscillator or ECO. It's a Hartley but with an RF earthed anode. Its significance is that it uses a tetrode (or tetrode connected pentode) where the screen grid acts as the earthed oscillator anode. (The cathode is normally connected to a tap on the winding). In its

original form the output is taken from the valve's anode giving a degree of isolation between the oscillator and its load. This is where the term electron coupled (ECO) comes in. It was popular for transmitter oscillators because if the screen and anode voltages are correctly proportioned the frequency of oscillation is largely immune from variations in the H.T. voltage."

I actually used separate anode and screen resistors and decoupling and connected the frequency counter to the anode.

Later an internet search gave a synopsis of J.D. Dow's patent application and in the circuit shown (Circuit 2) is applied to a Colpitts oscillator rather than a Hartley. The full patent is available at Ref. 1.

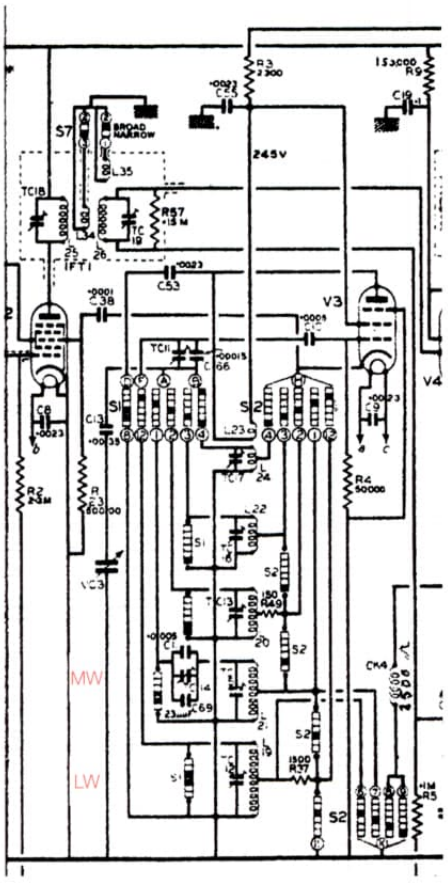
The part of interest is this:
"The frequency of a valve oscillator is kept constant despite changes in anode voltage by providing an auxiliary anode and applying to it a voltage proportional to that of the main anode, whereby any frequency change due to alteration of anode voltage is counterbalanced by a frequency change of equal amount but of opposite sense due to alteration of the auxiliary anode voltage."

EMI, as can be seen in the 561 oscillator circuit (Circuit 3); saw fit not to use a potentiometer between the anode and the screen so presumably performance even on the short wavebands was sufficient without doing this. They choose to take the output from the low impedance cathode.

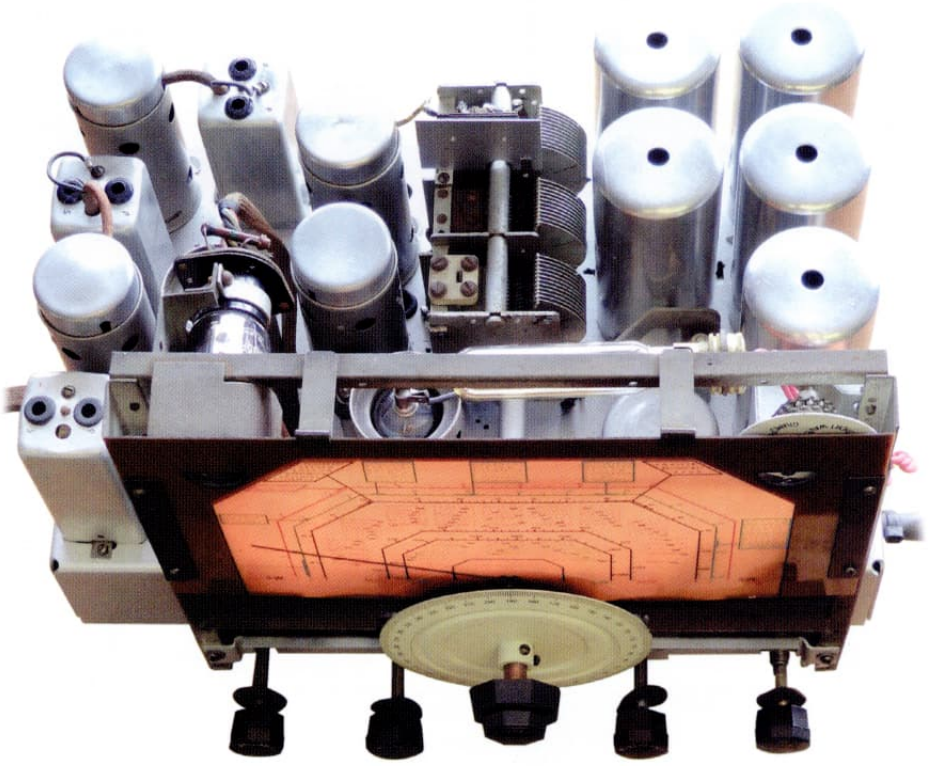
I asked member, and radio historian, Alan Douglas if he knew anything about J.D. Dow as some of these early pioneers have little or no biography. This extract from the IRE Year Book shows that he was a Navy man.

"Dow, Jennings B: Born January 2, 1897 at Bowling Green, Ohio. Graduated U.S. Naval Academy, 1919; attended postgraduate school, U.S. Naval Academy, 1924-1925; received M.S. degree in E.E. Harvard University 1926. Various fleet and shore assingnments1919 to date ..."

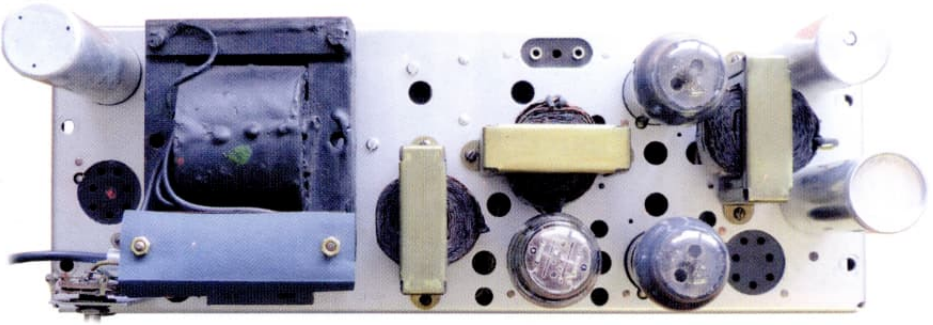
Having now got a full name another Internet search came up with this (Ref: 2) from the top man Admiral Chester Nimitz.



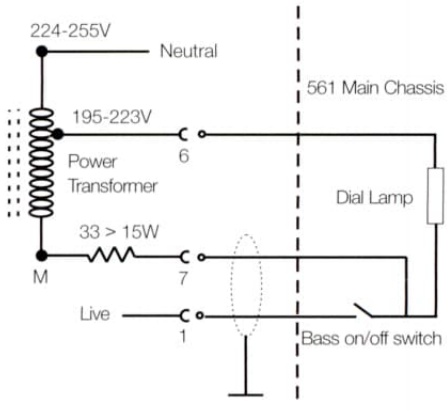
Circuit 3: EMI oscillator circuit



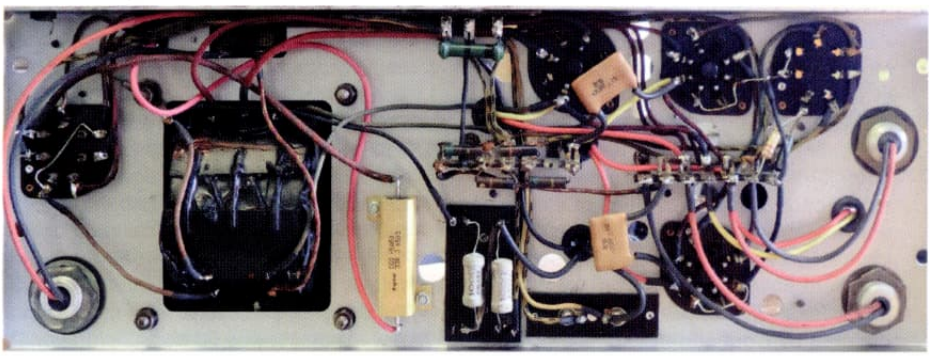
Finished main chassis viewed from above



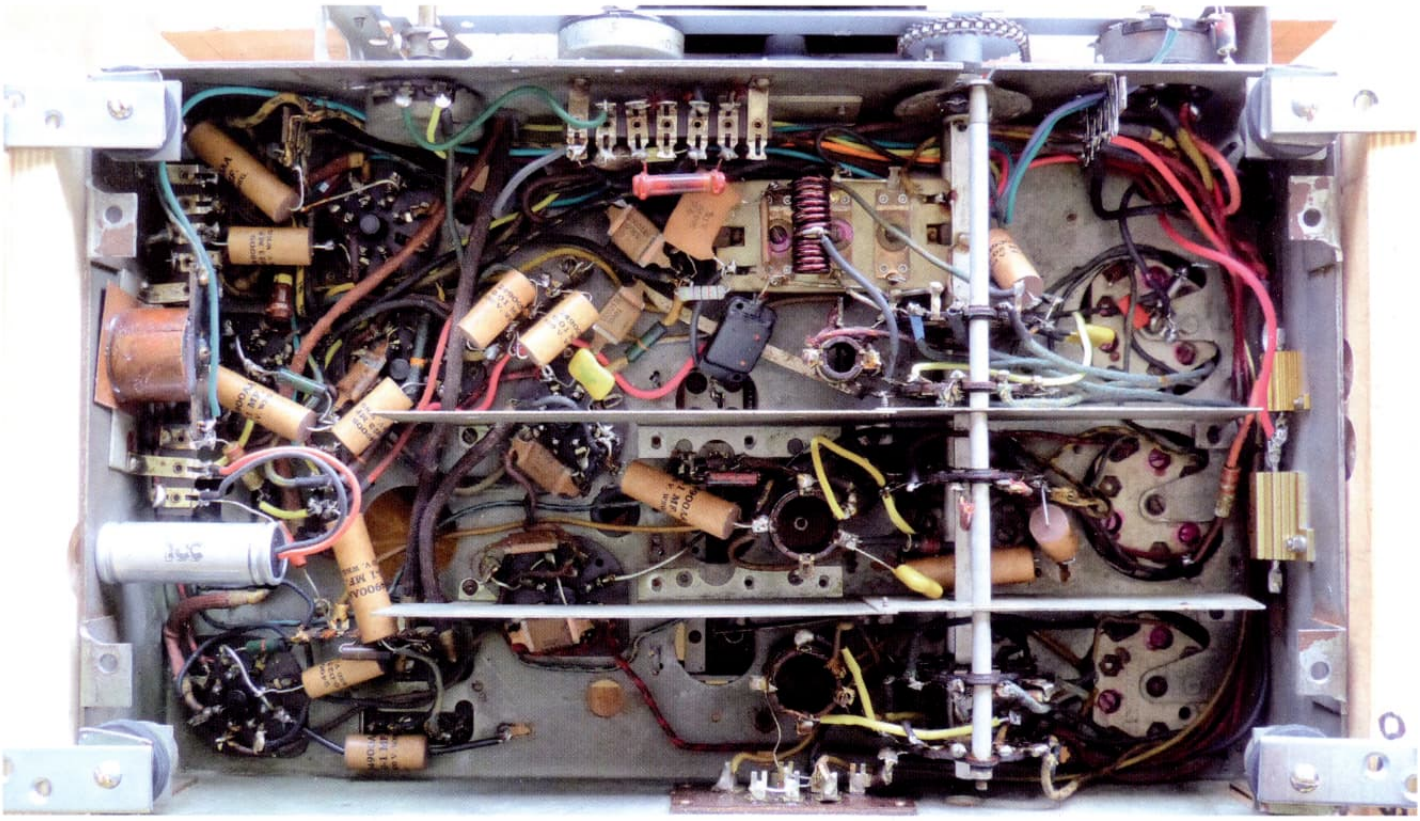
Finished power chassis



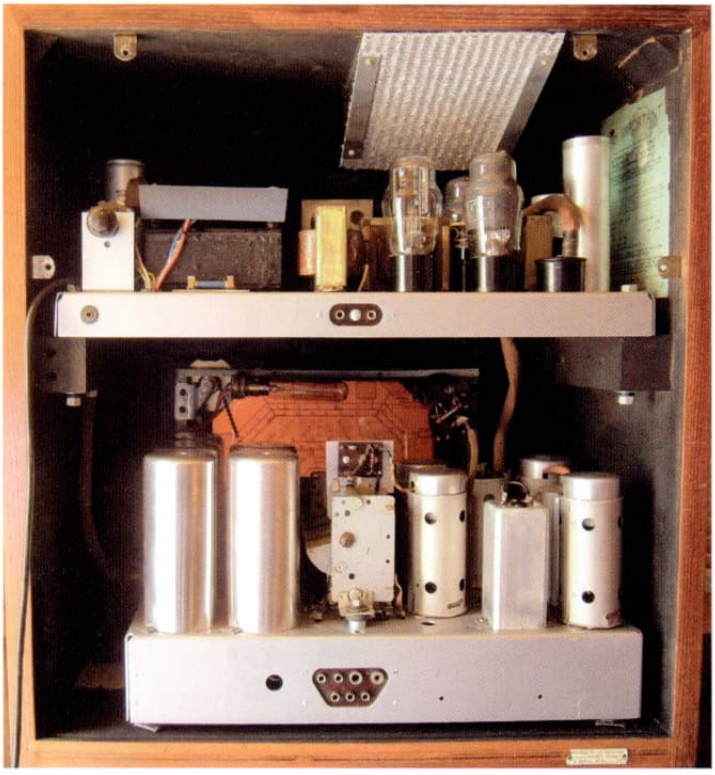
Circuit 4: Mains dropping resistor



And from below



Work underneath



"Upon assuming command of the U.S. Pacific Fleet on 31 December 1941, I found a well-functioning communication system capable of great expansion. Could it expand rapidly enough to handle the far-reaching demands suddenly thrown upon it? It could and did, to my great satisfaction. Large quantities of electronic equipment and increasing numbers of installation and maintenance personnel began to flow to Pearl Harbor from the Electronics Division, Bureau of Ships, directed by Commodore Jennings B. Dow."

Mains dropping resistor

Having played the radio for hours at a time I was concerned at how hot the mains transformer got and I had heard of these transformers having to be rewound. The situation is made worse by EMI spacing the transformer off of the power chassis because of the minimal depth. Maybe if the laminations had been clamped directly to it, it may have run cooler. By the old rule of thumb if you don't want to keep a finger tightly pressed to it for more than a few minutes it was 50 deg. C or more.

The mains voltage here often gets into the high 240's and that wasn't helping so I added an under chassis dropping resistor. For simplicity I used a metal clad type that was easy to wire of 33 Ohms and 50W (simply because I had some). This dropped the mains input from 247 to 233V with the heaters at 6.29V. The 255 to 224V tap being used.

Note: the lamp current does not flow through this resistor (Circuit 4). Should anyone want to make this modification, and the transformer runs noticeably cooler,

the wiring change is simple. Disconnect the wire going to "M" on the transformer and pull back through the grommet and connect to one end of the already mounted metal clad resistor. From the other end of this fit a new wire back to "M".

Alignment

There was an initial problem in that the bandwidth (DPDT) changeover switch for the IF transformer tertiary windings was unreliable with some high contact resistances. After removing the switch I applied a good dose of De-Oxit switch cleaner via the forked toggle. With the switch worked backwards and forwards then low resistances were once again restored.

I had fitted the damping resistors to the IF transformers that I found so beneficial when doing my 561 and subsequent 650 chassis. Aligning the IF's was particularly easy and would have been good enough on a peak alignment with a signal generator (as detailed in the service manual), when checked with the wobbulator. It only needed a tiny trim to get ideal waveforms for both wide and narrow band operation. Maybe it all depends on how well the individual coils in the transformers were spaced when made.

The RF alignment followed and was successful although I had to add a little extra capacity to the MW trimmer as the maximum for these is only 25p.

Bill and Sailor's work nearly finished

The cabinet

For the original cabinet, time had not been kind to it. Some veneer was missing, some loose and it had the usual distress wounds. What a piece of luck to be offered a restored cabinet, at a very fair price, looking for some nice chassis to make it warm again.

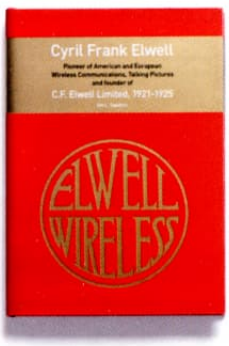
References:

Ref: 1: www.google.com/patents?id=A6dUAAAEBAJ&pg=PA1&source=gbs_selected_pages&cad=1#v=onepage&q&f=false

Ref. 2: http://earlyradiohistory.us/1963hwin.htm (There is a huge amount of radio history here.)

Book review

Cyril Frank Elwell, Pioneer of American and European Wireless Communications, Talking Pictures and founder of C.F. Elwell Limited, 1921-1925 by Ian L. Sanders Reviewed by Alan Douglas



Cyril Elwell had a very difficult time obtaining national recognition for his pioneering work in wireless. In the United States he made the Poulsen arc a commercial success, but then left its later development to Federal Telegraph and Leonard Fuller, not returning to these shores until 1940. In England he founded the company that bore his name (and played a part in founding Mullard) but most of his products had limited sale and aren't common in collections. His work building arc stations, particularly at Leafield and erecting many of the tallest wireless towers was at best out of public sight, and at worst, the butt of complaints from neighboring listeners about the incidental RF hash created by that arc. His work erecting high-power stations and towers in other countries was again out of public sight and mainly of interest to those particular countries although there were many of them. He apparently designed the first Chain Home towers. His connection with J.L. Baird and his work in talking pictures have gone unnoticed.

He wrote many autobiographies and tried to get them published without success. Meanwhile, quite probably to his annoyance, his contemporary Lee de Forest managed two published biographies and the self-proclaimed title Father of Radio. Yet de Forest, who worked in many of the same fields and at the same time, had far less technical or business ability, and accomplished essentially nothing after the 1920s.

Among Elwell's papers at Stanford University (his alma mater and where he maintained strong ties to its principals) is this extract from correspondence:

"Although I had quite an impact on the art of communication, I doubt now in the light of events whether I am worthy of a biography or an autobiography... Time will tell and long after I have shuffled off this mortal coil if someone doing research at Stanford will run across my manuscripts and write them up in (a) style which befits my epoch making work."

Ian Sanders has done it, in style and at length, from widely scattered sources. He has written a detailed treatment of C.F. Elwell, Ltd. products, though curiously Elwell himself never mentioned that venture in his own manuscripts. It's a handsome presentation and I found it fascinating reading.

Pennine Amplifiers 'Scout' radiogram by Joe Freeman

I was given this radiogram in the mid-'90s by the family of a school friend.

For all that I've had a life-long interest in electrics and electronics, valves were an utter blind-spot. This was in part due to warnings as a child that I shouldn't mess about with them as they used high voltages. I was also confused by the little I had read about them as there was much talk of 'High Tension' supplies but nothing that seemed more than a few hundred volts whereas to me 'High Tension' brought forth images of electricity distribution cables with thousands of volts on them. Besides that I also believed that valves only lasted about as long as light-bulbs and when one blew it would be impossible to get a replacement.

I started fixing old radios in April 2010 and often thought about tackling the radiogram. However it had been wrapped in a sheet and well and truly buried in the corner of my bedroom so it was only when moving things about for other reasons that the chance to exhume it occurred.

I knew that it worked but not very well so it was probably just a case of duff capacitors.

There doesn't seem to be any data available on this model but as the valves are 6K8GT, ECH35, EBL31 and AZ31 it's a short superhet.

Some forum experts were quick to question the above and one insisted that the 6K8GT must be a substitute and that I should change it for an EF39. If this were the case the wiring would have needed changing and there was no sign of interference.

After getting the chassis out my main concern was the health of the EBL31 as it rattled and a large bit of loose metal could be seen inside.

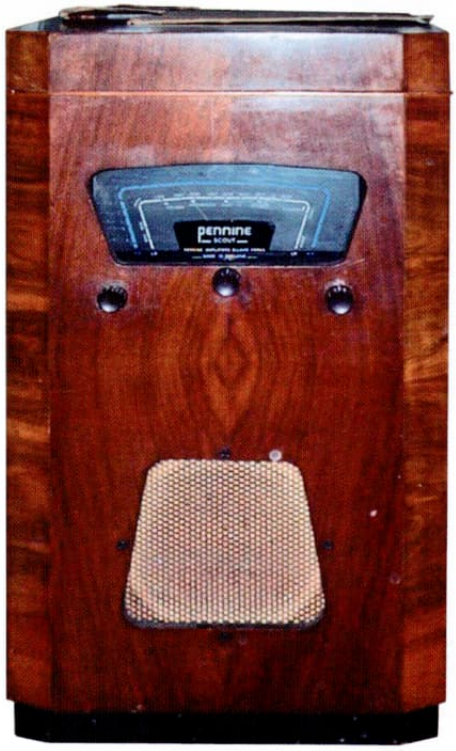
When I was given this set I was told it had been bought in 1939. The more I worked on it the less I thought this was correct. For a start two of the valves didn't come on the market until 1940 and the wiring on the deck was PVC. I finally settled it when I found that the speaker is dated 27 May 1949.

After doing the caps and cleaning the controls it was much better in terms of volume and tone but would only get strong stations. A tweak of the alignment soon dealt with that and the wounded output valve behaved fine.

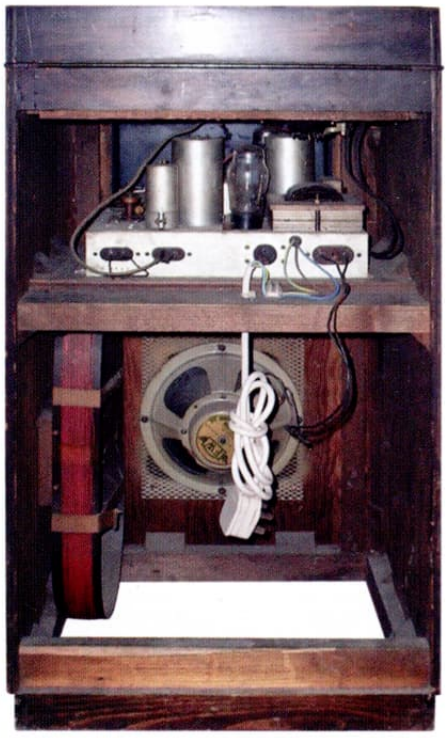
The next thing to sort out was the record deck. The idler was rock hard and had a notch in it where it must have been left pressed against the drive spindle. I turned it down and glued a rubber band around it which sorted it out very well. Unfortunately there proved to be some equally past-it rubber in the pick-up.

This wasn't a great problem as I'd no urge to play 78s and have better uses for the Gram input. The pick-up must have had quite a high output as modern devices seemed very quiet when connected; being a short superhet it has one less gain-stage so I set about devising one.

The obvious thing would be to bung another valve in but I'd no idea how much redundancy there was in the power supply and the last thing I wanted to do was overload the transformer. This left the option of a solid state device. And after some experimenting I settled on the attached circuit based around a UA741. This may well not be the best device available but I'd got some and they seem



Pennine 'Scout' radiogram before restoration



Rear of Pennine 'Scout' radiogram before restoration

Chassis rear of Pennine 'Scout' before restoration

The turntable before restoration

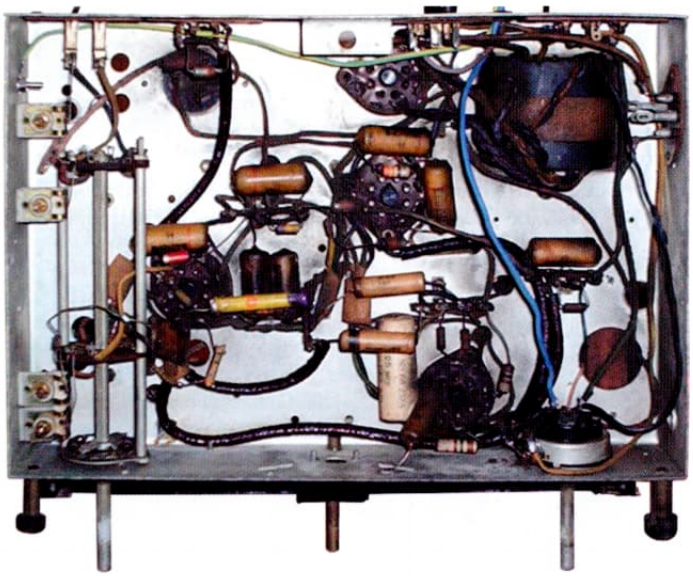
pretty free of vice and are well-documented. Besides that the design is now forty years old which gives it a certain 'vintage' appeal.

I had intended powering this from the valves' LT supply as I couldn't see drawing a few extra milliamps from that being a problem. I hooked this up via four diodes configured as a bridge rectifier but two of them literally blew up as one side is earthed. I therefore fitted an additional transformer out of an old 'phone charger.

I had a spare record deck so thought I may as well fit that. I made a new mounting board meaning that it would be a very simple matter to re-fit the original deck if desired. I also fitted a "Gram/Aux" switch so I could still connect other devices to the amplifier.

Cosmetically there wasn't much to do beyond cleaning and polishing. The top of the lid was quite badly ridged and the lacquer cracked but a rub over with a pan-scrubber dipped in boiled linseed oil followed by beeswax greatly improved it. It certainly looks better than it would had I stripped and re-polished it as it would then look brand new.

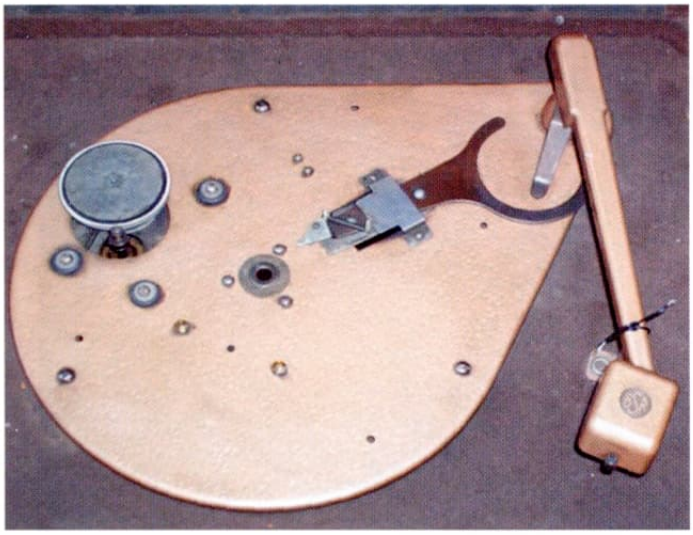
The biggest problem was the back. This was laid loose on the chassis and was flaking and had a crack right across it so that it was barely holding in one piece. My initial reaction was to make a new one but I then thought that there was nothing lost in trying to repair it.



The chassis underside before restoration

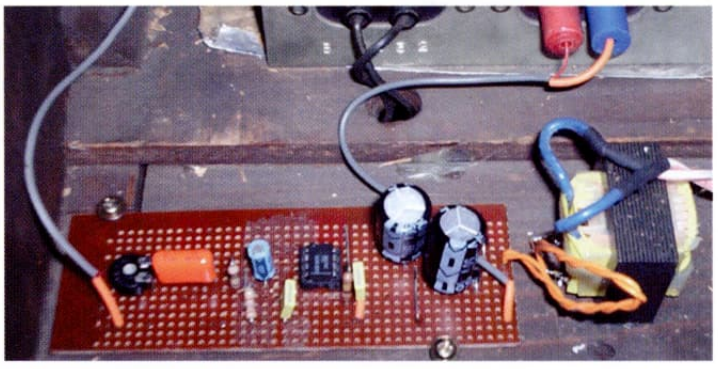
The new deck in place

The restored Pennine 'Scout' radiogram



Repair of the idler mechanism

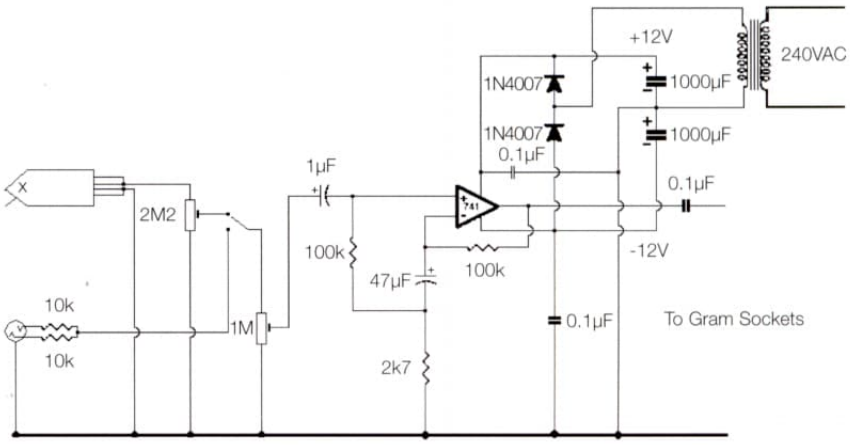
Repaired back panel



The pre-amp

I stuck down the loose bits with PVA glue and then ran some into the cracks before spraying the whole thing with water and running the iron over it on both sides. This treatment was far more successful than I'd dared to hope and no further reinforcing was needed.

As will be obvious, I didn't lose any sleep over worries about 'Authenticity' on this job not least because the modifications I've made could be completely reversed in a few minutes. Besides, the ends justify the means as it sounds fantastic and gets far more use than it would if it could only receive AM radio and play 78s.



Pre-Amp for Pennine 'Scout' radiogram

The Ever Ready 5214 pre-War portable radio

by Stef Niewiadomski

Any radio introduced just a few months before the outbreak of the second World War was bound to encounter production problems for the duration, and the Ever Ready 5214 (and other related model numbers, see later) is a good example of such a radio. I bought this radio on eBay in December 2012 and because I thought that the restoration might have some challenges, rather than dive straight in I decided to wait a while and see if I could find another example of the radio to use as a possible donor. In fact I managed to find two more radios, and these, along with the original, showed the interesting story of the radio through at least part of its production lifetime.

On the back page of the Radio Times for 7th July 1939, Ever Ready advertised an 'All-dry Superhet Radio' – clearly the 5214 - being carried by a good-looking woman in a swimming costume and cape, on her way to the beach, see Figure 1. The radio was described as 'the radio that goes anywhere', and its advantages were listed, including that it weighed in at 'only 18½ lbs' – presumably including the battery - and that its 'single dry battery gives at least 240 hours' service'. The 'all-dry' description was novel and significant in that most contemporary portables still needed wet accumulators to be lugged around to supply the current to their filaments. Ominously the advert also states: 'Reception is free from interference in steel and concrete ARP shelters', indicating the commonly-accepted view at the time that war was inevitable. The scan of this advert was kindly supplied by the Radio Times Archive, at Reference 1.

Figure 1: Ever Ready's Radio Times advert for 7th July 1939.

Models and variants

The 5214 has a red/black leatherette finish (see Figure 2 for a view of my restored 5214), and this model was also offered as the Lissen 8514. The knobs on the 5214 were black with a red speckle, to match the cabinet. One of these knobs was missing on the original radio I obtained, which Mike Barker was kindly able to supply, and I also inherited a few more from one of the 'extra' chassis which eventually came my way.

There was also the model 5215 (gold/black leatherette and matching knobs, Lissen 8515 – with an olive green scale, rather than the red Ever Ready scale) and the 5216 (blue/black leatherette, again with matching knobs). With the advent of war, how many of these colours, different from the 5214, were actually manufactured is an interesting question: perhaps readers can indicate if they have seen any of these models?

A 'Forces Entertainment Radio' version of the 5214 was also produced, supplied to RAF canteens between 1940 and 1944. This was finished in RAF blue, and used a hybrid collection of valves, as and when they were available. Finally the 5218 was a 'table model' using a similar chassis to the portables but with a larger cabinet and loudspeaker. The Lissen factory in London was destroyed by bombing in early 1941, and this may well have been the end of Lissen-branded versions of the 5214.

My radio was an early model as indicated by it having six elliptic holes in the back panel, each about 1-inch wide and 1¼-inch high, and the provision to connect an external aerial and earth via sockets mounted in the right-hand hole. The front has a clean finish without visible screw heads, four of which can be seen in later models. The dial pointer rotates in the opposite direction to the tuning knob via a friction drive mechanism, see Figure 3. For later versions this was revised to a dial cord, which allowed the dial pointer to rotate in the same direction as the tuning knob, as might be expected by a user.

The volume control has a red-painted bakelite disk with a narrow white stripe pushed over its shaft, which indicates whether the radio is switched on or off. There is a similar disk, painted white with 'MW' and 'LW' stencilled onto it, on the shaft of the wavechange switch. These disks are visible through holes in the top panel, adjacent to the control knobs.

The first radio I bought (chassis number 2144201) contained a set of Ever Ready-branded first generation D-series 1.4V filament battery valves, apart from the frequency changer which was marked 'Mullard'

(see Figure 4 for the complete valve line-up). Two examples of the DK1 frequency changer valve are shown in Figure 5. The one on the left has golden-coloured metallising and was the original valve from the 5214, and the fact that a non-metallised version was produced - presumably later - seems to indicate that the metallisation was not needed in practice.

Since Mullard produced valves for Ever Ready (apart from some very early valves produced by Ever Ready itself) all the valves were in fact of Mullard origin. These valves were among the first whose filaments were intended to be powered from 'dry' zinc-carbon rather than 'wet' rechargeable batteries. They were also pretty much the last valves designed to use the 8-pin side-contact base format (of Continental origin, and also called 'Ct8' in the Mullard literature), with most later functional equivalents using an octal base. Most other portable radio manufacturers seem to have skipped this generation of 1.4V Ct8-based valves, and persevered with 2V filament valves until adopting the DK32 (introduced in 1945), etc, series of octal-based valves in their immediate post-war designs of 1945-46.

The design

The schematic of the 5214 is shown in Figure 6. The radio is a standard medium/long wave battery portable superhet with an IF of 452kHz. Loop aerials are used for the two bands, and external aerial and earth sockets are provided on the back panel. The radio used an Ever Ready All-Dry No. 3 combined 1.5V LT and 90V HT battery, fitted with a four-pin socket for connection to the radio.

V1 is the DK1 heptode frequency changer stage; V2 is the IF amplifier stage using the DF1 pentode; V3 is the detector/AF preamp stage using the DAC1; and V4 is the audio output stage, a DL2 pentode.

The 5214 entered production in June 1939, at the time the country was about to go to war, and difficulties would soon be experienced in obtaining the originally-specified valves. The Trader service sheet for the 5214 (published in February 1940) gives equivalent octal valves for the side-contact versions, 'where difficulty is experienced in obtaining the specified valves', as: 1A7 (for the DK1), 1N5 (for the DF1), 1H5 (for the DAC1), and 1C5 or 1Q5 (for the DL2). I believe these were US-manufactured (RCA, Sylvania, etc) 'tubes' which no doubt were being shipped over on convoys at great cost to human life. This was only six months or so after the outbreak of war and it looks like supplies of the original valves were anticipated to dry up very quickly.

Because of the timing of the introduction of the DK1, DF1, DAC1 and DL2, apart from Ever Ready (and the Lissen brand) very few radio manufacturers designed them into their radios. In the UK I believe Ferguson used them in their 906B and 907 models; Pye used them in the 'New Baby Q'; and Beethoven Radio Ltd (a little known company based in London) incorporated them into the 'Little Prodigy' 909 model, all in the 1939-1940 period. In all cases the service sheets were advising a switch to octal equivalent valves as supplies of the original valves dried up. The Trader service sheet for the Pye also advises how a 2V accumulator could be substituted for the dry LT battery, by the addition of a series 2.4Ω resistor.

To help the use of these octal valves without having to replace and re-wire the original valve bases, plug-in adaptors could

Figure 2: The restored Ever Ready 5214 portable radio.

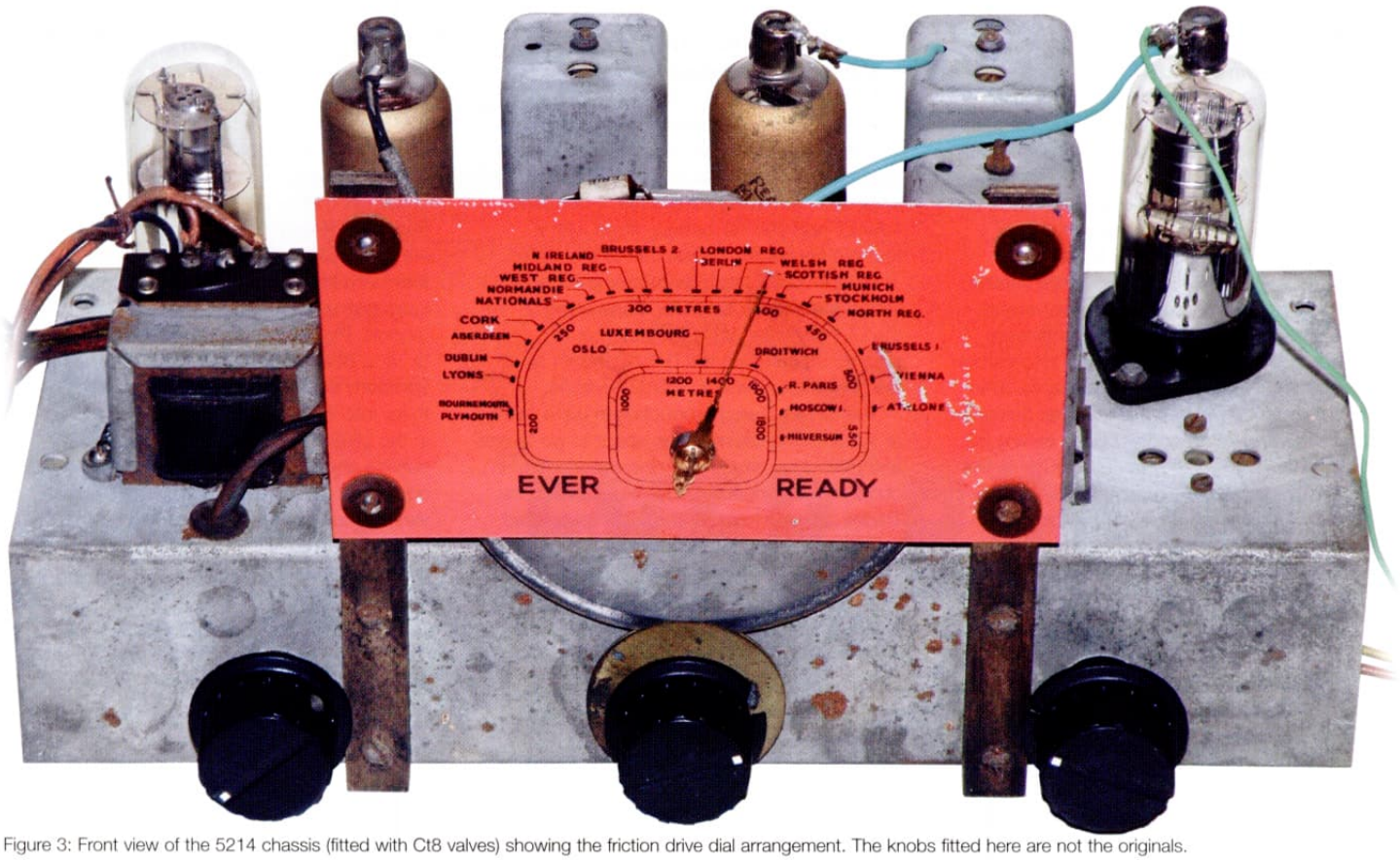


Figure 3: Front view of the 5214 chassis (fitted with Ct8 valves) showing the friction drive dial arrangement. The knobs fitted here are not the originals.

be purchased to adapt the side-contact sockets to octal. See Figure 7 for one of these adaptors, manufactured by Ever Ready itself. It may have been necessary to extend the valve's top-cap connection if this wasn't quite long enough to accommodate an octal valve with a longer envelope.

CV equivalents

The DK1, DF1, DAC1, DL2 set of valves had a very short design-in lifetime and data on them has not survived well. The only data I could find was for their CV equivalents. CV service codes are quoted for these valves at Reference 2. The codes given are:

DK1 = CV2910
DF1 = CV2907
DAC1 = CV2887
DL2 = CV2911

Since these valves were given service CV codes, I presume they were used in military radios. It would be good to hear from readers about any military radios known to use these valves. Although I couldn't find any online data for the D-prefix valves I did find brief data for their CV equivalents, and this data is now exhibited at the National Valve Museum (see Reference 3).

Figure 4: An 'identity parade' line-up of the DK1, DF1, DAC1 and DL2 valves from my Ever Ready 5214.

Restoration

The cabinet of my radio wasn't in bad condition, bearing in mind its age of something like 70+ years. A good clean up and replacement of the very yellowed and distorted plastic dial cover made it look much better. The handle, often a very worn part of a portable, was in remarkably good condition.

I removed the knobs and the chassis fixing screws and lifted the chassis from the cabinet, replacing and lengthening the speaker leads which were perished and too short to work conveniently with the chassis out of the cabinet. I also had to connect flying leads to the frame aerials: not ideal as this adds inductance to the connections, but again it made life much easier. The medium wave aerial is mounted on the inside of the back cover, and the long wave aerial is screwed to the inside left hand side of the cabinet. Figure 8 shows the underneath of the chassis, which is very simple. First of all I checked the values of all the resistors: they all seemed to be pretty close to their nominal values, even the high value ones, and so I left them alone. As I checked each component I looked carefully for dry joints and loose connections, a couple of which I found. The wiper of the volume control seemed to be intermittent in its contact, and some switch cleaner and back-and-forth motions seemed to fix this. I was suspicious of all the paper and electrolytic capacitors, and changed them all for modern components.

The lead from V1 grid (top-cap) to the tuning capacitor, and that from V2 grid to its IF transformer, were perished and so these were replaced with new wire.

I connected up a 90V HT and 1.4V LT supply and switched on. Initially the filament current measured low at about

180mA and I suspected that one valve had a blown filament. I checked around all the valves and I could see that one side of the filament wiring for V1 wasn't grounded. I made the connection and the current came up to the correct value of 250mA.

There was a slight hum from the speaker, but no stations as I tuned around the medium and long wave bands. I injected modulated RF into the grid (top cap) of V3 and could hear the demodulated tone. With my 'scope I checked to see if the frequency changer stage was oscillating, which it wasn't. Checks to its DC potentials looked OK and so I suspected that the DK1 wasn't in the best of health. This stalled progress for a while until I obtained a replacement valve from Mike Barker.

With the new DK1 fitted things improved slightly, but only a very weak Radio 4 on the long wave could be detected - which I could only hear when I plugged in an external aerial - as I tuned around both bands.

Alignment

I concluded at this stage that there was no good reason why the radio shouldn't work, and that it was probably badly mis-aligned. Following the service sheet's procedure I short circuited the oscillator section of the tuning capacitor (C14) and connected a 470kΩ across the tags to the frame aerials. I then injected a modulated AM source at 452kHz to the control grid (top cap) of V1 via a blocking capacitor. The IF transformer cores were then peaked in the correct order, which made a big difference to the volume of the demodulated audio output. Then I removed the short from C14 and the 470kΩ resistor. The service sheet recommends that alignment is carried out with the chassis in the cabinet, and adjustments are made through the holes in the back panel. This looked tricky to me, so I thought I'd give it a try outside the cabinet first.

I followed the recommended medium wave alignment procedure and got several stations on this band. Then switching to the long wave I aligned to get Radio 4 at the correct position on the dial. Switching back to the medium wave, I needed to re-peak to get my stations back at reasonable strength. At the low frequency end of the medium wave band the radio started 'motor-boating' but was OK over the rest of the band. I then re-assembled the chassis into the cabinet: I don't think my results were brilliant, but I was happy enough at this stage to get some stations on both bands. I may come back later and attempt the alignment using 'keyhole surgery' through the back panel holes.

Figure 9 shows the chassis back in the cabinet, with the large space allowed for the combined LT and HT battery.

Figure 5: Two examples of the DK1 frequency changer valve. The one on the left has golden-coloured metallising and was the original valve from the 5214.

The other two Chassis

As I mentioned at the beginning of this article I managed to find two more chassis, which in the end I didn't need to cannibalise, but which showed the interesting history of this radio. I was very lucky to pick up a very wood-worm eaten 5214 from the wall outside the hall at the September 2013 meeting at Harpenden. The cabinet was quickly disposed of but the chassis (number 2257373) is in reasonable condition, see Figure 10. The chassis is equipped with 100% Ct8 bases but V1 is a Mullard DK32 plugged into an octal-Ct8 adaptor. This must have happened sometime after 1945 and it's reasonable to assume that the radio was originally built with a DK1 in this position. Note that the cans of the IF transformers, and the can containing the front-end coils are fabricated from sheet metal with their seams soldered together. Perhaps this was a cost and/or labour saving adaption from the extruded aluminium cans used on my original chassis.

Figure 11 shows the chassis (number 2277553) found at the Dunstable Downs rally in 2013, containing octal-based valves of US origin. Hopefully the dial cord can be seen, which results in the dial pointer rotating in the same direction as the tuning knob. Note that the can containing the aerial and oscillator coils on the Ct8-based chassis is missing. The coils are mounted under the chassis, around the wavechange switch, which begs the question 'is this really from a 5214?' There's the possibility that it's a model 'A', designed for the DK32, etc range of valves (but probably built using stocks of the 1A7GT, etc), and produced between 1946 and about 1950 (see Reference 4). Photos of the 'A' clearly show an above-chassis screening can containing the front end coils, which my chassis doesn't have, where these coils are below the chassis. I'd say therefore that it's maybe 90% certain that chassis number 2277553 is a 5214 with variations on the original build level, as would be expected with any radio, let alone one that was being built under wartime conditions.

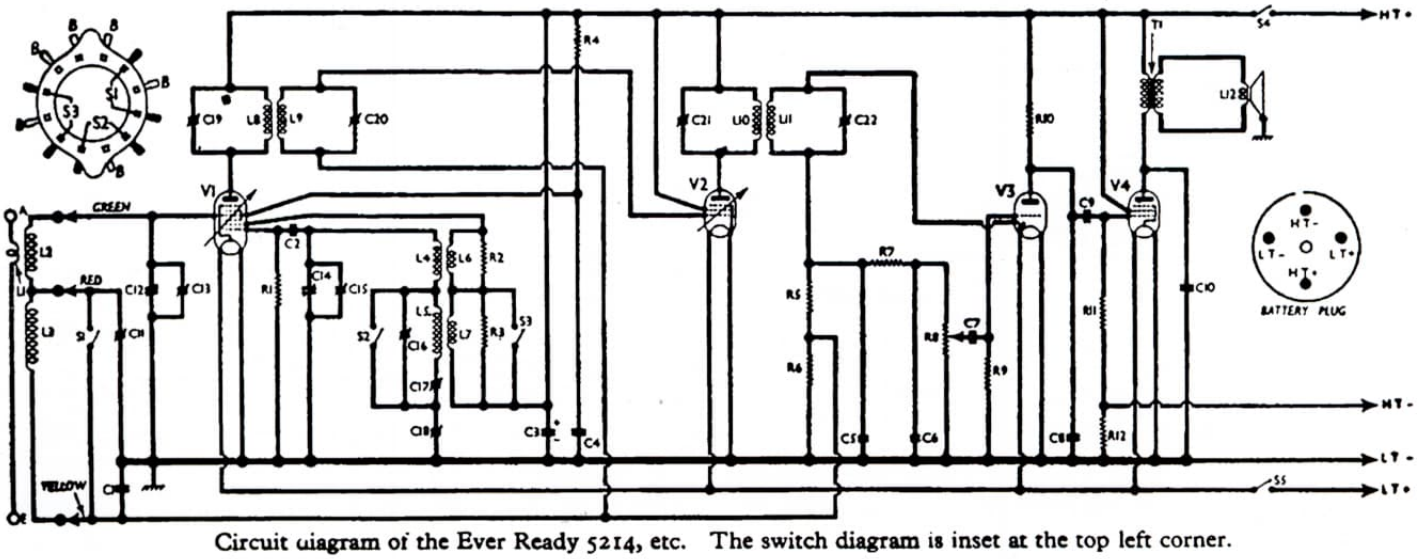
Evolution of the 1.4V Frequency changer valve

Having mentioned the DK1, 1A7GT and DK32, I thought I'd complete the story of the evolution of the frequency changer stage for 1.4V filament valves. Figure 12 shows a complete line-up, with the highly successful B7G-based range consisting of the DK91 (introduced in 1947), DK92 (1951) and DK96 (1953) added in. And that was the end of the line for valves for use in battery-powered radios.

The Sylvania 1A7GT/VT-147 has a shorter glass envelope than the DK32 and presumably was a useful height reduction in the service equipment in which it was used.

The DL2

The DL2 audio output valve is unmetallised and is marked 'Ever Ready' in red ink. I have



Circuit diagram of the Ever Ready 5214, etc. The switch diagram is inset at the top left corner.

Figure 6: Schematic of the Ever Ready 5214, which used Ct8-based valves immediately pre-war. The same chassis also appeared in the 5215, 5216, 5217 and 5218, as well as the Lissen 8514 and 8515, which were of course Ever Ready sets, having acquired the Lissen brand in 1934.

an original box (see Figure 13) for this valve and it shows the Mullard 'Pentone' branding for pentodes, started in the 1920s, continued into the octal era and even used for their B9A valves, such as the EL84. Note also the strict policy on price maintenance: the valve could not be sold to the public for less than 9/- (presumably radio manufacturers and the trade got a discount), and 'No allowance, bonus, rebate, gift, or other consideration shall be given to the purchaser of this valve in connection with its sale'.

Conclusions

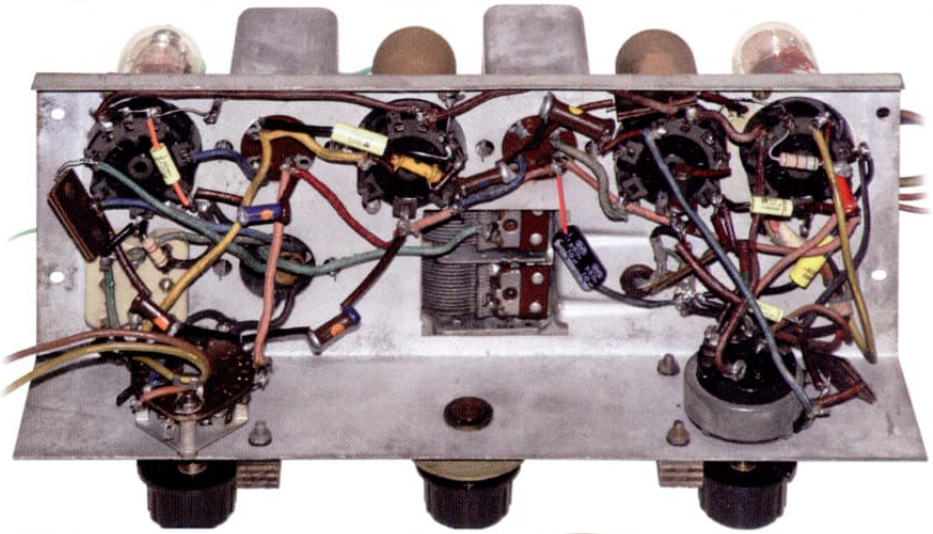
The 5214, and associated Ever Ready and Lissen models, and a handful of radios from other UK manufacturers, gave a very brief design-in window for the side-contact DK1, DF1, DAC1 and DL2 valves. With 1.4V filaments, and intended to be powered from 'dry' rather than 'wet' batteries, these valves were the ancestors of the D90 series of B7G valves (DK91, DF91, etc) which were designed into portable radios in their millions between 1947 and about 1960. The outbreak of war in 1939 caused a rapid migration to octal-based equivalents, many of which were shipped over to the UK from the USA. I must admit I found removing and inserting these side contact valves a nerve-racking experience as it's very difficult to avoid putting considerable pressure where the glass meets the base.

By the end of the war, side-contact valves were obsolete. As new portables were designed post-war, for just a couple of years a typical octal line-up for battery radios - for example in the Ever Ready A, and the Vidor 351 - was: DK32, DF33, DAC32 and DL35. By 1947 the Vidor 353 used the miniature all-glass construction B7G DK91, etc line-up, and this was adopted by most portable radio manufacturers very quickly. There was a DK21 (see Reference section) but as far as I can see this valve did not reach production status in any British portables.

The numbering of the DL2 begs the question 'what happened to the DL1?' So far I've found no data whatsoever on this valve, so for a while I presumed that it was an unsuccessful prototype of what became the DL2. However I did manage to find a Mullard DL1 in its original box on eBay recently and so it looks like it was released to production, though not used by Ever Ready in any of their radios.

Figure 7: The Octal-to-Ct8 adaptor, made by Ever Ready. On the adaptor it says 'Only to replace Ever Ready valves DK1 – DF1 – DAC1 – DL2'.

Below Figure 8: The underneath of the 5214 chassis.



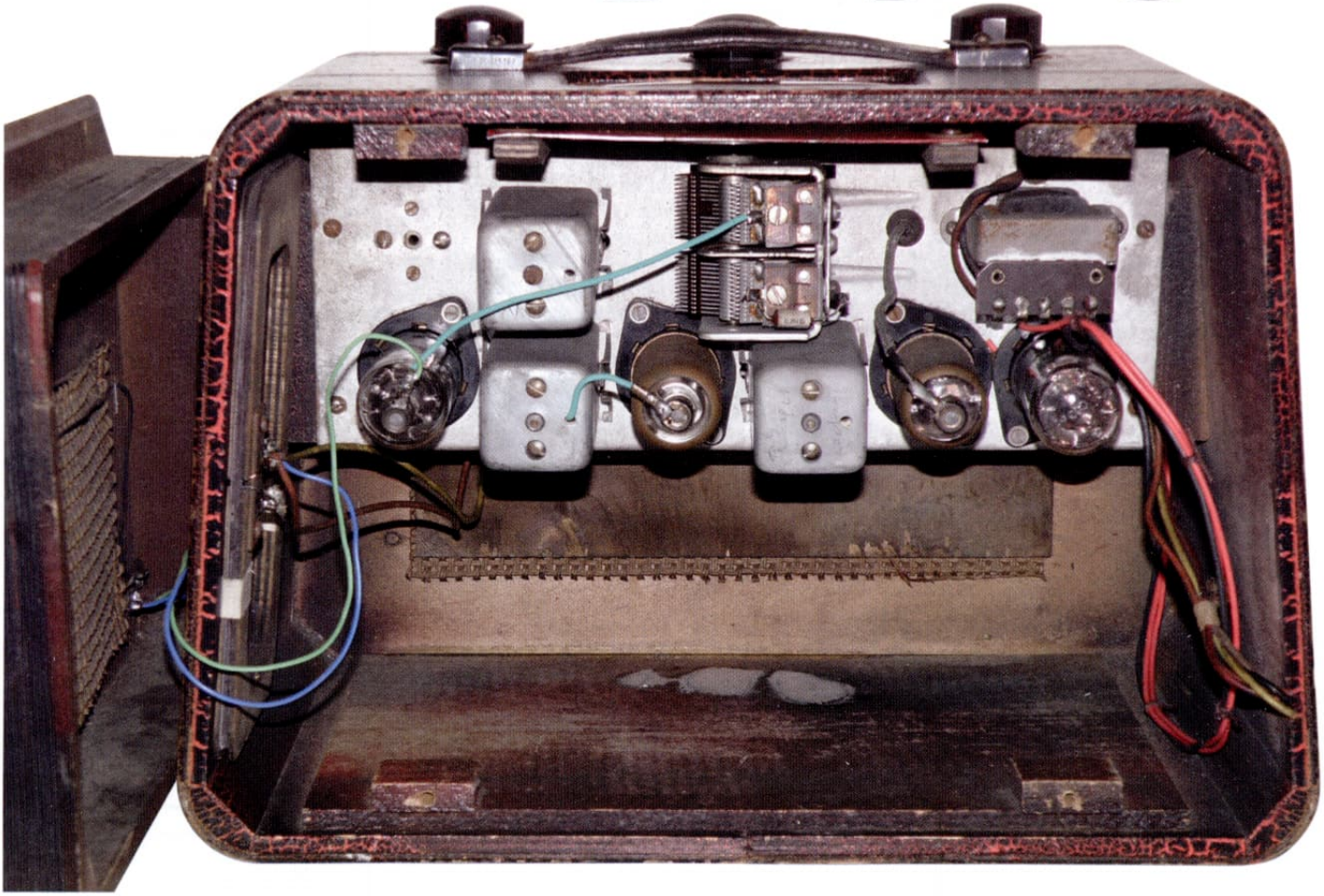


Figure 9: The chassis installed back in the cabinet.

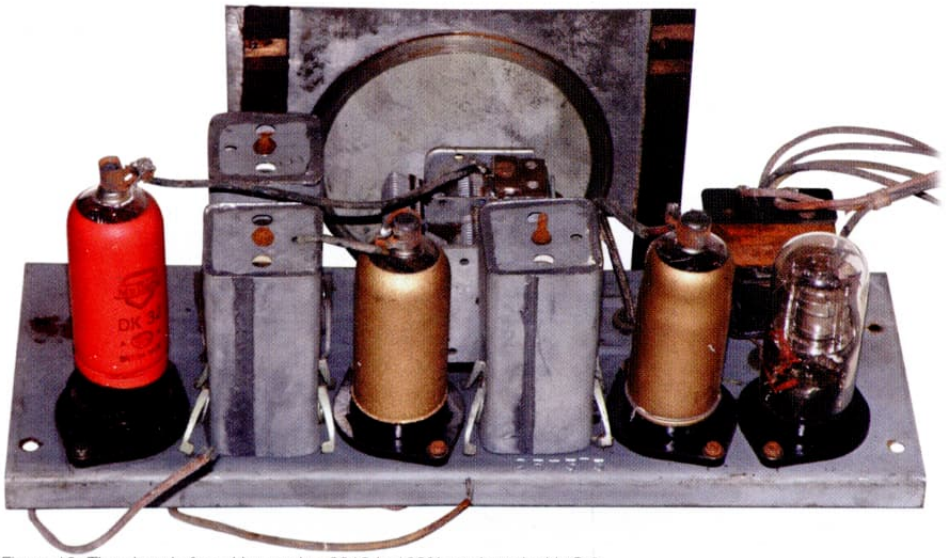


Figure 10: The chassis from Harpenden 2013 is 100% equipped with Ct8 bases. V1 is a DK32 plugged into an octal-Ct8 adaptor.

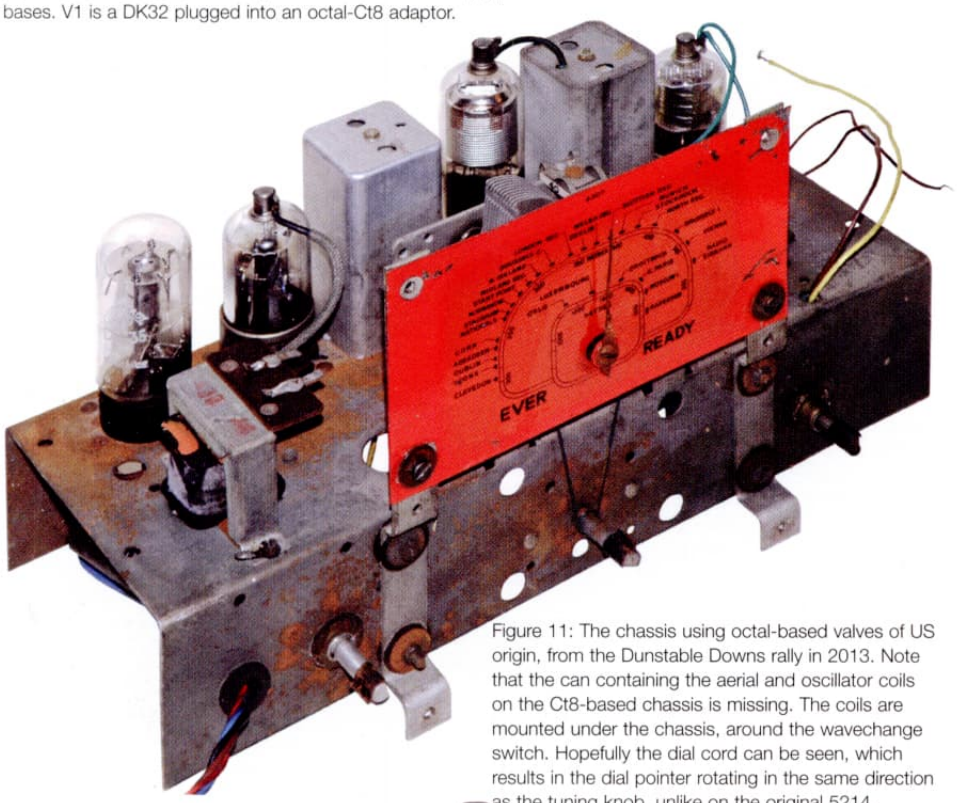


Figure 11: The chassis using octal-based valves of US origin, from the Dunstable Downs rally in 2013. Note that the can containing the aerial and oscillator coils on the Ct8-based chassis is missing. The coils are mounted under the chassis, around the wavechange switch. Hopefully the dial cord can be seen, which results in the dial pointer rotating in the same direction as the tuning knob, unlike on the original 5214.

Figure 12: Line-up of 1.4V frequency changer valves. Left-to-right are: DK1, 1A7GT (VT-147), DK32, DK91, DK92 and DK96. Mullard has supplied the DK91 with a plastic cover for the pins, helping prevent them from being bent during handling. The DK96 is marked 'Ever Ready', but as with earlier Ever Ready valves, this was manufactured by Mullard.

Right - Figure 13: An original box for the DL2 showing Mullard's 'Pentone' branding. Note also the strict policy on price maintenance: the valve could not be sold to the public for less than 9/-, under any circumstances.

References

Reference 1: The Radio Times Archive can be accessed at: http://www.radiotimesarchive.co.uk/

Reference 2: A searchable list of CV valve codes and a full list of CV valve manufacturers' codes can be found at the Virtual Valve Museum at: http://www.tubecollector.org/cv-valves.htm

Reference 3: The National Valve Museum at http://www.r-type.org/index.htm is a valuable source of valve history and data, including many high quality photos of the valves featured. Data for the DK1, DF1, DAC1 and DL2 (mainly derived from their CV equivalents) has now been published on this website.

Reference 4: The Ever Ready model 'A' can be seen at: http://www.radiomuseum.org/r/ever_a.html

The Lucerne, Switzerland-based Radiomuseum contains a wealth of online information on radios, TVs, etc. A good starting point for exploring what they have on Ever Ready sets can be found at: http://www.radiomuseum.org/r/ever_all_dry_battery_portable.html

A fascinating history of valves can be found in 70 Years of Radio Tubes and Valves by John W Stokes. Published by The Vestal Press Ltd, New York, in 1982.

In occupied Europe there was a range of octal-based 1.4V valves produced during the war. Descriptions of the Dx21 series of valves (in undated documents) can be found at:
http://frank.pocnet.net/sheets/046/d/DK21.pdf
http://frank.pocnet.net/sheets/046/d/DF21.pdf
http://frank.pocnet.net/sheets/046/d/DAC21.pdf
http://frank.pocnet.net/sheets/046/d/DL21.pdf

How do they work? 3. Ohmmeters & Meggers

by J Patrick Wilson

Instruments to measure electrical resistance come in several forms. The most common being the multimeter with a scale calibrated directly in ohms. This requires an internal battery and depends upon Ohm's law, R=V/I, the ratio of the voltage across the resistance to be measured to the current flowing through it. Early instrument designers such as Ayrton and Evershed recognised that it is possible to design instruments which indicated this ratio directly without knowing the actual voltage and current, resulting in various forms of ohmmeter and Megger. In fact the original determination of the Absolute Ohm was also such a method.

When I studied physics at King's College London (KCL) there was a old resistor belonging to Wheatstone calibrated in *miles*, representing the resistance of that length of telegraph wire. In 1861 the British Association (BA) set up a committee to standardise electrical units by going back to first principles defining them, as far as possible, absolutely in terms of length, mass and time. Resistance was determined by rotating a vertical short-circuited coil in the earth's magnetic coil which thereby induced the deflection of a small compass needle at the centre of the coil. It can be shown that $R=2\pi^3n^2af.cot\phi$, where n is the number of turns, of radius a, rotating at f revolutions per second, and ϕ is the deflection of the needle.

This led to a number of standard ohm resistors being made and distributed in 1865, one of which went to Maxwell at KCL, it being recognised that a practical standard could be reproduced more precisely than an absolute determination. One of our practicals at KCL was to compare this original BAU with a copy of the *Legal* ohm defined in 1884 as the resistance of a column of mercury of 106cm and 1mm^2 cross section. In turn that was succeeded in 1893 by the *International* ohm based on a column of mercury of 106.3cm and finally in 1949 by the *Absolute* ohm. In spite of the fact that it was recognised so early that the BAU was about 1.35% too small, the submarine telegraph industry retained it as their standard until about 1955 as many cable instruments demonstrate.

Wheatstone's name is usually associated with the bridge method of comparing resistances as he brought it to people's notice although he admitted, probably reluctantly, that the idea stemmed from Christie. Such methods are used when great accuracy is required and depend on the fact that when two resistors, R1 & R2, are connected in series across a battery the potential is divided in the same proportion as their resistances. Thus if a second pair of resistors, R3 & R4, is also placed across the battery their junctions will be at the same potential when R1/R2 = R3/R4. This can be detected with a sensitive galvanometer as the bridge is adjusted for balance. This condition of balance also holds when battery and galvanometer are interchanged. One version has a sliding contact along a wire stretched over a metre scale so that an unknown resistance has the same ratio to a comparison resistance as the corresponding lengths of scale. Others use either plug or switch connection to fixed ratio arms and an adjustable comparison arm comprising several decades of switched standard resistors. Although bridges are really a separate topic

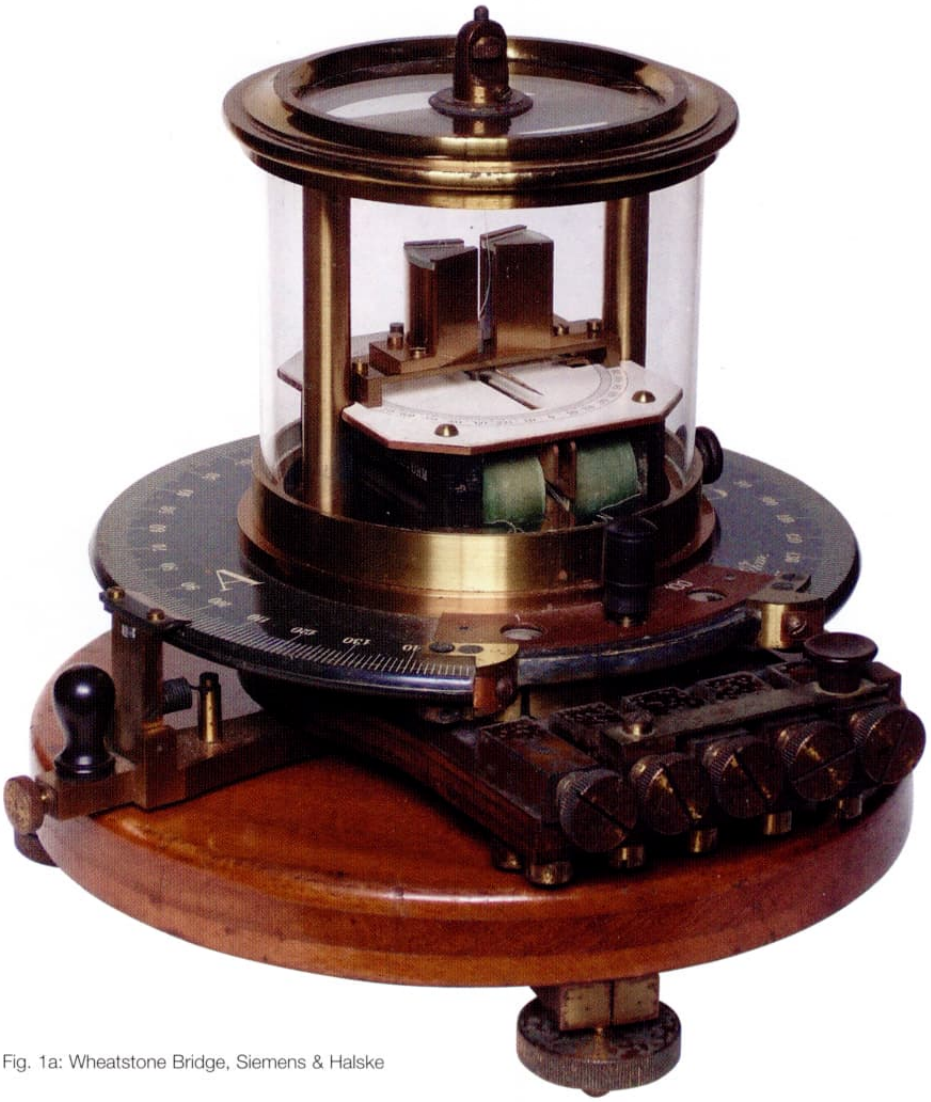


Fig. 1a: Wheatstone Bridge, Siemens & Halske

examples of self-contained ones and those incorporated with a Megger will be included.

Siemens & Halske Bridge

(Bench instrument with levelling screws, 22x20x21, 45cm circular slide wire ±150° 4.6Ω, silver roller contact over ±140° with 0.2° vernier, 1, 10 & 100Ω comparison resistors, tangent galvo (described in Part 1, Bulletin 38 (3)), tapping key, Siemens & Halske No. 1935U).

This instrument (Fig. 1) is not easy to use. After releasing the locking screw the instrument has to be carefully levelled to allow the pointer to swing freely. Then the table and terminal block has to be rotated (without moving the base) until the pointer lies along magnetic N&S and centrally between two stops, indicating zero. Now connect the unknown resistance to terminals II & II (with

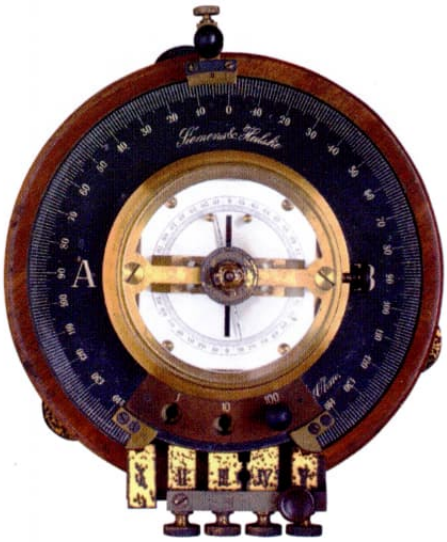
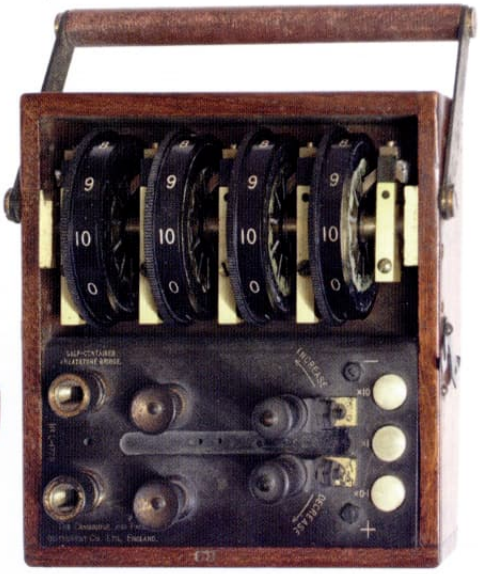


Fig. 1b: Wheatstone Bridge, Siemens & Halske

Fig. 2a: Wheatstone Bridge, Cambridge & Paul

Fig. 2b: Wheatstone Bridge, Cambridge & Paul



a linking plug inserted between III & IV) and the battery to terminals I & V. The standard resistor is then selected by removing the required plug (with no plugs the three are in series giving 111Ω). Then move the rolling wheel contact around the wire at the periphery of the ebonite table (again without moving the base) to the expected balance point and check with the tapping key connecting terminals II & V, finely adjusting until balance is obtained.

The range of the silver roller means that ratios of A/B can be set from 290°/10° to 10°/290° giving ranges of measurement of 0.034 to 29Ω, 0.34 to 290Ω and 3.4 to 2.9kΩ respectively for the 1, 10, 100Ω comparison resistors (up to 3.2kΩ with 111Ω), e.g. as the comparison resistors are below A and the unknown X below B a balance at A = 28.4° on the 10Ω range gives, X = 10x(150+28.4)/(150-28.4) = 14.67Ω. Precise measurements are possible around the middle of the scale but towards the extremes, end errors and reading errors will compromise the result.

The country of manufacture could be either Germany or England as William Siemens established a branch of Siemens & Halske in Britain in 1858 becoming Siemens Bros. London in 1865. The galvo coil is marked 100 int Ω indicating it cannot be before 1893. Almost identical examples can be found marked Siemens Bros. London, some with 10, 100 & 1000Ω comparison resistors. It would seem likely that they were all manufactured in the same country and marked according to market.

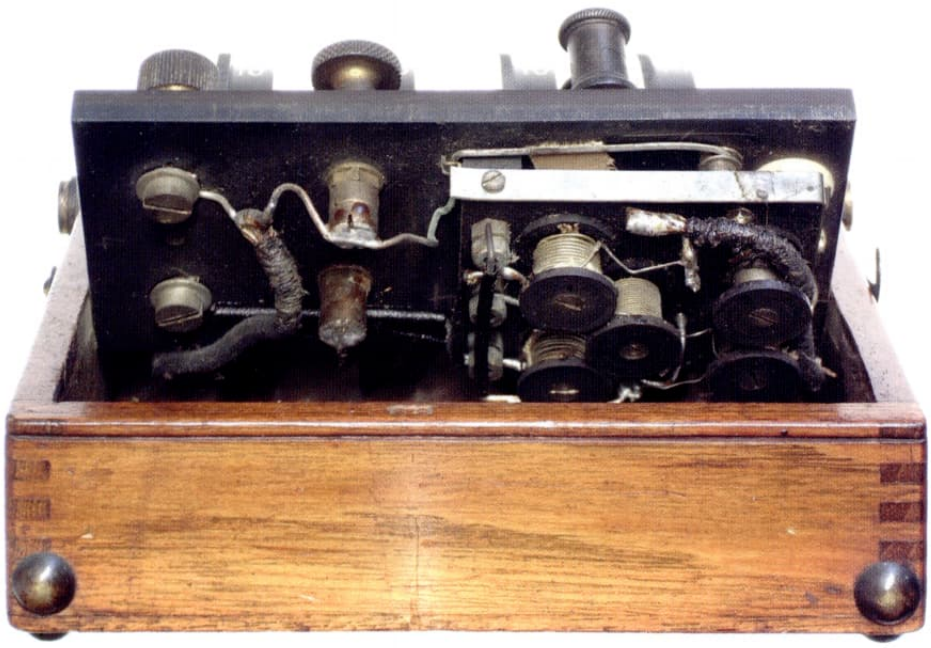


Fig. 2c: Wheatstone Bridge, Cambridge & Paul

Cambridge & Paul self-contained Wheatstone Bridge
(Bench instrument 15x15x8, 4-decade thumb wheel 000.0-1111.0Ω, three range x0.1, x1 & x10 giving measurement settings from 0.01-11,110Ω. The Cambridge and Paul Instrument Co. Ltd. No. L-1778)

This is a very neat and compact instrument (Fig. 2) with the decade resistors embedded within the wheels, although unfortunately both the galvanometer above the ebonite panel and battery contacts in the base have been removed and replaced by four terminals for external galvo and battery. It dates from between 1919 when Paul joined with Cambridge and 1924 when it became The

Fig. 3: Weston Ohmmeter

Fig. 4: AVO 7 scales & ohms adjusters

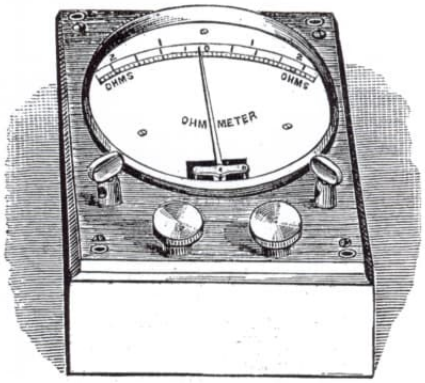


Fig. 5: Ayrton & Perry ohmmeter

Fig. 6: Model of a tangent ohmmeter

Cambridge Instrument Co. Ltd. The range is selected simply by choice of white button on the right which connects to the corresponding junction on the ratio chain of resistor. With light pressure it connects the battery via a 220Ω resistance for coarse adjustment, then, heavy pressure shorts this resistor for full sensitivity. The decade resistors are about 0.1% too large.

Weston Direct Reading Ohmmeter

This instrument (Fig. 3, reproduced thanks to Geoff Tomlin) requires an external battery to the upper terminals and after inserting the plug in the appropriate hole on the left "To Check Battery" a magnetic shunt is adjusted for battery voltage to give fsd, by the knob above the scale. The plug is then transferred to the appropriate range hole and the unknown resistance across terminals X is measured. The instrument works by measuring the voltage across the unknown resistor. If a constant current source and infinite impedance voltmeter could be used, the scale would be linear. With a finite source impedance the scale becomes compressed slightly towards the higher readings. From the degree of nonlinearity and Norton's theorem it is possible to calculate the ratio of effective source resistance to the full scale value, which has to be the same on all ranges. The ranges starting above zero require bridge circuitry to offset the reading. The instruments were available in two or three range versions with maxima from 10 to 3000Ω, and require a battery from 1.5 to 9V. The specified accuracy of 0.25% of fsd from 10 to 30°C is comparable to a basic Wheatstone bridge, and much easier to use. Like all Weston instruments, however, they were expensive, ranging from 75$ to 90$ in 1919.

The ohmmeter ranges of multimeters

These are not generally available as separate units and multimeters will be discussed in the next article. For completeness and comparison, however, it is necessary to consider their function here. They were introduced by Macadie in 1923 when starting the AVO company by incorporating a dry battery and a scale directly marked in ohms (Fig. 4, AVO Model 7 scales and ohms adjusters). The scale can be marked out by calculation from the current calibrations. A battery potential V will register a current I_{fsd} with a series resistor $R_0 = V/Ifsd$ which is therefore marked 0Ω. A further resistance of R_0 in series will thus register half scale. In general $I = V/(R_0 + R)$ allowing R to be marked throughout the scale. From this it can be seen that the ratio of the R values occurring at 10% and 90% of fsd will always be $9R_0/0.1111R_0$ = 81:1 whereas the total range of values actually marked is 10,000/0.5=20,000:1. Outside the 10:90% range the readings become increasingly imprecise.

Unfortunately as batteries discharge, they vary both in emf and internal resistance, requiring two adjustments to the instrument. In the first AVO these were labelled P for potential and R for resistance. Later instruments with several ohms ranges also have a Q adjuster with corresponding adjustment instructions. These instruments are justifiably popular for test purposes.

Direct reading ohmmeters: Ayrton & Perry ohmmeter

The first direct reading ohmmeter (Fig. 5) was described by Ayrton & Perry in 1884 as two vertical coils set at right angles with a soft iron needle at the centre and two pairs of terminals (see Fig.6). The *current* terminals (outer in Fig. 5, left in Fig. 6), connected to a coil of thicker wire (E-W), carry the current through

the resistance to be measured, aligning the needle along its coil axis and the pointer to zero (N). This current produces a controlling torque which tends to return the pointer to zero. When the *potential* terminals (lower in 5, top in 6) from a coil of many turns of thinner wire (N-S), are connected across the resistance, it deflects the needle and pointer left or right according to the polarity and magnitude of this voltage. Ideally this would be a tangent relationship, depending only upon the ratio of voltage and current, but they claimed that their coils had been arranged to give a linear scale. The earth's field has to be cancelled by using an astatic double needle or by fixing an opposing magnet above or below. It would appear that the instrument was not fully thought out as positive and negative values are not really necessary. A tangent relationship would cover a range of 40:1 between the 10% and 90% deflections.

Evershed's ohmmeter

(Bench instrument 16x15x16 with separate generator 18x19x18, 9.5cm engraved silvered brass scale 0-INF (No. 4256, 0.05-5MΩ on A, 5-500kΩ on B) spirit level & levelling feet, pointer clamped by lid, Evershed's Patent, No.6203)

Evershed's first ohmmeter was introduced by WT Goolden & Co in 1889 and was a moving iron instrument (Fig. 7a) with separate generator. For an excellent history of the company and their wide range of instruments see Chris Deavin's article on *Evershed and Vignoles*, BVWS Bulletin Vol 38, No. 1, Spring 2013. The Electrician (December 13, 1889) describes it as similar to the Ayrton & Perry ohmmeter above, although now it is the *voltage* coil which provides the restoring force towards the infinity mark and the *current* through the unknown resistance which provides the deflection.

In 1895 Evershed introduced a new version working on different principles although this has not been recognised in some subsequent descriptions. Externally it appears similar (Fig. 7b), except that the kidney shaped window

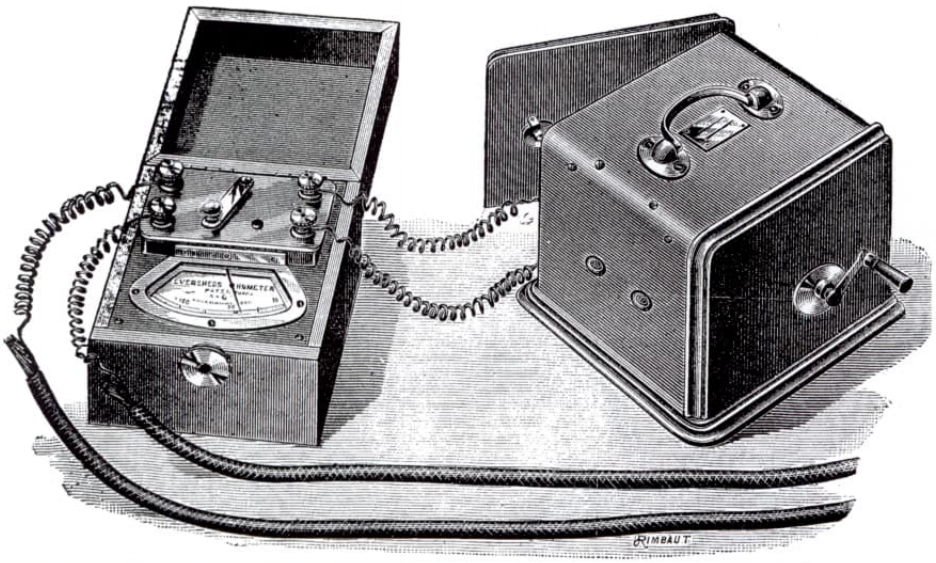


Fig. 7a: Evershed's 1889 ohmmeter

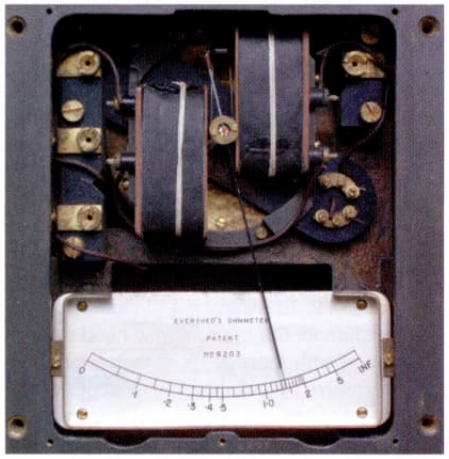


Fig. 7c: Evershed's 1895 ohmmeter

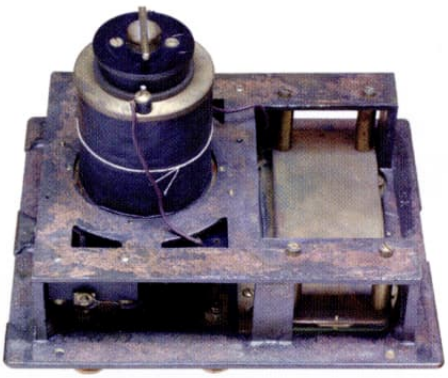


Fig. 7d: Evershed's 1895 ohmmeter

Fig. 7b: Evershed's 1895 ohmmeter

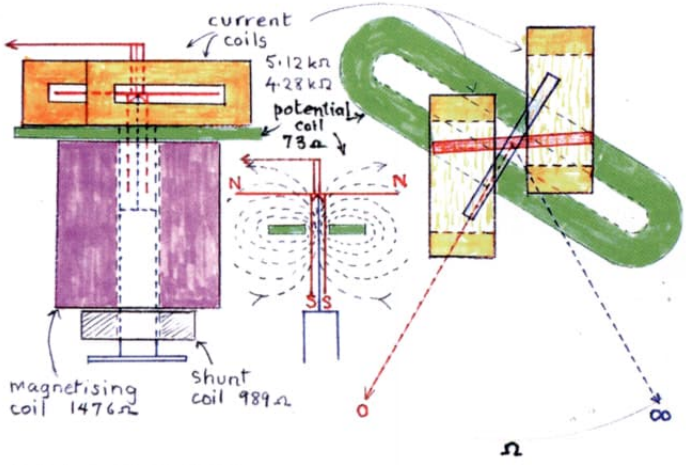


Fig. 7e: Evershed's 1895 ohmmeter

Fig. 7f: Evershed's pre-1889 generator

Fig. 8: French ohmmeter relying on correct voltage

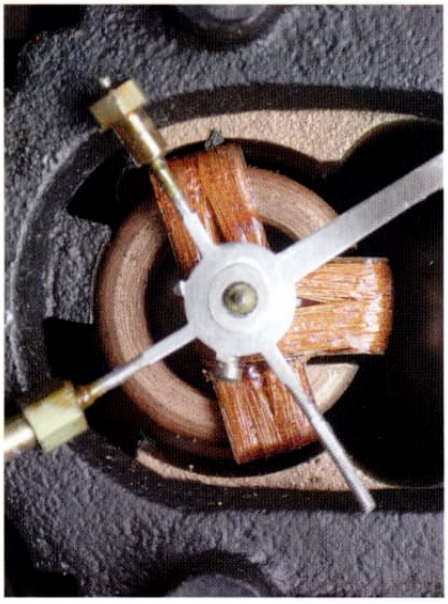


Fig. 9a: Simple moving-coil ratio movement

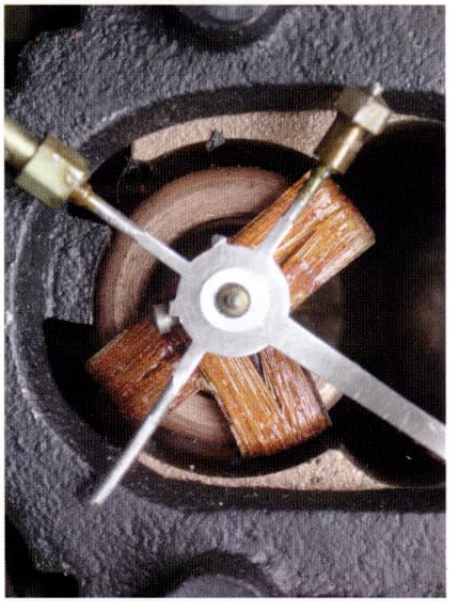


Fig. 9b: Simple moving-coil ratio movement

has been replaced by a rectangular one and levelling screws added. The needle is of soft-iron mounted across the top of a vertical soft iron tube (red in Fig. 7e left and centre) on the axis of a vertical magnetising solenoid (pink) connected across the generator, the function of which is to create say, a S-pole at the lower end of the tube and N-poles at *both* ends of the needle This would be astatic and take up no particular direction, but between this vertical coil and the needle is a horizontal flat coil (green) with axis vertical, greatly elongated in one direction so that its magnetic flux would flow vertically through the slot and then spread out on both sides above it at right angles to its longer dimension. This, the *potential* coil, is connected in series with the magnetising coil, supplementing the magnetising effect, but now giving direction to the needle (indicated at the right in blue) as both points would follow their respective fluxes away from the line of the slot. A pointer attached at an angle above the needle thus indicates 'infinity'.

The *current* coils (orange), in series with the unknown resistance, are mounted with their axes horizontal to embrace the points of the needle but are wound in opposite directions. The axes of these coils are set at about 60° to the long side of the potential coil and when energised, rotate the points of the needle towards their axes. The maximum current, occurring when the terminals are shorted, gives a deflection indicating zero (red position). The current coils are wound on rectangular copper formers with slots just large enough to clear the needle, the copper being intended to give eddy current damping. As the needle moves over only about 60° the current coils are offset accordingly.

As the resistance depends on the *ratio* of voltage to current, the reading is again independent of the generator voltage. When switched to 'B' a shunt situated below the magnetising coil is connected across the current coils reducing the values measured by a factor of ten. Resistance values from 50kΩ to 5MΩ are engraved on the silvered brass dial. To measure a higher range of resistances the current coils need to be wound with more turns of finer wire: the alternative of *reducing* the strength of the potential coil is not acceptable because the instrument would become too sensitive to external fields and pivot friction. Although the measured coil resistances are given on the figure, some or all coils must have been rewound as the instrument under-reads by a factor of three to four. Although nominally 100V, the generator produces 150V off-load, 65V with the ohmmeter open circuit, and 35V with the ohmmeter test terminals shorted. Instruments were available with ranges up to 5, 10 or 60MΩ and with generators of 100V, 200V, 500V or 1000V. (10:90% scale range 110:1, marked range 100:1)

A French ohmmeter
(Bench use 16x16x17, 10.5cm red scale 0-440V, black scale 0-20MΩ, 1.44mA standard moving coil, Ohmmètre R.N. No.396-3628-2).

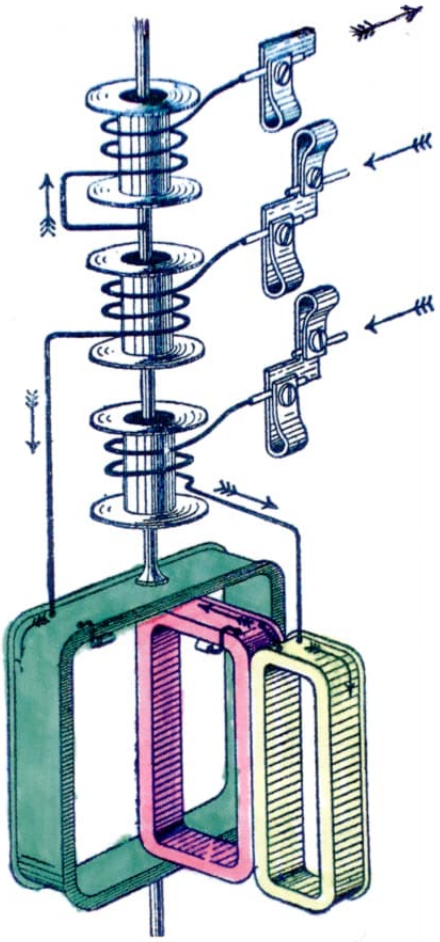


Fig. 10a: Moving-coil ratio movement with compensating coil and horns

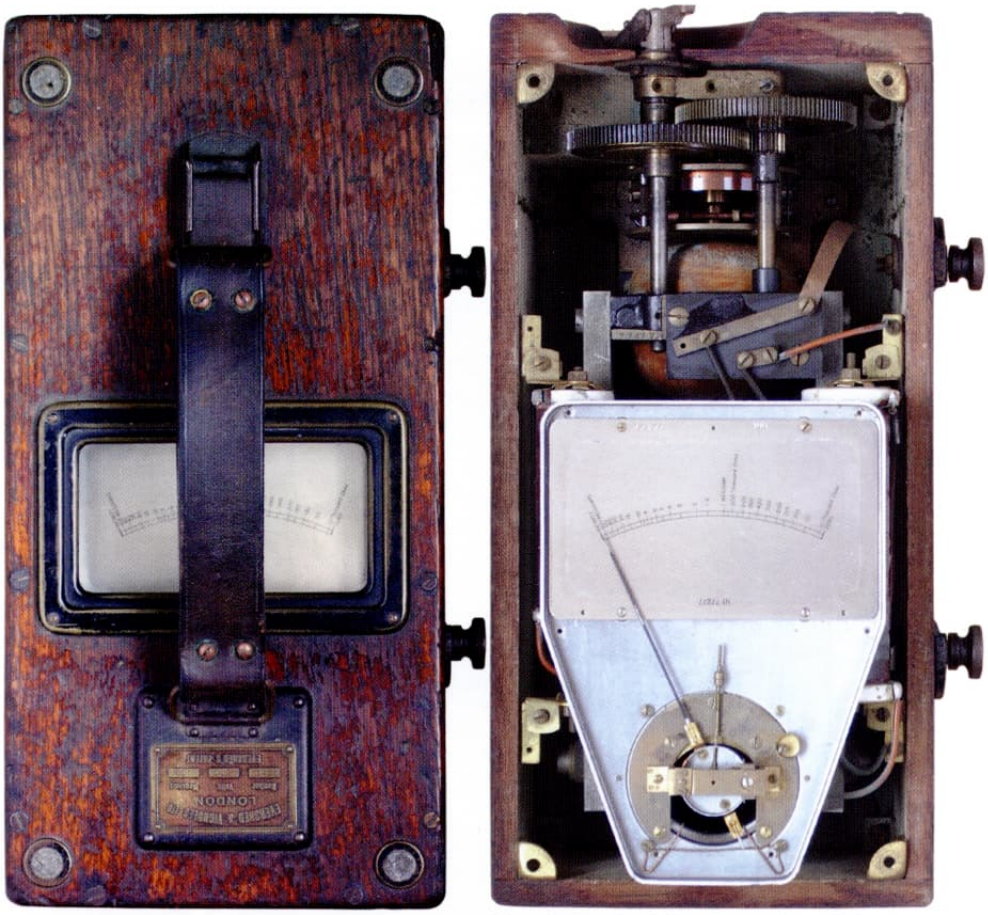


Fig. 11a: Evershed & Vignoles moving-coil Megger

Fig. 11b: Evershed & Vignoles moving-coil Megger

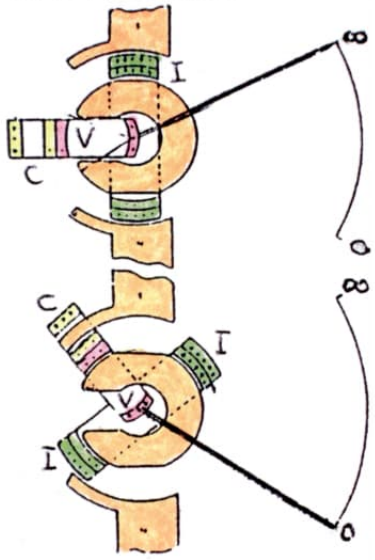


Fig. 10b

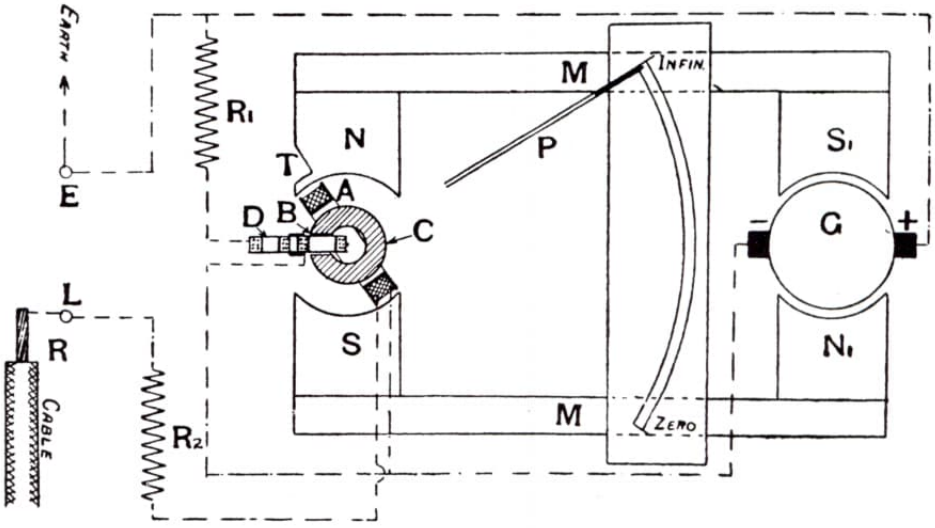


Fig. 11c: Evershed & Vignoles moving-coil Megger

At first sight this anonymous French instrument (Fig. 8) appears to belong to the same class of ohmmeters. However, on reading the instructions and inspecting the meter it incorporates a conventional moving-coil movement and is not a *ratio* device. It depends upon the user turning the handle at a speed to produce exactly 440V then, without varying this speed, releasing the small ivory button to bring the unknown resistance into circuit. Presumably owing to loss of magnetism the generator now produces only 360V. This would still indicate the integrity of insulation but not give an accurate resistance value.

Evershed & Vignoles patent

The moving iron instrument was superseded by the moving coil version in 1904 which combines greater inherent sensitivity with lower sensitivity to external fields, takes much less current from the generator, and uses the same magnets for generator and instrument. The heart of the design is a moving coil assembly (Fig. 9) in which the *current* coil is similar to a standard moving coil instrument but attached at almost a right angle to this is a *potential* coil (green and pink respectively in Fig. 10) of half the diameter, with its inner limb passing through a

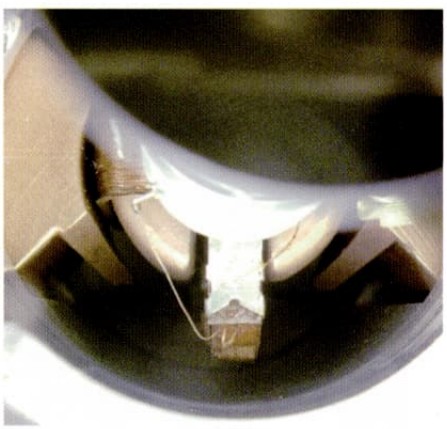


Fig. 11d: Evershed & Vignoles moving-coil Megger

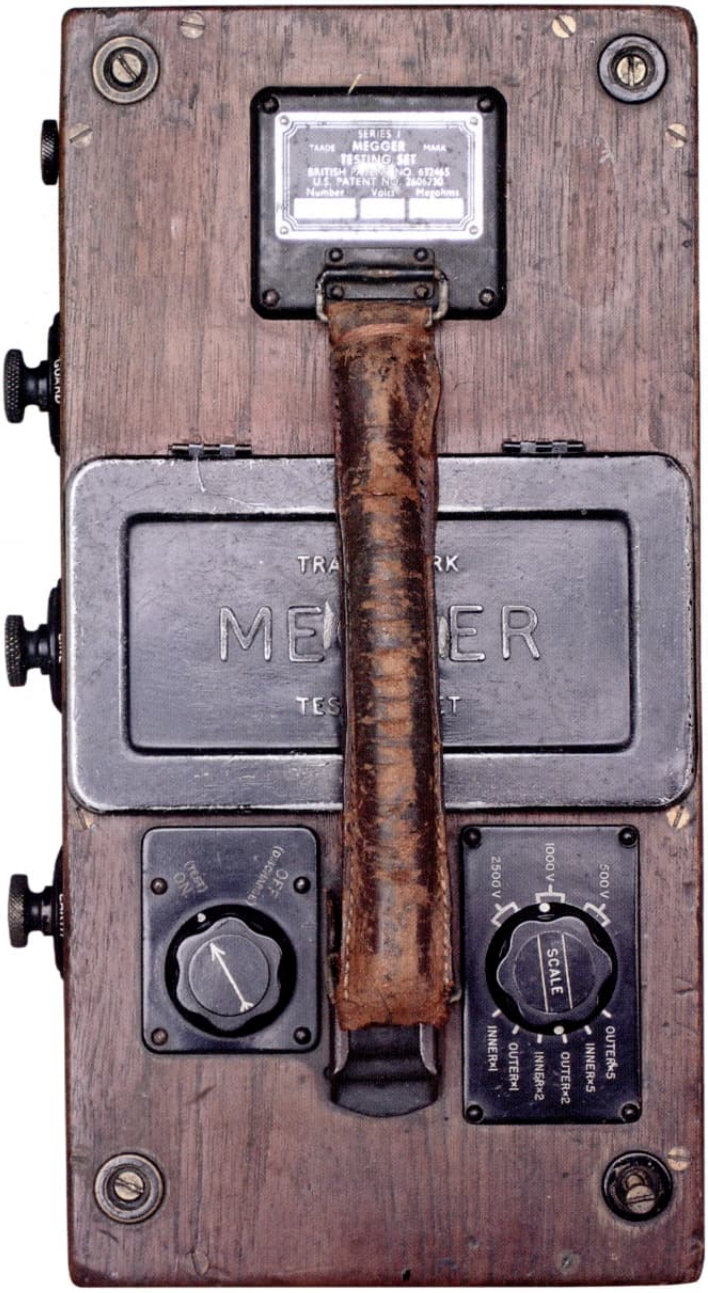


Fig. 12a: Eversheds & Vignoles six range Megger

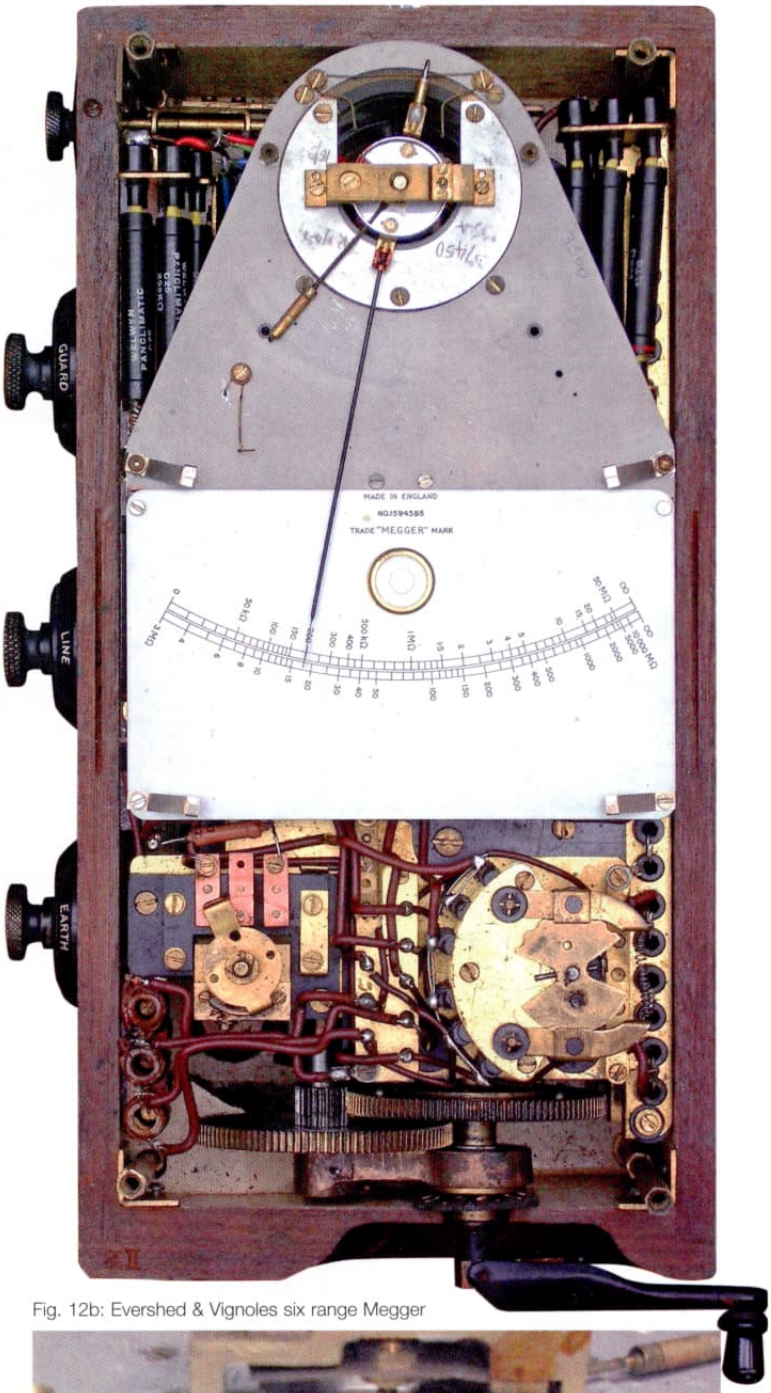


Fig. 12b: Eversheds & Vignoles six range Megger

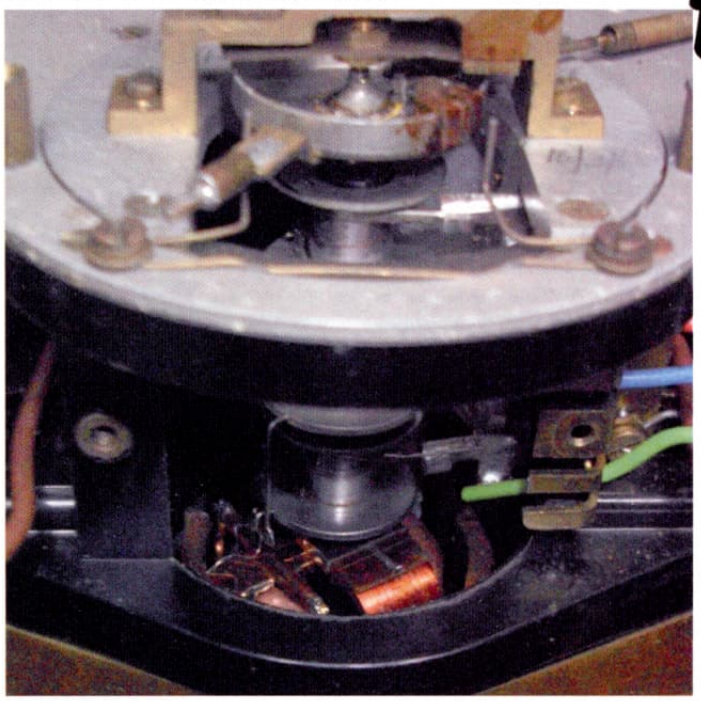


Fig. 12c: Eversheds & Vignoles six range Megger

hole in the centre of the soft iron cylindrical core.

If these coils were both within the normal uniform radial magnetic field of a conventional moving coil instrument the assembly would simply move to one of the end stops according to which coil exerted the greater torque. To render the device effective, the radial field for the potential coil must decrease monotonically towards a zero position, beyond which it reverses, acting, when energised, like a spring whose return torque increases with displacement from zero. To achieve this the annular cylinder has a gap midway between the pole pieces (also required for assembly of the instrument). Thus when the potential coil is over the gap (Fig. 9a) and halfway between the poles there will be zero radial field and the pointer will indicate 'infinity'. When the current coil, which fully embraces the core, is energised it will behave like a normal moving coil instrument with 'spring' effected by the potential coil. Full scale deflection (fsd) is set by resistors in series with the current coil, and indicates 'zero' external ohms (Fig. 10b). The coils are fed by very thin metal strips which exert negligible restoring force so that the pointer position is indeterminate until the generator is energised.

In the better instruments this basic design is refined in various ways, differing in detail between models. Firstly, a third, narrow 'compensating' coil (Fig. 10 yellow) is attached to the outer limb in series with the potential coil. This is wound to cancel any external field which might otherwise affect the deflection particularly near the 'infinity' position where the 'spring' effect is weak. Secondly, the pole pieces do not extend to cover larger deflections of the

current coil, being fully effective only where greatest sensitivity is required near 'infinity' but becoming less sensitive towards 'zero'. Thirdly, tapered horns are added to the pole pieces, the lower one assisting in the gradual decrease of flux for the current coil, the other stiffening the 'spring' effect of the potential and compensating coils towards 'zero' when the compensating coil eventually embraces this horn. These refinements serve to increase the range of measurement.

Fig. 11 shows a model from 1916 (probably similar to the 1904 version and not yet called a Megger) (35x18x16, 8.7cm engraved silvered brass scale Zero-Infinity (10kΩ-100MΩ markings) Evershed & Vignoles Ltd, London, No.77277, 500V, 100MΩ). This instrument has a compensating coil and two tapered horns (Fig. 11d) resulting in an increased 10-90% scale ratio of 320:1 (marked 10,000:1). There is a downside to increased range in reduced precision of measurement.

Megger Testing Set Series 1

Fig. 12 shows a six range Megger measuring resistances from 10kΩ up to 50,000MΩ (50GΩ). (35x18x16 excl. feet & terminals, 13.5cm individually calibrated painted aluminium scale with spirit level (and levelling feet) 0-inf. (10kΩ-50MΩ inner scale) & (3MΩ-10,000MΩ outer scale), 500V Rx1, 1000V Rx2 & 2500V Rx5 (each with "inner" or "outer" scale setting) giving maxima of 10, 20 & 50x 1000MΩ) Brit. Pat. 632465, US Pat.

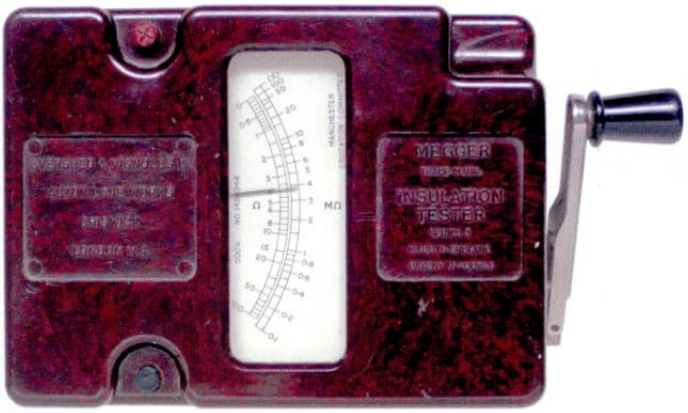


Fig. 13a: Series 3 Megger

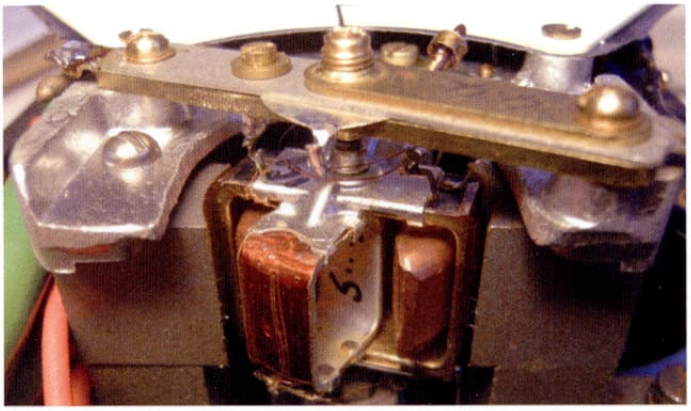


Fig. 13b: Series 3 Megger

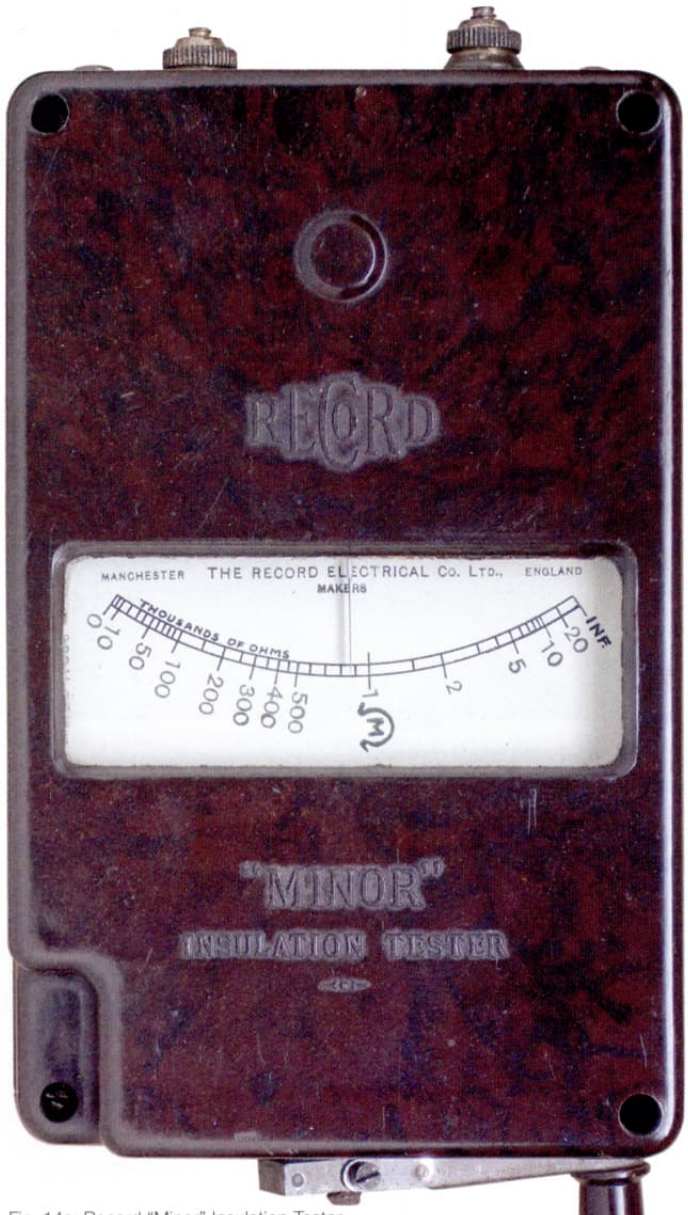


Fig. 14a: Record "Minor" Insulation Tester

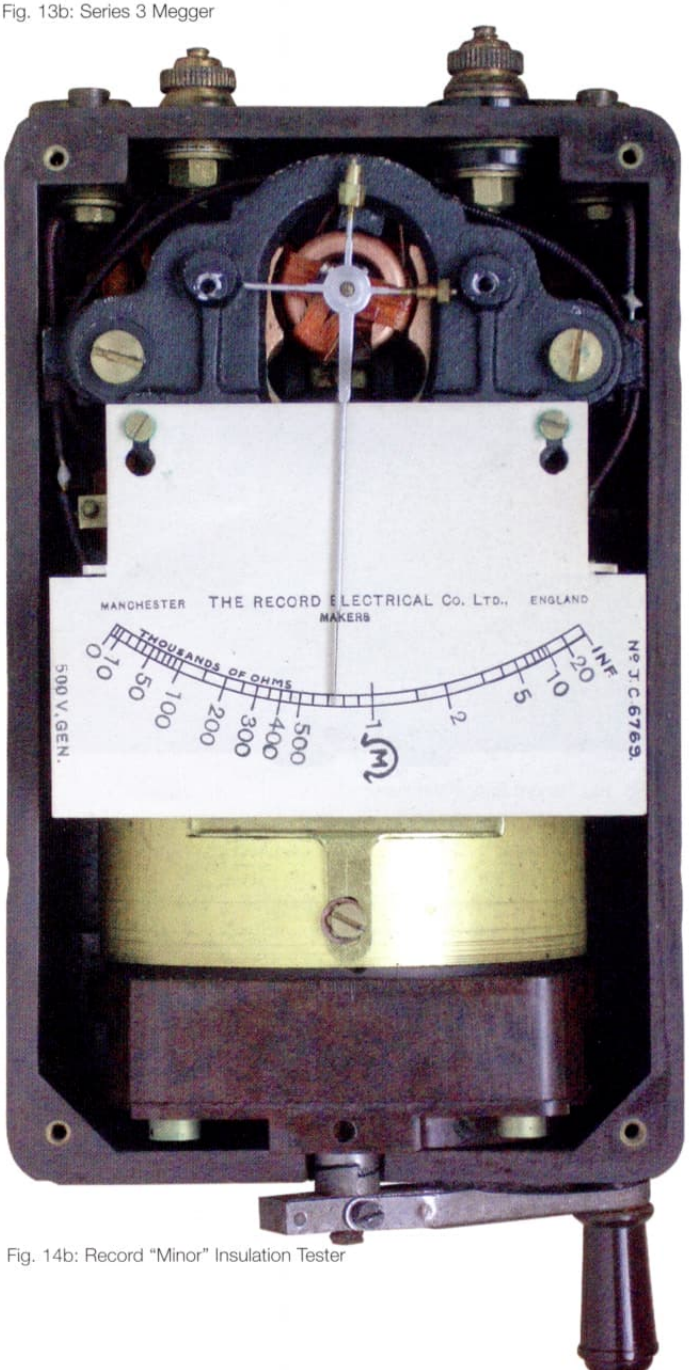


Fig. 14b: Record "Minor" Insulation Tester

Fig. 15a: Eversheds & Vignoles low-resistance ohmmeter

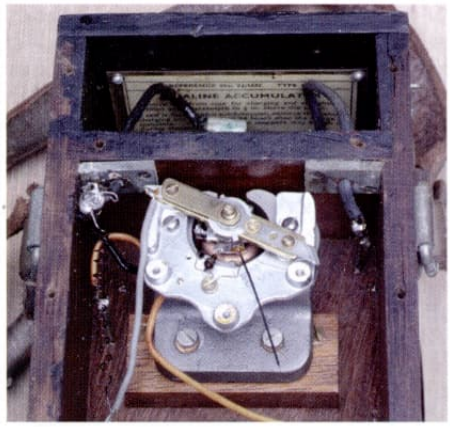


Fig. 15b: Eversheds & Vignoles low-resistance Ohmmeter

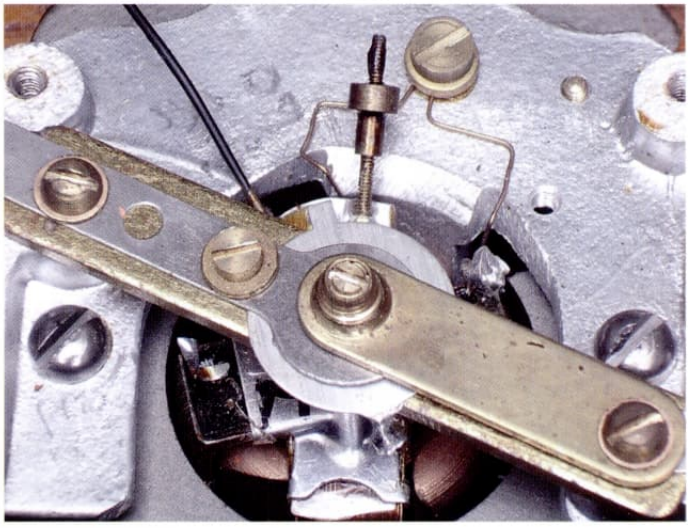


Fig. 15c: Eversheds & Vignoles low-resistance ohmmeter

Fig. 16a: Record Bridge-ohmmeter

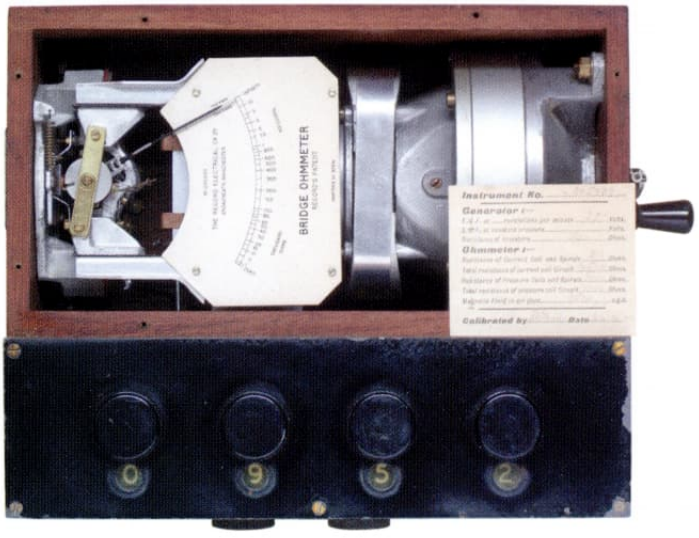


Fig. 16b: Record Bridge-ohmmeter

2606230, No.1594585, Current coil circuit 1658kΩ, Pressure coil circuit 1MΩ, certified 23/3/63). This has a 10:90% range of 650:1 and marked range of 5000:1 (ranges starting above zero cannot be compared).

Megger insulation tester Series 3
(14.5x10x6, 6.5cm individually calibrated painted aluminium scale 0.1-100MΩ and 0-100Ω, 500V, Eversheds & Vignoles, Acton Lane Works, Chiswick W4, Pat. No.400728, No. 1458344).

This compact and popular Bakelite instrument (Fig. 13) was available in a number of ranges and test voltages. The higher range on this example starts at 0.1MΩ rather than the more usual zero, leaving a large gap between this and the lower range of 0-100Ω, thus indicating its primary application for testing the insulation and resistance of house wiring and earth resistance. It will be noted that the low resistance scale runs in the opposite direction because, like Ayrton & Perry's original ohmmeter, *current* supplies the spring controlling force to the radius (pink) coil, and ranges from about 6mA at zero to 5mA at 100Ω, whilst the *voltage* developed across the unknown resistance is monitored by the full diameter coil (green). It should be noted that the nominal test voltage applies only if the insulation is good: at 0.1MΩ the voltage drops to 200V.

Record "Minor" insulation tester
(16x9.5x9, 7cm individually calibrated painted metal scale, 0-INF (5kΩ-20MΩ marks), 500V, Record Electrical Co. Ltd., Manchester, No. J.C.6765).

Fig. 14 shows another compact Bakelite instrument by the Record Co. Neither this instrument nor the preceding one have compensating coils or horns, and this is the movement shown in Fig. 9, with the top bearing bridge removed. (10:90% range 140:1, 4000:1 marked).

Low resistance ohmmeter
(12x16x18, 6.3cm individually calibrated painted aluminium scale 0-0.1Ω with 0.002Ω (2mΩ) divisions, compartment for alkaline cell (Ref. No. 51/1623 Type N) sockets for two 5A round three pin plugs, Evershed & Vignoles Ltd, London W4, Ohmmeter No. 505182, Pat. No. 198182).

This instrument (Fig. 15) like the Series 3 Megger on its 100Ω range applies the voltage, developed across the unknown, to the full diameter coil (green) effectively dividing this by the current flowing in the radius coil (pink). Thus the reading is again independent of the actual voltage or current. In this case the current is high (~2A) and mostly absorbed by a shunt and both coils are of much lower resistance than for a Megger. The instrument is intended for checking bonding and switch contact resistances. Four-terminal connection is made to the unknown resistance via 5A three pin plugs, one on each side. The live pins convey the voltage developed across the unknown and the neutrals supply the current, thus eliminating lead and connection resistance errors.

Bridge ohmmeters
These instruments combine an Ohmmeter with a Wheatstone Bridge in one unit with the meter used in the latter, as galvanometer, in its most sensitive region around "infinity". Fig. 16 shows a wooden boxed instrument by Record (16x21x16, 7.2cm individually calibrated painted dial marked from 1kΩ to 10MΩ, bridge ÷100, ÷10, x1, x10, x100 x 0000 to 9999Ω, with third terminal & instructions for Varley Tests, The Record Electrical Co. Ltd., Broadheath, Manchester, No. 205939, 55V, current circuit 10,500Ω, pressure circuit 10.400Ω, magnetic field 2500cgs, 22.4.40). Thus the bridge section will measure from 0.01-999,900Ω overlapping the ohmmeter measuring from 1kΩ to 10MΩ, 10:90% range 520:1, 10,000:1 marked).

Fig. 17 shows a dicast zinc cased Bridge Meg Resistance Tester by Evershed & Vignoles (23(excluding handle)x20x16, 7.2cm individually calibrated painted dial marked from 10kΩ to 50MΩ, bridge ÷100, ÷10, x1, x10, x100 x 0000 to 9999Ω, Evershed & Vignoles Ltd, Acton Lane Works, Chiswick, London W4, No. 587156, A.P. 6496, 255V, current circuit 38,040Ω, pressure circuit 50,340Ω, magnetic field 2400cgs, 22.10.43). This covers the same bridge range as the Record but higher values as a Megger from 10kΩ to 50MΩ, 10:90% range 710:1, 4,000:1 marked.

Although externally these two instruments appear to have different origins, internally they are virtually identical including the calibration cards actually signed by the same tester (AE Finney). Whether this pooling of resources was just a wartime expedient encouraged by the government or whether they had a longer association is unknown.

It is difficult to state the accuracy of an ohmmeter because of differing scale lengths, degrees of nonlinearity of the scales, and position within the scale, but as a gross generalisation ±5% is suggested as a starting point.

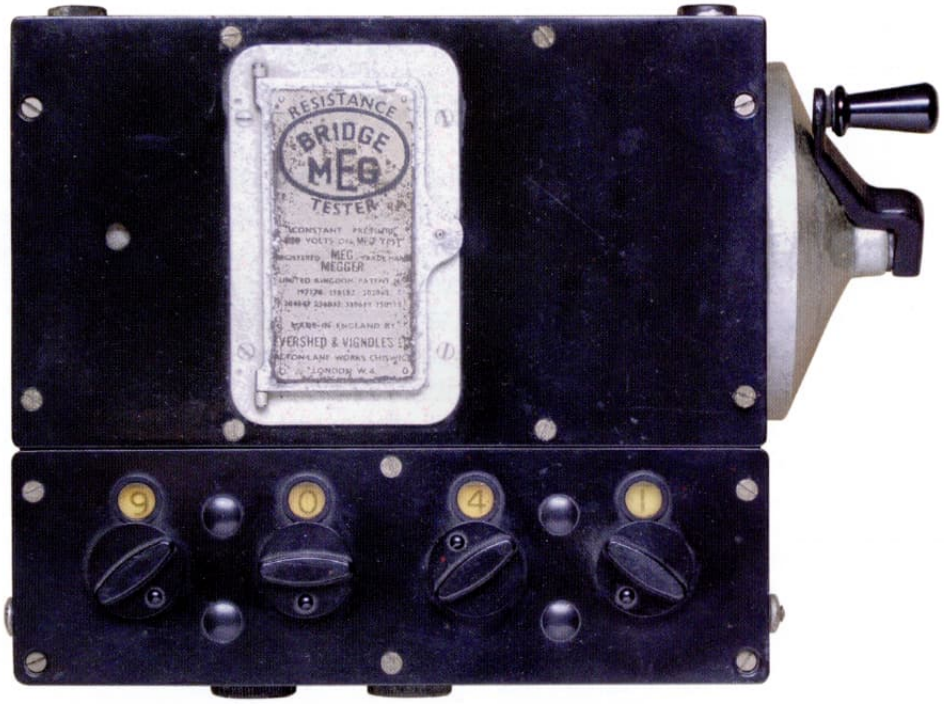


Fig. 17a: Evershed & Vignoles Bridge-Meg Resistance Tester

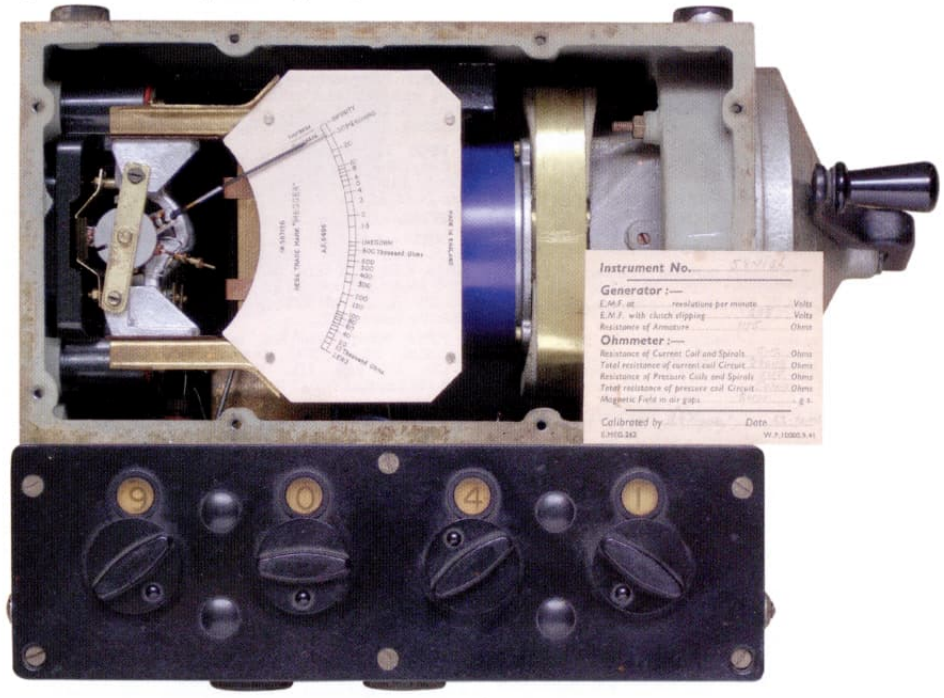


Fig. 17b: Evershed & Vignoles Bridge-Meg Resistance Tester

The Kolster-Brandes QP21 Gaiety transistor radio

by Stef Niewiadomski

Kolster-Brandes is probably one of the lesser known radio manufacturers in the UK, and perhaps the 1950s FB-10 series of 'toaster' style transportable superhet radios are its best known products. The company was an American owned, British manufacturer of mid-range consumer electronics such as radios, radiograms, televisions, tape recorders and amplifiers, based in Foots Cray, Sidcup, Kent. During the late-1950s the company went through a phase of giving its radios and record players names rather than simply model numbers. This practice gave us the 'fun' names of Aristocrat, Bikini, Calypso, Caprice, Gaiety, Gavotte, Gaytime, Golden Rhapsody, etc, before it was discontinued in about 1964. A snapshot of Kolster-Brandes products in 1959, taken from that year's edition of the Wireless and Electrical Trader Year Book, can be seen in Figure 1.

Hobday

HOBDAY BROS., LTD., 21–27, Great Eastern Street, London, E.C.2.

Hobart Stereo. RG.—10 v (plus) AC 4-band AM/FM stereo. ARG. EZ81, ECC85, 6BA6 (two), 12AH8, 6AL5, 6AT6, 12AX7 (two), 6AQ5 (two). 465 kc/s, 10·7 Mc/s. SML and VHF. PU. XLS. 200–250 V. £54 19s 8d., plus tax £21 3s 3d. Aug., '58.

Invicta

INVICTA RADIO, LTD., 100, Great Portland Street, London, W.1.

Distribution policy:—Selected wholesalers.

16.—4 v (plus) AC/DC 2-band table with printed circuit. Int. aerial. UCH81, UF89, UBC81, UL81, UY85. 470 kc/s. ML. 200–250 V, 40–60 c/s. £10 4s 8d., plus tax £3 18s 10d. June, '57.

17RG.—5 v (plus) AC 2-band AM/FM stereo ARG, ECC85, ECH81, EBF89, ECL82 (two). 470 kc/s, 10·7 Mc/s. M and VHF. XLS. 200–250 V. £47. 15s 2d., plus tax £18 7s 10d. Oct. '58.

28.—4 v AD 2-band portable with printed circuit. DK96, DF96, DAF96, DL96. 470 kc/s. ML. HT 90 V; LT, 1·5 V. £9 17s 1d., plus tax £3 15s 11d. Mar., '57.

30.—6 transistor 2-band portable. V6/RLM, V6/R2 (two), V10/50B, V10/30A (two). 470 kc/s. ML. U11 (four) batteries. £17 16s 4d., plus tax £6 17s 2d. May '58.

39.—5 v (plus) AC 3-band AM/FM table. Int. aerial ECC85, ECH81, EF85, EABC80, EL84, EZ80. 10·7 Mc/s. 470 kc/s. ML and VHF. XLS. PU. 200–250 V. £21 4s 6d., plus tax £8 3s 6d. March '58.

39RG.—5 v (plus) AC 3-band AM/FM ARG. ECC85, ECH81, EF85, EABC80, EL84, EZ80, EM34. 470 kc/s. 10·7 Mc/s. ML and VHF. XLS. 200–250 V. £52 6s 2d., plus tax £20 2s 10d. April '58.

40.—6 v (plus rect. and T.I.) AC 4-band AM/FM table. ECC85, ECH81, EBF89, EF80, ECC83, EL84, EM81. 470 kc/s, 10·7 Mc/s. SML and VHF. PU. XLS. 200–250 V. £33 7s 2d., plus tax £12 16s 10d. Oct., '58.

400.—8 v (plus rect. and T.I.) AC 4-band AM/FM stereo ARG. ECC85, ECH81, EBF89, EF80, ECC83 (two), EL84 (two), EZ81, EM81. 470 kc/s, 10·7 Mc/s SML and VHF. XLS. 200–250 V. £87 3s 8d., plus tax £33 11s 4d. Oct., '58.

K-B

KOLSTER-BRANDES, LTD., Footscray, Sidcup, Kent.

Distribution policy:—Selected dealers.

MR10.—5 v (plus metal rect.) AC 3-band AM/FM table. Int. aerials. 12AT7, 6BE6, EL84, EABC80, 6BJ6. 422 kc/s, 10·7 Mc/s. ML and VHF. 200–250 V. PU. XLS. £15 18s 5d., plus tax £6 2s 7d. Sept., '55. (Service Sheet 1233.)

OG10, Minor.—7 v (plus) AC 2-band AM/FM TARG (with legs). Int. aerials. ECC84, 6BW7, 20D4, 6BJ6, EM34, EABC80, EL84, EZ80. 422 kc/s. 10·7 Mc/s. ML and VHF. XLS. 200–250 V, 50 c/s. £39 8s 5d., plus tax £15 3s 7d. June, '57.

OB10, Minuet.—4 v (plus) AC 2-band transportable with printed circuit. Int. aerial. 6BE6, 6BJ6, 6AT6, 6AQ5, EZ80. 422 kc/s. ML. 200–250 V. £8 6s 9d., plus tax £3 4s 3d. Sept., '57. (Service Sheet 1345.)

PR10, Nocturne.—4 v (plus) AC 2-band table. 6BE6, 6BJ6, 6AT6, 6AQ5, EZ80. 422 kc/s. ML. 200–250 V, 40–100 c/s. £12 2s 7d., plus tax £4 13s 5d. Aug., '58.

PGT10 Radio Tunetime.—4 v (plus) AC 2-band table ARG. 6BE6, 6BJ6, 6AT6, 6AQ5, EZ80. 422 kc/s. ML. 200–250 V. £21 4s 6d., plus £8 3s 6d. Oct., '58.

PP11 Rhapsody.—4 v AD 2-band portable. Plastic case. Int. aerial. DK96, DF96, DAF96, DL96. 470 kc/s. ML. HT 90 V; LT 1½ V. £9 17s 1d., plus tax. £3 15s 11d. March, '58.

PG20 Interlude.—8 v (plus) AC 3-band AM/FM stereo. ARG. ECC84, 6BW7, ECH81, 6BJ6, EABC80, 6AT6, EL84 (two). 422 kc/s, 10·7 Mc/s. ML and VHF. PU. XLS. 200–250 V. £56 2s., plus tax £21 12s. Sept., '58.

OP21, Rhapsody.—6 transistor AD 2-band portable, with printed circuit. Int. aerial. OC44, OC45 (two), OC71, OC72 (two). 470 kc/s. ML. Two 4·5 V batteries. £17 8s 8d., plus tax £6 14s 4d. Nov., '57.

PP21 Rhapsody.—4 v AD 2-band portable. DK96, DF96, DAF96, DL96. 470 kc/s. ML. Ever Ready B126, 90 V., AD35 1·5 V. £10 19s 10d., plus tax £4 4s. 8d. May, '58.

PG30.—As PG20, but price not yet available.

NR30.—5 v (plus rect. and T.I.) AC 3-band AM/FM table with triple speaker. Int. aerials. 12AT7, 6BJ6, 6K8, 6U5, EABC80, EL84, EZ80. 422 kc/s, 10·7 Mc/s. ML and VHF. PU. XLS. 200–250 V, 50–100 c/s. £25 15s 6d., plus tax £9 18s 6d. Oct., '56. (Service Sheet 1327.)

PP31 Rhapsody.—Six transistor AD 2-band portable. OC44, OC45 (two), OC71, OC72 (two), OA70. 470 kc/s. ML. Ever Ready PP11 9 V. £18 11s 5d., plus tax £7 3s 1d. May, '58.

MP151.—4 v (plus metal rect.) AC/DC/AD 2-band transportable. Int. aerial. DK96, DF96, DAF96, DL96. 470 kc/s. ML. 200–250 V. HT, 67·5 V Ever Ready B101; LT, 7·5 V AD38. £12 10s 2d., plus tax £4 16s 4d. June '55. (Service Sheet 1247.)

PP251 Rhapsody.—4 v (plus) AC/DC/Batt. 2-band portable. DK96, DF96, DAF96, DL96. 470 kc/s. ML. 200–250 V. Ever Ready B126, 90 V, AD 38 7·5 V. £13 12s 11d., plus tax £5 5s 1d. May, '58.

McCarthy

FELGATE RADIO, LTD., Felgate House, Studland Street, Hammersmith, W.6.

FMW6.—7 v (plus) AC 4-band AM/FM ARG. Int. and ext. aerials. 12AH8, 6BA6 (two), 6AT6, 6AL5, ECC85, EL84, 5Y3. 465 kc/s, 10·7 Mc/s. SML and VHF. PU. XLS. 200–250 V. £43 4s 3d., plus tax £16 12s 9d. March, '58.

FM10.—7 v (plus) AC 4-band AM/FM ARG with printed circuit. 5Y3, EL84, 6AT6, 6BA6 (two), 12AH8, 6AL5, ECC85. 460 kc/s, 10·7 Mc/s. SML and VHF. PU. XLS. 200–250 V £35 12s 8d., plus tax £13 14s 4d. June, '57.

McMichael

McMICHAEL RADIO, LTD., Slough, Bucks.

Distribution policy:—Selected dealers.

M201R.—5 v (plus rect. and T.I.) AC 3-band AM/FM table. Int. AM aerial. ECC85, ECH81, EF85, EABC80, EL84, EZ80, EM81. 470 kc/s, 10·7 Mc/s. ML and VHF. PU. XLS. 200–250 V. 40–100 c/s. £18 19s 1d., plus tax £7 5s 11d. Aug., '57. (Service Sheet 1340.)

M101RG.—4-speed ARG version of M201R. £44 14s 6d., plus tax £17 4s 6d. Aug., '56.

M105R.—3 v AC/DC 2-band table. Int. aerial. UCH81, UBF89, UCL83, UY85. 470 kc/s. ML. 200–250 V. £9 9s 6d., plus tax £3 13s 0d. Aug., '57.

Figure 1: The Kolster-Brandes company entry in the 1959 edition of the Wireless and Electrical Trader Year Book., illustrating their extensive range of radios, including no less than five radios using the 'Rhapsody' name.

I bought this Gaiety radio at the 2013 National Vintage Communications Fair for a very reasonable £4 as it was a model I was not familiar with. Although it was very dirty it looked intact and had promise for a quick restoration. Figure 2 shows the radio after cleaning, though it's still not as clean as I would have liked, but I felt I risked damaging the case if I applied any more elbow grease. The grey-ish looking strips are partially worn-off gold paint, which must have looked impressive when the radio was new. I believe the value of this model is very much affected by how much of this gold coating is still intact. Figure 3 shows a close-up of the Kolster-Brandes logo moulded into the metal lid catch of the radio. I came across another QP21 at the BVWS meeting at Harpenden in May 2013 but didn't make up my mind quickly enough to snap it up at £3, and it was gone when I came back to the stall.

transistor attaché radios

The attaché case style had been very popular in the UK for valve radios during the late 1940s and the 1950s. The lid of the attaché case was a useful location for the frame aerial built into many valve sets. As ferrite rod aerials came into use (for valve- and transistor-based radios) there was less need for the lid, and hence the style of the case was more able to be changed.

By the end of the 1950s the style had just about run its course. Ekco (and the Ferranti 'clone' PT1010), Invicta (a subsidiary of Pye), Kolster-Brandes, and Marconi each only produced one transistor radio design; and Pye produced two (the Q3, and the Q4, in six- and seven-transistor versions) in 1958/59 in this format before switching to the more familiar upright or compact plastic cases we are more familiar with.

Kolster-Brandes

The company was a descendant of Brandes, a Canadian company founded in Toronto in 1908. Brandes became part of AT&T in 1922 and a British subsidiary - Brandes Ltd - was established in Slough, in 1924, to manufacture headphones. The company rapidly expanded producing a range of loudspeakers and in 1928 moved to a former silk mill at Foots Cray. The company was renamed Kolster-

Figure 2: The Kolster-Brandes Gaiety QP21 radio, after a good cleaning. To the right of the volume control, left-to-right the push buttons are: On/off, MW and LW, though no markings can be seen on the case or on the buttons themselves. The grey-ish looking strips on the speaker aperture are partially worn-off gold paint. The handle has 'Gaiety' moulded into it, though this is hardly visible after cleaning

Brandes Ltd after the merger between its American parent company, Brandes, and the Kolster Radio Corporation in 1928. In 1930 the company supplied 40,000 of its Masterpiece two-valve, bakelite cabinet radios to the Godfrey Phillips tobacco company, who gave them away to customers in exchange for cigarette coupons. Kolster-Brandes also began a long association with Cunard after they won a contract to provide communications equipment for the Queen Mary liner. In 1938 Kolster-Brandes became part of ITT's British subsidiary STC. The Foots Cray site was also shared by Brimar, another STC company which was founded in 1933 to manufacture American pattern valves for the British market.

The circuit

Figure 4 shows the circuit diagram of the radio. The design uses a GEC GET874 in a self-oscillating frequency changer stage, covering the medium and long waves; then two GET873s act as IF amplifiers at 470kHz; a GET114 is the audio driver; and a matched pair of GET114s drive the speaker in the audio output stage. All are PNP germanium transistors of course. These transistor codes were not familiar to me and so I checked them in Reference 1, and a table of their equivalents is shown in Figure 5. As suspected they are approximate equivalents of the Mullard OC44, OC45 and OC72. A Brimar GD3 germanium point-contact diode is used as the AM signal detector, and AGC generator back to the first IF amplifier, TX2.

So that the audio output stage can be transformer-less the set was designed to use two Ever Ready PP9 or Vidor T6009 9V batteries, taking a quiescent current of about 7mA. These batteries are quite bulky of course, but at least this type of battery is still easily available, whereas many batteries used by early transistor radios, and even the Gaiety's successor, the Romance, are not. For example Kolster-Brandes' 1957 Rhapsody OP21 transistor radio used a single centre-tapped PP11 4½V+4½V battery.

The QP21 operates with a positive

Figure 3: Close-up of the neat-looking Kolster-Brandes logo moulded into the metal lid catch of the radio.

ground (connected to the chassis of the radio, shown as the thick line at the bottom of the schematic) with the On/Off push-button switch – next to the MW and LW buttons - in the positive lead from the 'top' battery and the negative lead from the 'bottom' battery. Unlike many other attaché radios there is no lid-operated switch to turn the radio off when the lid is closed.

TX1, TX2, TX4 and TX5 operate from the 'top' battery, and TX3 and TX6 operate from the 'bottom' battery. The bias points for TX5 and TX6 are stabilised by two thermistors, quite unusual even for this time when preventing thermal runaway for the output transistors was high on the agenda, though this might have been more of an imagined than a real problem. Looking at the PCB assembly TX5 and TX6 each has a thermistor physically attached, secured with tape, holding them in close proximity.

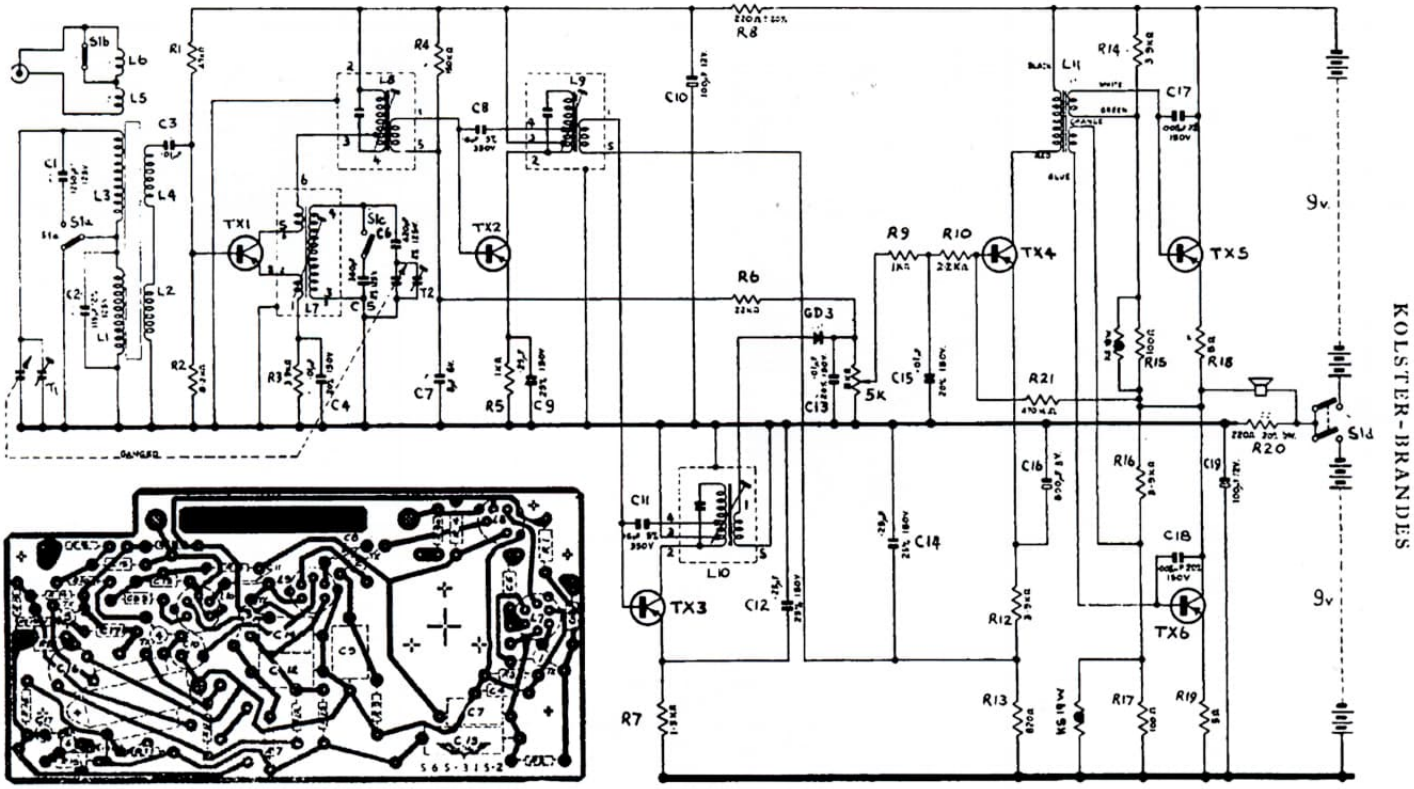
Case and PCB assembly

The case of the radio was available in two colour schemes: there was a bright blue lid and base, with a white-grey lid lining and band – which was the finish of my radio; and a coral pink lid and base, again with a white-grey lid lining and band.

It's not obvious at first how to get access to the PCB, there being no exposed screws to undo. First of all the lid needs to be removed by lifting it and sliding sideways off its hinges. Then the battery cover is removed by means of the finger clearance slots at its ends. After removing two fixing screws on the control panel the complete chassis assembly can be eased backwards and lifted out vertically. The speaker and car aerial connections can be unsoldered if you want to completely separate the chassis from the case. A view of the PCB assembly, removed from the case, can be seen in Figure 6, showing a stick-on paper label indicating the model number and the radio's serial number, 19350.

The tuning capacitor is an air-spaced component: before too long most radios would switch to using more compact (and cheaper) polyvaricon capacitors. The hefty 7/8-inch diameter ferrite rod can be seen along the 'top' edge. An external aerial socket is fitted to the left hand side of the radio, connected to windings L5 and L6 on the ferrite rod, which are selected by the wavechange switch.

Figure 4: Circuit diagram of the QP21.



CIRCUIT AND PRINTED WIRING DIAGRAMS—KOLSTER-BRANDES MODEL QP21

On the schematic many of the capacitors are rated at 125V or 150V, or even 350V for C8: Of course this doesn't reflect the voltage level they are going to 'see' in the circuit – more likely the designers simply used valve-era capacitors that were available for use on the production line. Within a few years transistor voltage rated capacitors would be introduced and would allow further miniaturisation of transistor radios.

The dial of the QP21 is shown in Figure 7. There's a very useful slow motion action between the dial and the tuning capacitor which makes resolving stations very straightforward. The 8-inch x 3-inch 700mW speaker in the radio was marked 40Ω and was made by Goodmans Industries, of Wembley.

Since there is no loop aerial in the lid, a clever feature of the Gaiety is that the lid can be detached and the radio used in an upright position, as shown in Figure 8. This is looking very much like the default style for most transistor radios as we moved into the 1960s.

Successors

The Gaiety received a make-over in December 1960 when an almost identical circuit was used in the more modern-looking Romance RP21, using an upright plastic case. The radio had the same transistor line-up as the QP21, except the designers reserved the right to use STC transistors, such as the TK1000C instead of the GET864 and GET873, rather than a purely GEC line-up. Maybe this was the result of pressure 'from above' in STC to try to use more of the company's in-house components, rather than supporting the competition. The use of STC transistors required slight changes in the neutralising capacitors from 16pF to 27pF. The designers took the opportunity to change the battery type to a pair of PP7s, which since they were smaller than the PP9, allowed for a more compact case, but which makes it trickier today to keep this model going.

The 1963 the Rhapsody Deluxe VP31 was spec'd to have an even wider choice of transistors, the company's own service sheet giving the option of using Texas Instruments, GEC, STC or Mullard devices. Whether these were used in production is unknown: I would have expected that by this time Mullard transistors would largely have been used.

Conclusions

This radio was obtained in working, but filthy, condition. After a considerable amount of cleaning to remove the ingrained dirt the case is just about acceptable. To show the improvement I made Figure 9 shows the case before cleaning. The dirt allows the Gaiety name to be seen on the handle. With a fresh pair of batteries the radio worked well and was sensitive on the medium and long wavebands.

The production of this transistor radio in 1959 did not mean the immediate end of valve radios for Kolster-Brandes. The company also released the Nocturne (with a wooden case) in 1959, the RB10 Gavotte (in a plastic case) in 1960, and the Rhapsody 96-series valve portable in 1960 – all three using valves - but from then onwards most portable radios were transistor-based.

The early 1960s were the time of change of technology for consumer appliances, but in Kolster-Brandes, as in most other UK manufacturers, valve designs held on for a long time in their products while transistor designs gradually gained momentum.

Useful references

Reference 1: *British Transistor Directory* by E N Bradley. Published by Norman Price Ltd in 1963.

Attaché Radios by Mark Johnson, published in 2005 by the BVWS is an excellent book on the history of this style of portable radio. The book is a comprehensive collection of colour pictures of these radios and their advertising material, and many useful facts and figures. Most of these radios were valve-based, but the transistor sets mentioned in this article are also covered.

Several Kolster-Brandes radios feature on YouTube, but sadly not the QP21.

A useful list of various battery types, of the valve and transistor eras, can be found at: https://en.wikipedia.org/wiki/List_of_battery_sizes

GENERAL EQUIVALENTS

(Approximate)

2G103	=	2N701	OC35	=	GET572
2G301	=	GET871	OC41	=	GET871
2G302	=	GET872	OC42	=	GET872
2G303	=	GET891	OC43	=	GET875
2G304	=	GET892	OC44	=	GET874
2G306	=	GET875	OC45	=	GET873
2N705	=	2G104	OC72	=	GET114
2S001	=	ST721	OC75	=	GET113
2S002	=	ST722	OC76	=	GET103
2S003	=	ST722	OC77	=	GET111
2S004	=	ST723	OC81	=	GET114
AC107	=	GET870	OC83	=	GET103
ASZ21	=	2N710	OC84	=	GET102
MD501	=	2N710			

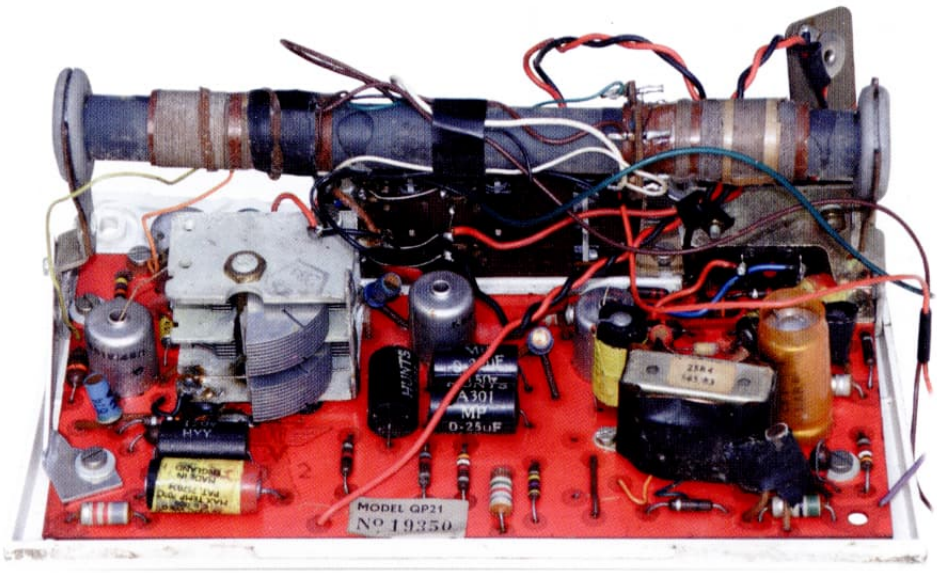
Figure 5: Table of equivalents to the GEC GETxxx range of transistors.

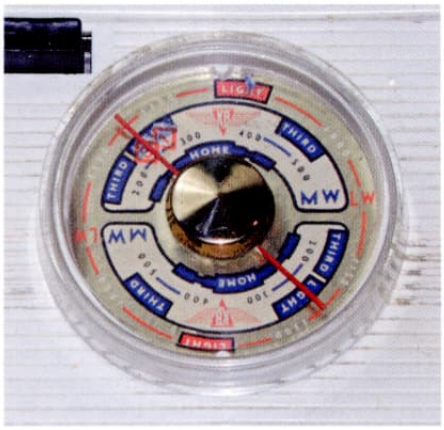
Figure 6 (top, right): View of the PCB assembly after removal from the case. The large diameter of the ferrite rod can be seen.

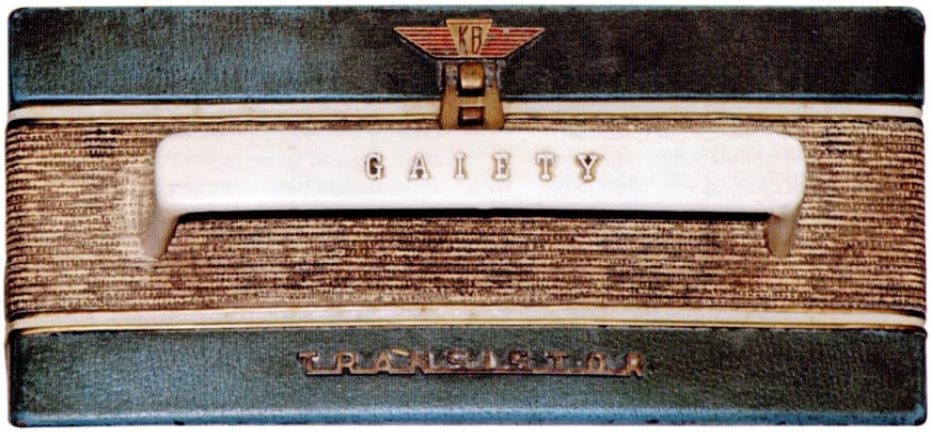
Figure 7 (below): Tuning dial of the QP21, showing wavelength and major station names on the medium and long waves. The dial markings are duplicated to allow the radio to be used in its normal attaché position, or upright with the lid removed (see Figure 8).

Figure 8 (centre, right): The radio in its upright pose with its lid detached. The heavily-worn gold paint strips on the speaker aperture can be seen more clearly in this view than in Figure 2. Even after a good cleaning the case still appears to be grubby.

Figure 9 (below, right): The radio 'as received' before cleaning. At least the dirt allows the model name on the carrying handle to be seen. It was all but invisible after cleaning: perhaps it was originally highlighted in gold, and this has worn off over the years.



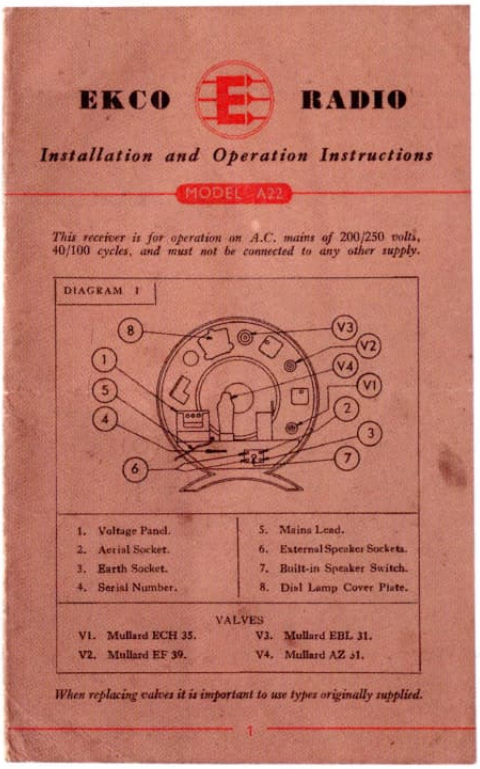




The Ekco A22, the barman and the gold lamé!

By Ian Liston-Smith

In September 2001 Simon, the barman in a pub I frequented, asked if I still restored old radios. He said he knew a couple who were moving away and had an old radio they wanted to sell. "Yes" I said. "Did they say what it was?" I was expecting a 1970s music centre, or something I'd find equally undesirable.



EKCO RADIO

Installation and Operation Instructions

MODEL A22

This receiver is for operation on A.C. mains of 200/250 volts, 40/100 cycles, and must not be connected to any other supply.

DIAGRAM 1

1. Voltage Panel.
2. Aerial Socket.
3. Earth Socket.
4. Serial Number.
5. Mains Lead.
6. External Speaker Sockets.
7. Built-in Speaker Switch.
8. Dial Lamp Cover Plate.

VALVES

V1. Mullard ECH 35.
V2. Mullard EF 39.
V3. Mullard EBL 31.
V4. Mullard AZ 31.

When replacing valves it is important to use types originally supplied.

Simon rummaged around behind the bar and found the piece of paper with "Ekco A22" and a phone number written on it and handed it to me. "Is it something you might want?" he asked. "Er... yes. This one's... very interesting, but it depends how much they want for it. I'll call them. Thanks."

The next day I called the BVWS chairman, Mike Barker to ask what a fair price was and what shortcomings and defects I should look out for. He told me that the dial bulb access plate is often missing, that the dial sometimes suffers burns from the bulb and also suggested where to look for stress fractures in the case.

I called the number on the piece of paper. A man answered and I explained why I was calling and asked what sort of price he was asking for his A22. He gave a price right in the range Mike had suggested, and he confidently went on to explain that he'd done some research and knew it was a fair price for a very collectable vintage radio. I arranged to make a visit.

Provenance

When I arrived a few days later, there it was, presented in the middle of the coffee table, together with the original instruction leaflet and receipt dated 7 June 1946. Cosmetically it looked excellent; no cracks, a very good dial and an undamaged back, which I asked if I could remove. All the valves were there as was the dial bulb access plate. This set was in a lovely condition.

The owner explained that it had been in his family since new, but he could only ever remember it being on top of his parents' bedroom wardrobe, and for the past 15 years on his own bedroom wardrobe.

I went prepared to haggle, but it was in such good condition, complete with its documented provenance that I paid the asking price. Then, 12 years later in February 2013, I decide it was time to restore this splendid radio... However, I resisted the temptation to switch it on!

It appeared to have had very little if any previous work done on it, but after some considerable reflection, I decided on a complete strip-down and rebuild. I wanted to remove the decades of dust, dirt and other grime that inevitably accumulates between components and their tag-strip connections which often leads to future problems. So it warranted more than a "patching up".

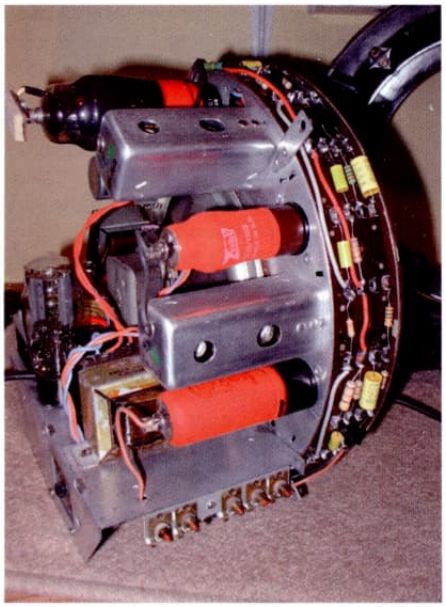
I know this will horrify a few readers, but after all, this is a classic radio and deserves to be working well after I've "shuffled off this mortal coil".

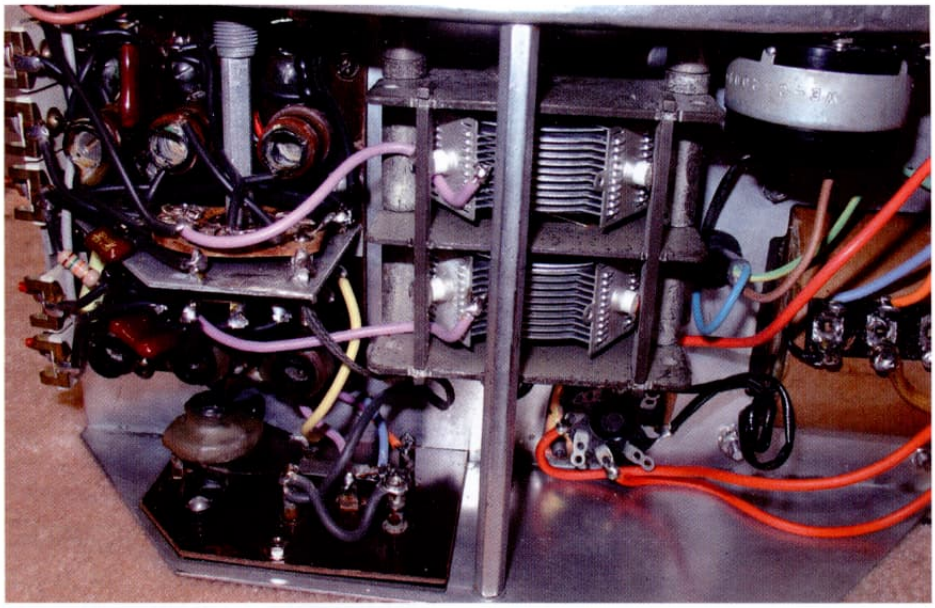
On studying the circuit, electronically the Ekco A22 will be found to be unremarkable. It's a standard post-war four-valve superhet – sometimes described as a "short superhet". Its value lies for some reason on a collective perception that all round Ekcos are valuable – no I don't understand it either! They are nice to look at, but why do they command such high prices? Assuming this hasn't always been the case, it would be interesting to trace back the value of the A22 and other round Ekcos and pinpoint when they started rising in value above comparable Bakelite sets from the same period.

Tarnish and discolouration

After close inspection of the brown bakelite case, I found one barely noticeable stress crack. But something that was very noticeable was the heavy tarnish and discolouration which had spread onto the speaker cloth from the plated circular metal speaker surround.

Predictably the cloth disintegrated after a number of unsuccessful attempts to remove the discolouration. The metal ring is described in *Radio! Radio!* as "florentine bronze". This is the external ring, not the internal trivet to which it screws. This internal metalwork is said to be made from "monkey metal" (also known as pot metal, Mazak, etc.) which





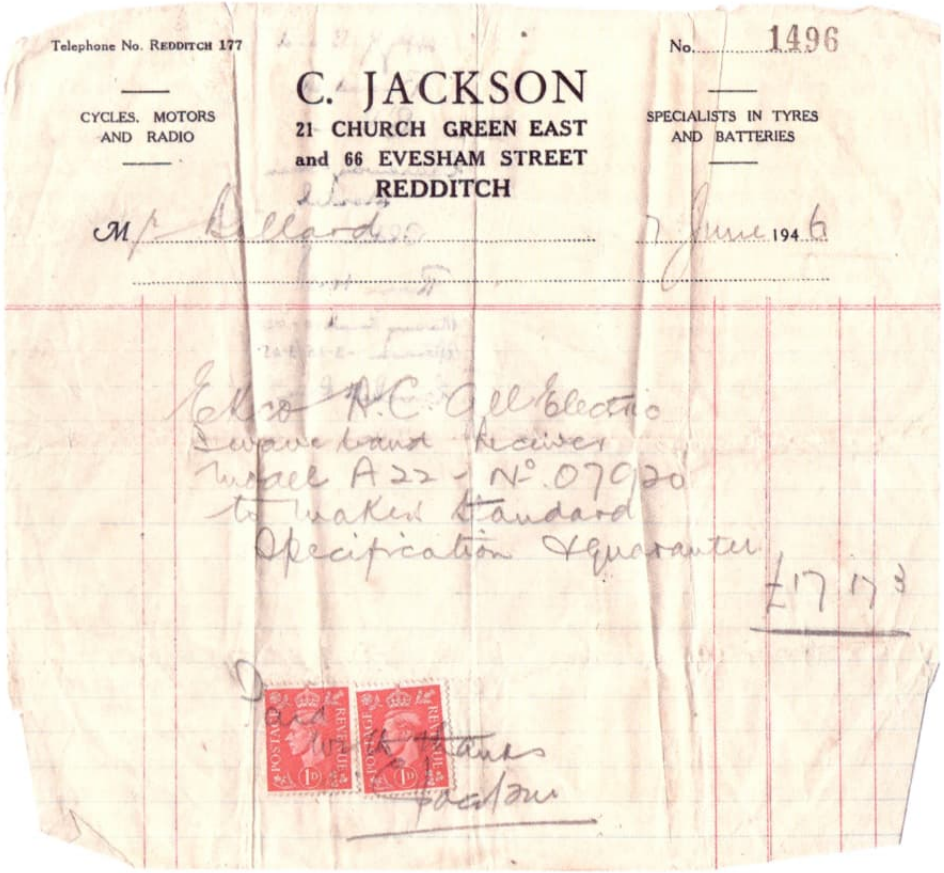
is a cheap alloy that can become brittle or deformed. Luckily mine was fine.

Once I unscrewed the ring, removing the tarnish proved impossible. All I succeeded in doing was removing some of the plating. There were still dark patches that wouldn't polish off. In desperation I used electrolysis to remove all the plating down to the base metal. This revealed a bright, shiny brass-coloured surface. Perhaps it is brass, but why did Ekco bother to plate it? Perhaps it was also originally lacquered to help prevent tarnishing?

The shiny surface thus revealed looked far too shiny, but after nearly a year it has now dulled a little.

The dials on these sets are sometimes found discoloured and distorted. Again, I was lucky. The dial on mine has a few tiny pinpricks through the paint, but I suspect they were always there. It has no scratches or lamp burn marks.

After meeting Sid Chaplin (supplier of vintage speaker cloth) at the NVCF, and showing him a remaining fragment of A22 speaker cloth, he picked out a replacement that was as close as he stocked. It was roughly the right colour, but of course it didn't have the original interwoven patterning. (Incidentally, this, like many modern speaker cloths, will shrink and tighten to remove wrinkles when blown with a warm hair-dryer after it has first been straightened and glued down.)



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Superheterodyne Receiver
Model A22 - No. 07920
to Naked Standard
Specification & Guarantee

£17 17 s

Tightly packed

I removed all the A22 components and dismantled the chassis down to nuts and bolts level. I bought new valve holders, valves, resistors and capacitors. The only original parts were the loudspeaker, wound components and variable capacitors. Some years ago I invested in an ultrasonic cleaner which cleaned the variable capacitor and other small metal parts to look like new.

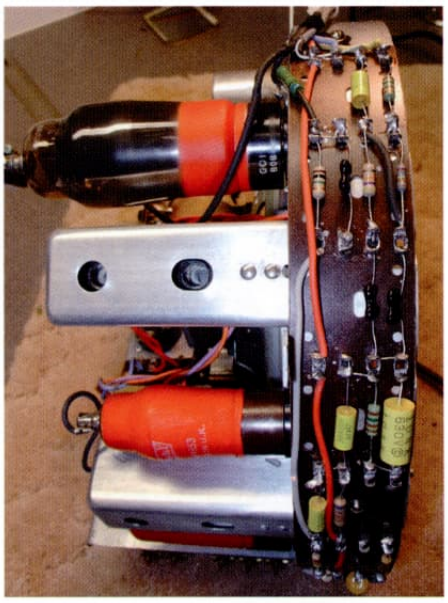
By far the most challenging part was the disassembly of the RF/mixer inductors and capacitors around the wafer switch. I really thought that to do the restoration properly this whole section also needed dismantling, cleaning and reassembling.

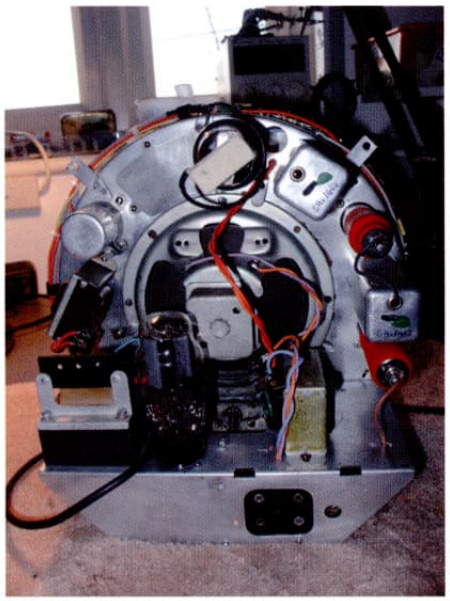
The components here are tightly packed. Some of the coils have very thin wires and there are mica capacitors squeezed into tight corners. Had I bitten off more than I could chew? I took plenty of close-up photos, but these aren't usually particularly helpful, especially when all the parts are brown! So I also made meticulous wiring drawings, confirmed them with the circuit diagram as I went, and just hoped I hadn't made any mistakes.

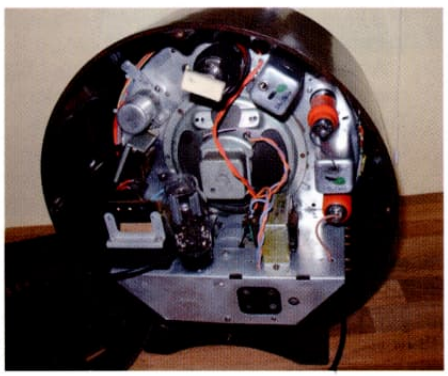
Nevertheless, I had the presence of mind to also measure the resistance and inductance of all the coils and mark these on the circuit diagram which turned out to be a huge help later. I'm pretty sure the mica capacitors were all perfectly OK, but the switch contacts needed a thorough clean and much of the wiring looked very dark and gooey, so if the RF assembly was to be dismantled, the mica capacitors had to be sacrificed as I was unlikely to remove them all without damage.

An hour or so in the dishwasher got the chassis looking like it just left the factory. The long, thin paxolin tag strip, mounted on the circumference of the round chassis, cleaned up well using strong hot detergent and a toothbrush. After removing the ferrite cores, I even re-dipped all the inductors into hot wax to remove any moisture, decades of dirt and to re-secure the windings and then carefully labelled each one.

The original wire used in most of the







chassis was rubber coated which I replaced with the silicone-covered type, available from BVWS member Phil Marrison. It matches the thickness and colours of the original wiring with the advantage that it won't melt if you catch it with the soldering iron!

Cheating

With all parts either cleaned or replaced, it was time to consider reassembling. But all I had were some photos of my chassis before disassembly and the circuit diagram. Not quite sufficient to make reassembly easy. This is where I admit to cheating...

At the start of the project Mike Barker very generously agreed to lend me one of his unrestored A22 chassis, and armed with this, I could start work by copying component and wire placements one at a time and confirm each step with the circuit diagram.

Working this way reveals all sorts of minor details; discrepancies in component values between documents and what's actually on the chassis, minor wiring variations and even circuit diagram errors

The discrepancy I found was around V2 cathode. Trader Sheet 768 and the Ekco service sheet both show the suppressor grid of V2 returned to its cathode, which was how mine was wired. Mike's A22 had the suppressor taken straight to chassis. Was this an assembly error on Mike's or a modification in production? I later tried both positions on mine, but didn't notice any difference in performance so followed the circuit diagram.

As anticipated, the hardest part was reassembling the RF coils and capacitors. And as expected, the photos turned out to be of limited use, so the labels, drawings and measurements were invaluable.

Before remounting the audio output transformer I tested it and found the primary was open circuit. No problem I thought; I'll use one of those modern multi-tapped replacements...

With reassembly completed, the time came to carry out various resistance checks, and confirm them against Mike's A22. Everything matched to within about 15 per cent, allowing for component tolerances or leaky capacitors, and resistors gone high on Mike's.

Signs of life

I fitted a set of new valves, but was still not brave enough to connect it directly to the mains; I wound it up gradually with a Variac. At 50 percent the dial bulb came on. At 75% some speaker hum and definite signs of life! With full mains voltage faint stations on short wave could be received with a bit of wire in the antenna socket.

At this point of course the whole thing was badly misaligned; I'd just screwed the ferrite cores to the approximate depths found on the other A22, but it was looking promising.

Before alignment, I decided to let it warm up, and left it for a few minutes and went to make a coffee...

Fizzing

On returning to the workshop a few minutes later there was a bit of a smell! The A22 mains transformer was severely overheating and fizzing. It didn't take long to ascertain that this was caused by shorted turns - I could see tiny white sparks between the transformer's paper layers. Although heartened by the fact that this fault was not of my making, I had to set the project aside and source a replacement.

I paid Mike Barker to rewind this mains transformer, and a couple of weeks later it arrived. The new transformer's construction and superior insulation allowed a chassis mains earth to be added. This is not always a good idea on a vintage radio with a mains isolating transformer as earthing the chassis may put undue stress on an ageing mains transformer's insulation.

Using my home-made wobbulator I realigned the IF circuits to 465 kHz followed by the IF trap. The trap doesn't really need adjustment these days - there are only a few low power amateur stations operating on the newly-allocated 472 kHz frequency now that all shipping Morse stations are long gone.

But this wasn't always the case; I have it on good authority that in the past people often turned up at Southampton Post Office to complain about hearing Morse on their radios. This was because the main working frequency of Niton Radio, on the Isle of Wight, was 464 kHz! Hence the introduction of IF traps across the aerial terminal by some radio manufacturers.

Top tip

Then I set about realigning the SW, MW and LW bands - as described in the service instructions - using my new (and rather cheap!) DDS RF oscillator.

A tip for aligning a domestic vintage radio with SW; it's easy to tune to the image frequency at the HF end of the band. To avoid this, tune a nearby SW digital radio to the local oscillator frequency of the set being aligned.

So for example if an alignment point is 15.000 MHz/20 metres, tune the digital radio to say, 15.465 MHz (15.000 MHz plus IF). Put the vintage radio's pointer on the 20m mark and adjust the local oscillator trimmer until you hear the local oscillator on the digital radio and at the same time the RF calibration oscillator will become audible on the vintage radio. Then you know you are not tuned to the image frequency. (Very occasionally the local oscillator is the IF below the tuned frequency on one or more short-wave bands, but this principle still works.)

All the inductors and capacitors behaved as they should during the alignment so the care I took in noting down all their many connections clearly paid off.

It didn't take long before I realised the sound was a little lacking in bass. I temporarily increased the values of the AF coupling capacitors, but it made no difference. Mike to the rescue again! He suggested that the relatively small replacement audio output transformer I'd used was to blame and he offered a substitute, which made a significant improvement.

Now that the A22 is reassembled, polished and accurately realigned, it makes a very handsome and lively set – even if the replacement speaker cloth does resemble gold lamé in a certain light...

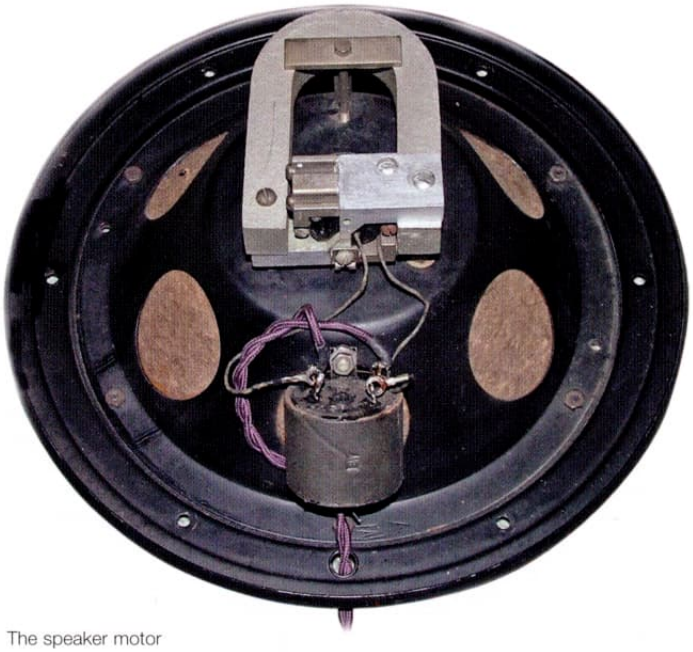
The 1923 RCA 103 Loudspeaker, revisited by Gary Tempest

I first wrote about this loudspeaker back in Bulletin Winter 2007 as part of an article on restoring an AC Pilot Super Wasp radio.The speaker was damaged having a break clean through one side and a loose foot. It would need repairing, refinishing and a reproduction grill cloth. It was missing its cardboard rear cover and silk dust bonnet. It came out well but over the years the reproduction screen printed grill cloth changed colour dramatically (see pictures). I was then lucky as I was able to buy another cloth, one of the few remaining reproduction woven cloths that Kenneth Erickson, from the Southern California Antique Radio Society (SCARS), had made back in the 1980's. Along with this second cloth came a beautifully made rear cover and dust bonnet. This to me is a fantastic story, which I will repeat shortly, showing real dedication in doing the best restoration possible, and an inspiration to us all.

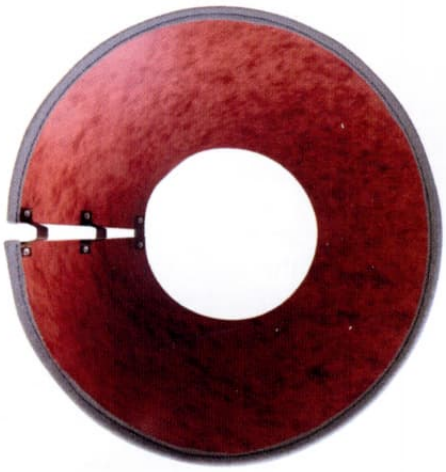
The speaker in 2007 with the screen-printed cloth

The faded screen-printed cloth as it looked in 2013

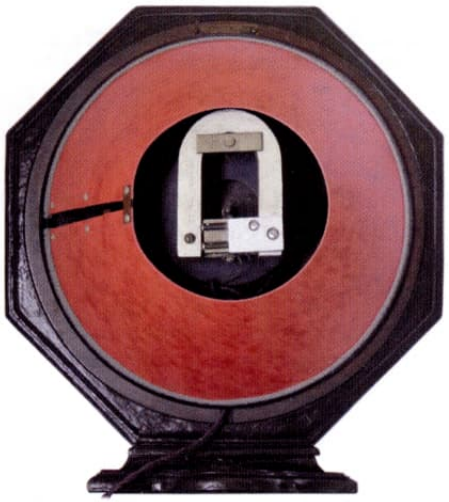
The speaker rear displaying the original homemade bonnet



The speaker motor

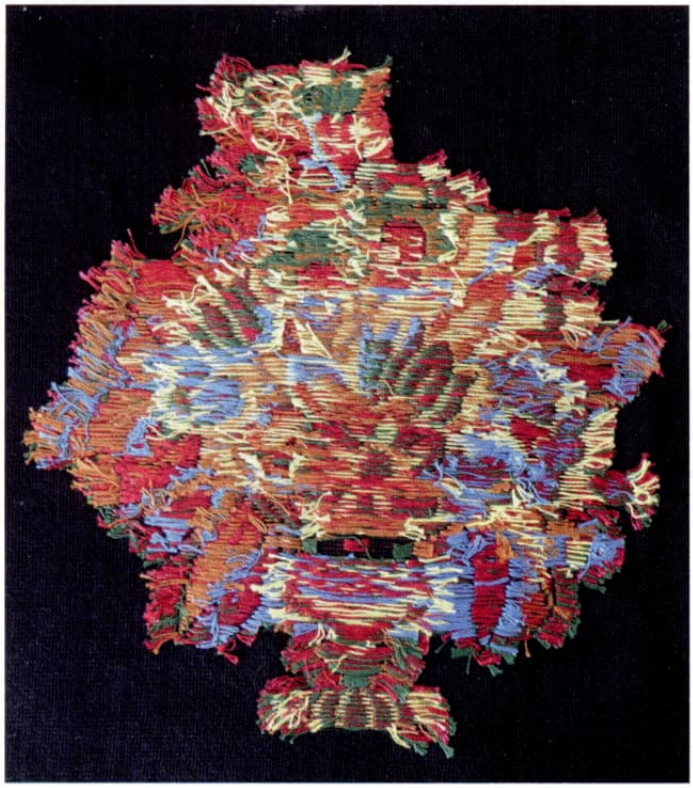


Inside the new rear cover



The new cover in place

With the new bonnet (RCA intended the strings to hang)



The reverse of the new woven cloth

The speaker now with the woven cloth

A little about the Speaker

This is of the balanced armature type, so called because an armature moves in a balanced fashion between the pole pieces of a horseshoe shaped magnet. Its movement is achieved by being surrounded by a coil of fine wire through which the audio output current of the radio flows. The armature is connected to the cone by a mechanical linkage.

The frame is moulded from Rep Wood, which is glue and sawdust, much the same as modern MDF.

Once I had it stripped down, 7 years ago, then repairs to the frame could begin. The loose foot was refitted with new dowels and Epoxy. I had imagined trying to include a pin, broken leg style, whilst gluing the side. However, I couldn't come up with a way of doing this, so simply just used the Epoxy again, leaving it clamped up until set. It has been fine ever since. After the repairs and lots of preparation the frame was re-sprayed with Mohawk toner and lacquer.

Fortunately the motor was in excellent condition and only required cleaning. There is a small choke, shunted by a capacitor, in series with the winding and a capacitor across it. This measured 7M Ohms at 100V, which with no DC from the Wasp I deemed satisfactory. These items are apparently to soften some of the strident high frequencies.

I had obtained the first reproduction cloth, which was screen printed, from Antique Radio Grill Clothes in the USA who are sadly no longer in business. But Radiola Guy, again in the USA, has taken over supply of this item, so it is still available as I write.

Some simple maths and trial and error was needed to make a protective cardboard cone for the motor. For this I used good quality art cardboard. The design although simple, compared to the new item, has stood the test of time and is still fine years later. The new silk dust bonnet is very similar in form, to the one my wife made, but a different colour.

Kenneth Erickson's story

I discovered this on a Web site many years ago and have repeated it here verbatim. Looking again, the extract does come from the SCARS (Southern California Antique Radio Society) Web Site and is part of an article on restoration of the RCA 103 Speaker by Kenneth Erickson.

Manufacturing the Tapestry Grill Cloth in the 1980's

The first time I looked upon a 103 loudspeaker was during a SCARS meet in 1982. It was the sorriest loudspeaker I had ever laid eyes on. The tapestry grill cloth, including the rear silk cover was in rags, it leaned over backwards on its pedestal, and its original finish had long since disappeared. From that time on I dedicated my efforts in Scars toward doing something for that loudspeaker.

Not long afterwards I met another member, Harry Grossman, who willingly gave me the rare tapestry grill cloth from

his loudspeaker to experiment with. Not many people would do that even today, and for this I hold great respect for him. That same year my wife Evelyn and I carried the grill cloth to the Peoples Republic of China where we met Mr. Chen Wen-Shuen and his associate Mrs. Xia Zhil-Lin, in an effort to determine the feasibility of reproducing the cloth which had been manufactured fifty-six years earlier. Many hurdles had to be overcome such as determining the type of weave and pattern, loom requirements, thread colour and our ability to meet or exceed the original RCA specifications. By 1986 after experiencing numerous failures and near look-alikes, we were able to recreate a grill cloth that appeared to meet all RCA's original specifications. For this effort, I hold both Chen Wen-Shuen and Xia Zhil-Lin in the highest esteem possible, for without their technical efforts the limited amounts of new grill cloths in existence today would never have been achieved.

Nothing is mentioned about the cardboard rear cover, complete with felt edge, and silk dust bonnet but I assume these were manufactured in China as well.

Fitting the New Grill Cloth

This is more difficult than fitting the screen printed cloth as this comes with the frame fixing screws printed on it such that alignment, of the vase and flower pattern, is automatic. The new cloth doesn't have these and as the instructions say "... is no easy task and will mentally tax an individual from beginning to end." I didn't actually use the suggested method, devising my own that to me was more likely to give a good result. There is no point in detailing it here as I understand that there are no more woven cloths so no one will be doing it in the future.

Conclusions

I'm pleased with the results as I had natural trepidation at the start. I hope the dyes used for it and the tapestry are more colour fast than the screen printed version it replaced. However, if it is not in use I intend to place a light proof dust cover over it which I would recommend if anyone uses a screen printed reproduction. There is no intention to denigrate that item which looks quite acceptable (it's certainly better than a threadbare original) and served me well for a number of years. If I had kept it covered most of the time it might still be in place.

Footnote

I wondered if Kenneth Erickson was still alive and so E-Mailed the Secretary of SCARS and had this reply (part of).

Regarding Kenneth Erickson, he was listed in our earlier membership rosters' however he was not included in our 2012 or 2013 rosters'.

I've been secretary for many years and normally send a sympathy card to the family if the SCARS Board is informed of a members passing. I do not remember sending one for Ken's family.

Minutes of the BVWS Committee meeting held at 13 Warneford Road, Oxford at 6.00 pm on Friday 13 September 2013.

Present: Mike Barker (Chair), Martyn Bennett (MB2), Jeremy Day, Guy Peskett, Terry Martini (on the conference phone), Paul Stenning, Lorne Clark, Carl Glover, Jon Evans, Greg Hewitt (part time).

1. Apologies for absence: Ian Higginbottom.

2. A correction and matter arising from the minutes of the Committee meeting held on Friday 20 July 2012.
(i) Membership Secretary's report: The number of members reported was the number renewed + the honoraries + the complimentaries.
(ii) The stock of some of the CDs previously sent to new members has run out. In future they will be sent a single DVD containing all the material that was on the CDs.

3. The Chairman proposed that Greg Hewitt be co-opted onto the Committee as an ordinary member with a view to him taking over from JD as Treasurer next year. Greg has been a helper at Harpenden and is familiar with accounting procedures. The motion was seconded by JD and carried unanimously. The Chairman invited Greg to join the meeting.

4. MB(2), the Membership Secretary reported that the total of paid up, complimentary, and honorary members stood at 1313 at the end of August. He commented that the numbers were holding up quite well but with some churn. End of July 2012 to end of July 2013 showed a fall of 18, (1324 to 1306) while there were 52 new members indicating that 70 had not renewed. The reasons for this will be investigated, once the database is updated. He presented an analysis showing the concentration of members' renewal activity in January and February and urged that efforts be made to get the Winter Bulletin with its membership renewal form sent out by the end of November at the latest to spread the renewals over a longer period and help the cash flow.

Late renewals were discussed. One proposal was that those renewing after the Autumn Bulletin mailing should pay a half subscription but receive only the Christmas (Winter) mailing and this would be conditional on the member also renewing for the following year at the same time.

5. CG, the Bulletin editor reported that 44 pages of the Winter Bulletin were complete and that he was working on the 2014 Calendar.

6. JD, the Treasurer, tabled the accounts for the 2013 NVCF showing a profit of £2,457. This compares favourably with the £1,552 made in 2012. He also reported that the Society's current account balance stood at £2118. The Treasurer then gave an overview of the Society's finances.

"Historically the Society built up a considerable deposit balance but in recent years has operated at a deficit and run this deposit down in favour of keeping down the costs to members. It now stands at £6219 which I consider to be the minimum we should contemplate. Accordingly I recommend that steps be taken to eliminate this annual deficit, currently close to £8,000, by raising revenue and cutting costs. I need hardly remind the Committee that our main source of income is subscriptions and the two largest items of expenditure are the Bulletin production and postage."

The Chairman reported that he was pursuing a number of options with the Bulletin printers (Hastings Print) which indicated that limiting the Bulletin to no more than 64 stapled pages, having the usual loose inserts incorporated into a pull out centre page, and having it mailed by the printers would reduce the costs by at least £500 each time and that additional savings would be made in stationary purchases and transport costs. Further efforts to minimise postage costs such as a reduction in the weight of paper used for the Bulletins would be investigated in consultation with the Bulletin Editor and the printing/ mailing contractor. The Chairman also remarked that he had found that different post offices could charge different amounts for the same mailing.

Against this background the following items were discussed at length and approved:
(i) that starting from the coming Christmas mailing the annual subscriptions be raised as follows; UK to £29, EU to £35, Zones 1 and 2 to £39.
(ii) that the Bulletin be limited to 64 pages and that mailing (where possible) be contracted out.
(iii) that there will be no Christmas DVD this year but there will be a calendar.
(iv) that the minimum auction bid be raised to £5 and some sellers commissions raised; members 12% for items prearranged with the auctioneer to be delivered on the day, 15% for items that are stored, non-members 20% (unchanged), members estates 12%.

CG left the meeting.

7. The Chairman highlighted the poor service being delivered and the high charges being levied by the management of the Harpenden Halls. The fall off in attendance and the rise in charges has led to the meeting running at a loss. It is feared that attempting to improve the situation by raising fees may further depress attendance. This brings our continued use of the halls into question despite its good parking and road and rail communications. He proposed that a search for a more sustainable venue in the same area, possibly a large village or school or church hall, be started with a view to moving for the first meeting in 2014 if possible. This was approved.

8. Non agenda item. In a discussion of storage it emerged that
(i) thanks to the generosity of the Chairman the BVWS has free use of a dry garage in Swindon as long as the tenancy of the associated house does not change. The garage houses all the back issues of the Bulletin, all archive copies, a huge quantity of TC1 (Tickling the Crystal 1), TC2, TC3, TC4, TC5, the Murphy book, the Attache Case book, the Obsession book, our DVDs, Valveman DVDs, and other BVWS supplements and paperwork. Recently 5 empty filing cabinets have been installed ready for the BVWS archive that will move from Oxford.
(ii) the Society rents, at less than the commercial rate, storage at Coate for auction items and the spares stock (mainly capacitors). As minuted above, some recovery of storage costs will come from the higher commission to be charged on auction items that are stored at Coate rather than delivered to the auction venue on the day.

9. LC, the Society's archivist reported that he and PS would work together on developing a web-based archive browser and search-utility, available via the BVWS website, progress being dependent upon other commitments. A mixed archive (papers, photos etc.) would be used as the subject and he showed an example consisting of over 6 GB of scanned images. A testing and appraisal phase would then follow. The storage implications for the website were discussed. A means of managing image rights would also need to be devised.

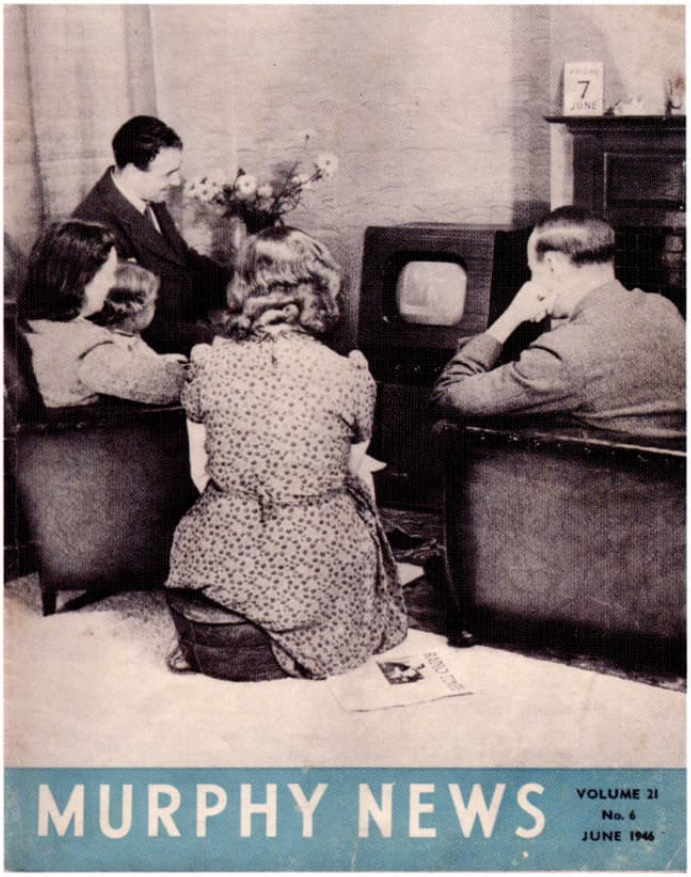
10. The Chairman reported that the Society is establishing a buy-it-now presence on ebay that it is hoped will accelerate sales from our stock of components. Society publications will also be sold. The items will be advertised at the non-member

Minutes continued on page 56

The Murphy V86CA

A Pre-War Television in Post-war Britain by Mike Barker

In 1939, the British television service was in full swing. Many technological advances had been made since its inauguration in 1936. Manufacturers had learnt a lot about producing reliable receivers at prices the public could afford. Murphy Radio Ltd. was no strangers to this with their very popular A56V 9" console TV selling for £30 in 1938 and still selling well in 1939.



V86CA

YES, YOU'VE SEEN IT BEFORE—but that was 6.75 years ago. It was the V86C then. Now it is the V86CA, the "A" being added to distinguish it from the early model, which, though generally similar in appearance, had several detail differences inside. The cabinet of the V86CA is of walnut, with the screen set forward and sloped for ease of viewing. The tube is a 12-in. type and gives a 10 × 8 in. picture.
(N.B.—No technical article is being published about the V86CA. See Murphy News, *19 August 1939, for the inside information. Now please turn over to the full-dress article about the A104).*

As was the trend with all manufacturers, a new range of Murphy receivers were designed and field tested for the 1939/40 season. These were the V84, table receiver and V84C/V86C and V88C (combined TV and radio) floor standing models.

The world changed very rapidly in 1939, and just as the new Murphy models were being released and orders taken at the Olympia radio show for full production to start, the Television service was switched off. Very few Murphy dealers had received their initial deliveries when all production was halted and orders cancelled. Most of any completed receivers never left the factory and were either broken up for parts during the war or stored in the hope of a very short spell of hostilities.

By September 1943 the Television Committee under Lord Hankey were assigned the task of deciding the future of television in Britain. The Hankey report was published in March 1945. Interestingly in it, one of the suggestions was that a future new television system could be developed giving approximately a 1000 line picture. Both Stereoscopic and Colour television were also considered.

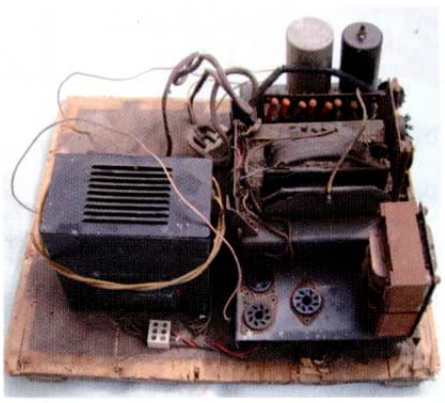
Eventually the recommendation was to restart the pre-war service with no changes by summer 1946.

With the many shortages of raw materials and components, the prospect of full scale television production in 1945 to meet public demand was impossible.

Murphy Radio responded by remaking the 1939 V86C 12" console with just a few minor improvements. It was designated the model number V86CA. Made in very limited numbers, just sufficient to supply the Murphy Dealers within the television service area with one receiver each. Even this is reported to have been difficult and still not all television qualified dealers received one.

This was an interim measure to enable Murphy dealers to demonstrate television to the public upon the restarting of the service. However these television receivers were not for sale! A quote from the Murphy News states; *I earnestly hope that all dealers will regard their V86CA as a demonstration model and retain this for the specific purpose of booking further orders.*

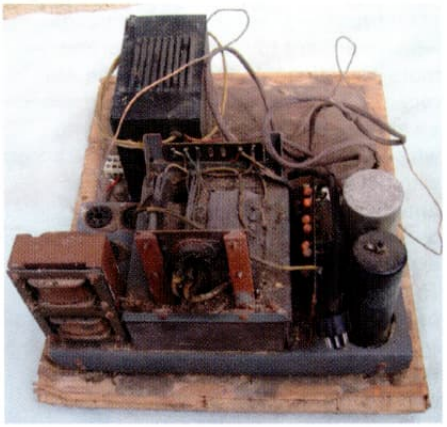
No price was announced for this television until a start had been made on the newly designed V114 table

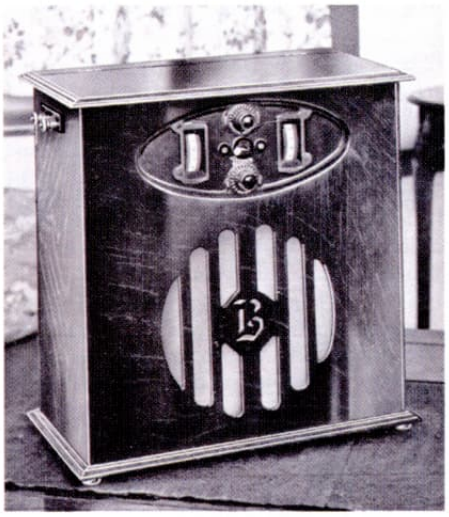


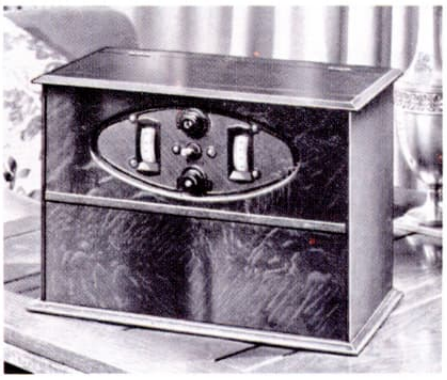
receiver which was a technological leap forward from the pre-war designs with the first appearance of the Mazda 6F12 miniature valve which was later made by Mullard as the EF91.
The V86CA was then listed at £67 plus £15-12.8d purchase tax so that dealers if they so wished could sell them.

Comparisons of the 1939 V84/V86/V88 receivers and the 1946 V86CA shows the same basic chassis and layout has been pressed in to use. On the V86CA an extra valve is incorporated in the sound stages to gain extra amplification and allow the noise limiter circuit to be more effective. Unfortunately the focus coil is still within the main HT supply and will suffer from mains voltage variations, apart from the heating effects of the coil itself. On the vision side, there are hardly any changes made, except to increase the receiver bandwidth. The purpose made EHT bleed resistor found on the 1939 models has now been replaced by a standard resistor chain.

The receiver pictured here is in rather a poor state and has suffered from being stored badly. Thankfully some one thought it was still worth saving and placed it into auction with the result that I was able to purchase it without much competition as most people thought it was too far gone. Thanks to Mike Izycky and Chris Gilbee I have now saved the receiver from further deterioration and intend to sympathetically restore it at a future date. After drenching it in 5 litres of wood worm killer (I use Cuprinol, beware Wicks' home brand causes staining) and allowing a few weeks for it to dry, an initial clean up showed that the cabinet is not as bad as initially thought. In fact I don't expect to re-finish the cabinet at all, just the parts that have to be remade. All woodworm holes will be filled and will become almost invisible. The chassis is actually in quite good condition with almost no replacement components. However the power transformer has suffered from a faulty EHT winding which was overcome by the use of a self-contained RF EHT unit. This is the black metal box in the pictures. The original Aerial connection panel has been removed and an extra single valve, "fringe" amplifier has been added at the top of the chassis at a later date. This will be an interesting restoration, and I look forward to starting it.







I am looking for any period advertisements or photographs of the later two- and three-valve receivers manufactured by S.G. Brown, Limited for a new publication on the Company's products. These sets were produced in 1929/30 either as kits and as complete receivers. I would be grateful for any assistance - appropriate credit will, of course, be given to the source of any information used. Illustrated from left to right: Type AM, Type BM, Brown Portable. Also looking for any copies of the Company's trade journal – "The Brown Budget." Please contact Ian Sanders at: castleridgepress@gmail.com PO Box 307, Morgan Hill, California 95038, USA.

Letters

Dear Editor

Development of FM broadcasting in the UK

I was most interested to read Stef Niewiadomski's article on the introduction of FM which reminded me of my early experiences. In 1956 I was rather daunted by the complexities of FM receivers and the prospect of aligning one, and not overly impressed by the sound quality of some early examples which were apt to produce distortion more objectionable than that of an AM receiver. I was delighted, therefore, when an article appeared in Wireless World which described a "Pulse Counter" design with only two (if I recollect correctly) tuned circuits: the RF input one and the oscillator, and was claimed to produce extremely low levels of distortion. This used an IF of about 100-200kHz passing through a series of RC amplifiers which overloaded to produce square waves. The frequency of these varied with the FM modulation depth.

The square waves then passed through a small capacitor to a resistor to produce an alternating series of positive and negative pulses. This was demodulated by a diode suppressing either the positive or negative ones. Integration of this signal was then achieved by the de-emphasis circuit to produce the required AF signal. Clearly there was almost no image rejection and the lack of interference from neighbouring stations relied on the FM capture effect. Nevertheless, it worked well in London at the time and then in Cambridge, Mass, USA where it remained almost permanently tuned to Harvard Radio which, unlike most US stations, rivalled the BBC for content. The introduction of stereo broadcasting signalled its demise (it proved too noisy). I would be interested to hear if anyone else tried this simple but effective FM receiver.

J Patrick Wilson

Dear Editor

Well it's Jan 1st and time to put up the new BVWS calendar. I just noticed the La Gloria radio opposite April claims to be Australian. Looking at the station call signs I believe it is from New Zealand. Australian call signs run from 2 to 8.

2 New South Wales
3 Victoria
4 Queensland
5 South Australia
6 Western Australia
7 Tasmania
8 Northern Territory

NZ call signs on the other hand run from 1 to 4 as on this radio

1 north of north island
2 south of north Island
3 north of south island
4 south of south island

Regards, Gareth Foster.

Dear Editor
No DVD this year!

I guess that most of us receive more calendars and diaries than we can use. Equally, I guess that most of us have come to look forward to the annual BVWS DVD. Clearly, the Committee must have regard for financial housekeeping. Perhaps, when times are hard rather than a calendar we might have a DVD every other year.

Hot wire Ammeters

May I add a footnote to Roger Grant's interesting article? I understand that these instruments were used in the early days of radio to measure aerial current. As the heating of the wire was proportional to the square of the current, a cramped scale resulted. As the effective resistance of the wire varied with frequency due to skin effect, better instruments used a thin strip rather than a round cross-section of wire. As this also increased the ratio of surface area to cross-sectional area the response time of the instrument was presumably slightly different for rising and falling currents, but this was probably insignificant. What was that these instruments were quickly damaged by overload. A heavy overload would melt the wire outright, whilst a lesser but persistant overload might cause oxidisation of the wire or melting of solder, if solder was used to terminate the wire.

I have an instrument labelled 'Radio Communication Co. Ltd. London. No 978', the range is 0-6A. I have not experimented to determine the temperature coefficient of resistivity of the wire, but I guess that to avoid further cramping of the scale as low a coefficient as compatible with other requirements would have been chosen.

Eliot Levin

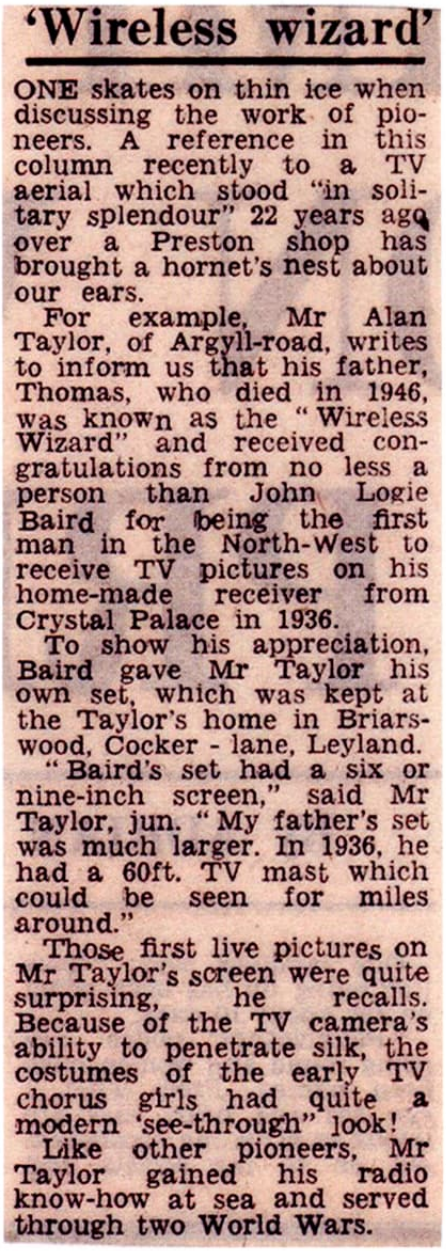
Dear Editor

There was a person up here in Leyland who had the first TV in the North West - He was called Thomas Taylor and was known as the Wireless Wizard, His great granddaughter has been in touch as she is trying to find out about this great, but not well documented member of her family. Apparently this was in 1936 and he had a 60 foot mast in his garden. He was congratulated by John Logie Baird on his achievements.

The house was cleared before she could get anything out and she wonders if anyone in the Society knew him or anything about him.

Can we help?

Cheers,
Steve Pendlebury.



'Wireless wizard'

ONE skates on thin ice when discussing the work of pioneers. A reference in this column recently to a TV aerial which stood "in solitary splendour" 22 years ago over a Preston shop has brought a hornet's nest about our ears.

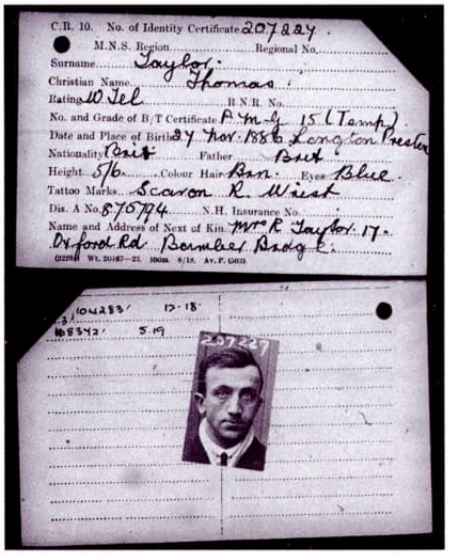
For example, Mr Alan Taylor, of Argyll-road, writes to inform us that his father, Thomas, who died in 1946, was known as the "Wireless Wizard" and received congratulations from no less a person than John Logie Baird for being the first man in the North-West to receive TV pictures on his home-made receiver from Crystal Palace in 1936.

To show his appreciation, Baird gave Mr Taylor his own set, which was kept at the Taylor's home in Briarswood, Cocker - lane, Leyland.

"Baird's set had a six or nine-inch screen," said Mr Taylor, jun. "My father's set was much larger. In 1936, he had a 60ft. TV mast which could be seen for miles around."

Those first live pictures on Mr Taylor's screen were quite surprising, he recalls. Because of the TV camera's ability to penetrate silk, the costumes of the early TV chorus girls had quite a modern 'see-through" look!

Like other pioneers, Mr Taylor gained his radio know-how at sea and served through two World Wars.

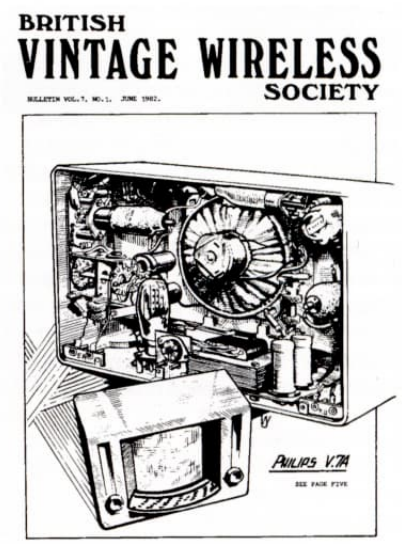


Above: Some material relating to Thomas Taylor

Robert Hawes1928-2014

Robert Hawes, one-time member of the BVWS, Bulletin Editor and Events Organiser, has died at the age of 86. A lifelong socialist, he lived in Tottenham for nearly all his life, moving from Hackney to the family's little Victorian terraced house in Manor Road in 1928 at the age of one. His father was chief area engineer for the GPO and it was from him that Robert developed a passionate interest in vintage radios, tvs and phonographs. He attended Tottenham Grammar School during which time he became a pacifist. At the age of 18, in 1945 and with the war continuing, Robert was due for call-up. He refused to go, and after appearing before a court martial he opted to go down the mines as a Bevin Boy and spent more than two years working at the coalface.

Robert Hawes at the British Vintage Wireless and Television Museum. Photograph by Jonathan Hill



The first Robert Hawes Bulletin, Vol 7, No. 1, 1982

In the 1950s and 1960s he spent time as a reporter on various local and national newspapers, before becoming the features editor at the former *North London Weekly Herald*. It was in arts reviewing that Robert came into his own - apparently going to see a performance with him was always fun and he didn't hold back on his comments! He met his partner, Bharat Goswami, 33 years ago – their civil partnership took place in 2008.

For many years, Robert had a strong and fulfilling connection with the BVWS. From the early 1980s through to the first half of the 1990s, he served in various posts including Bulletin Editor, Membership Secretary and Events Organiser and for his work within the BVWS was rewarded with Honorary Membership status in 1990.

Those of us who knew Robert in those early days found him interesting and delightful company - the sort of person who would light up a BVWS gathering with his endearing outward demeanour and his whimsical, Ned Sherrin-like sense of humour - and all this despite an inward depression which he managed to keep secret from most people. He loved all things from the 1920s and 1930s and especially wireless novelties and off-beat items - an interest which upon his arrival as BVWS Editor in 1982 signalled a change in style and content of the Bulletin which now began to contain many more amusing articles and comic book cartoon illustrations - although, of course, this was not everybody's cup of tea.

Robert was always generous with his time and was eminently hospitable - he would often bring little hampers of food across to Gerry Wells' Friday gatherings at the Museum and artistically arrange his plates of labelled sandwiches and cakes around the kitchen table - or "the trough" as he liked to call it! His interest in vintage radio led to him writing books on the subject, notably Radio Art (1991) and Bakelite Radios (1996) and also to tv appearances including on the Antiques Roadshow and Blue Peter. He would also pop up from time to time giving his slant on radio history to the tv cameras, sometimes appearing in a white coat - a la Gerry - for added gravitas!

But in the early 1990s, the BVWS became embroiled in a serious dispute between Robert and other members of the Committee which threatened to bring the Society to its knees, and despite an agreed resolution, continuing unresolved differences led to Robert's honorary membership being withdrawn, and his final departure from the Society in 1995. I, like others, regret this turn of events, but I shall always remember Robert as he was in those early days - a loyal, witty and engaging friend ... and for this I shall truly miss him.

Jonathan Hill

(Some background information from the Islington Tribune).

Minutes continued from page 53

prices, the prices to members will be set out on the BVWS website. Members must buy at the non-member price but can obtain a Paypal refund of the difference by quoting their name and membership number when buying. Sales from the Society's website and on-line renewals are planned but no date for implementation has been set.

11. Several complaints have been received about a member who appears to be trading solely for financial gain and not for any purpose related to the Society's objectives set out in the Constitution. This is against article . After discussion a motion to expel was put to the meeting but lost in a vote 5:3. Instead it was agreed that a warning letter would be sent to the member by the Chairman and if no positive change was noted, the society would not invite that person to renew his membership in 2014.

12. GP reported that a non-member had donated items of significant value to be auctioned for Society funds. It was agreed that the donor would be offered a years free membership. GP to give details to the membership Secretary and to write expressing our appreciation.

13. AOB

(i) It was suggested that more use is made of Skype and conference calls for Committee meetings. It was agreed that this be tried at the next meeting by use of a video conference link to TM.

(ii) The Science Museum has told us that the conversion of the old shipping gallery into a new communications gallery is in progress. They would like up to 6 members of the Society to be more closely involved, in particular to attend three meetings in October.

(iii) MB(2) reported that a new style magazine "Vintage Life" wanted some images of old radios from the Society. This could give us some welcome publicity. Martin was authorised to go ahead.

(iv) The Society will be present with a vintage radio and television display at Bletchley Park on 5th and 6th October. Helpers will be welcomed. Accomodation will be at the Premier Inn at Milton Keynes.

Date and venue of next meeting: Friday 6th December at Lorne Clarks house.

The meeting closed at 10.45 pm

New book:

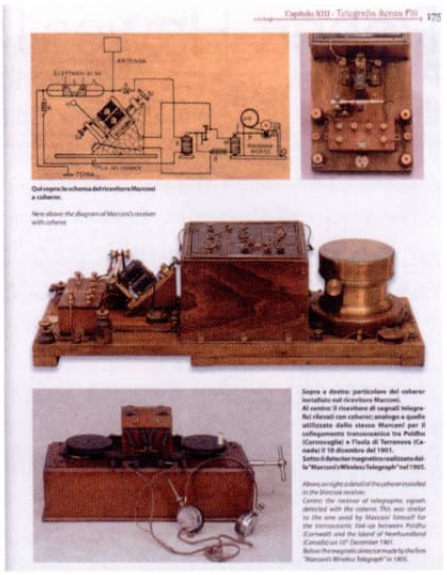
1700-1800 L'epoca d'oro DELL' ELETTRICITÀ

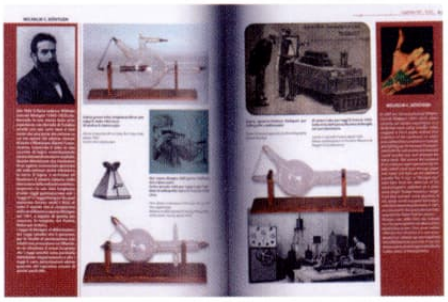
A truly beautiful book covering the development of electricity in the century (1700-1800). Romualdo Gianni, the Author and BVWS member presents this magnificent book which takes us through his extensive collection of electrical apparatus.

A vast subject matter is covered. From the very earliest beginnings of electricity and magnetism through the 1700's and onwards, encompassing the fields of telegraphy, telephony and radiotelegraphy. However there is much more to be found within the pages of this splendid publication. The book is packed with hundreds of historical facts and details of the pioneering men who discovered and made use of Electricity. Early radio is also covered.

This beautifully compiled book of 184 pages, which includes more than 500 excellent quality photographs, is printed with both Italian and English text throughout.

Available directly from www.antiqueradio.it (Libreria section) at the price of 45 Euros.

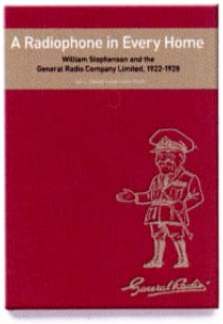


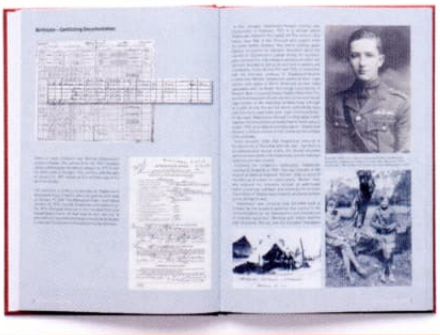


Out Now!

A Radiophone in Every Home - William Stephenson and the General Radio Company Limited, 1922-1928

by Ian L. Sanders and Lorne Clark, with foreword by Jonathan Hill. Published by Loddon Valley Press. ISBN 978-0-570773-0-0.



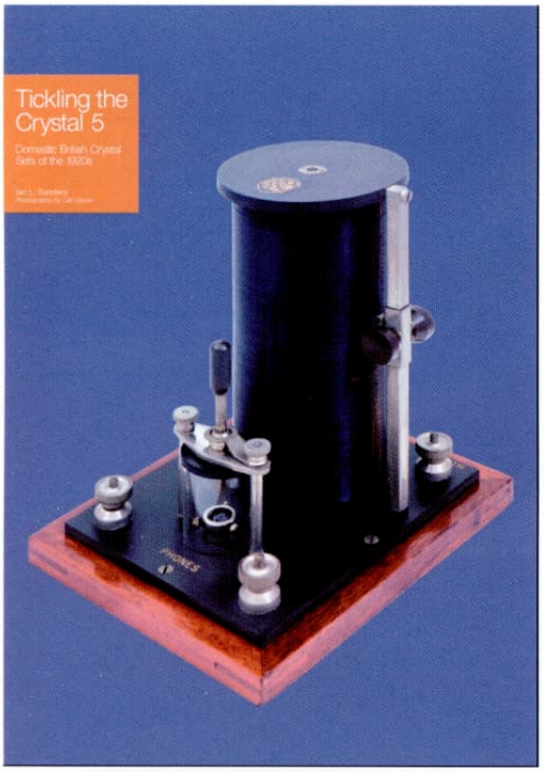


Between 1922 and 1927, during the life of the British Broadcasting Company (forerunner of today's British Broadcasting Corporation), literally hundreds of wireless manufacturing firms sprang up to take advantage of the new craze for 'listening-in'. In the fiercely competitive market of those pioneering days, many of these businesses were to disappear within just a few years. While much has been written on the history of the larger companies during this period of attrition, names such as Marconi, British Thomson-Houston, Burndept and General Electric – very little has been published about the smaller to mid-sized enterprises.

In their superbly illustrated new book, Ian Sanders and Lorne Clark tell the fascinating story of one of these smaller firms, the General Radio Company Ltd., and its enigmatic Canadian founder, William Samuel Stephenson, WWI air ace and WWII secret agent, thought to be the model for Ian Fleming's James Bond character. As well as producing an extensive range of radio receivers, the company also worked on the development of mechanical television.

This high quality publication is available for immediate despatch, price £19.95 (£17.95 for BVWS members) plus £4.95 P&P for UK, £7.50 P&P for EEC. BVWS members should quote their membership number in order to secure the discounted price. Payment via PayPal accepted.
For North America/Asia Pacific enquiries and orders: loddonvalleypress.us@gmail.com or write: Loddon Valley Press (North America), 1175 Teresa Lane, Morgan Hill, California, 95037, USA.
For UK/EEC/RoW enquiries and orders: loddonvalleypress@gmail.com or write: Loddon Valley Press, 16 Kibblewhite Crescent, Twyford, Berkshire, RG10 9AX, UK (note on paying by cheque: only sterling cheques drawn on UK bank, made payable to 'Loddon Valley Press' will be accepted).
Also available from BVWS stall and BVWS: Mike Barker, Pound Cottage, Coate, Devizes, Wiltshire, SN10 3LG chairman@bvws.org.uk

BVWS Books



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Photography by Carl Glover
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Full colour throughout. Strictly Limited Edition! only 500 copies printed
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Gerry Wells
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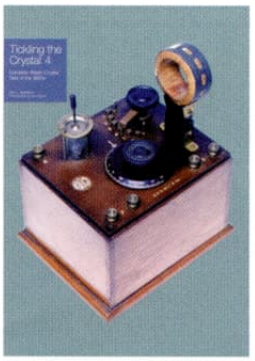

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Shareholders of the British Broadcasting Company Lorne Clark
68 pages. For the first time, a comprehensive listing of all of the companies, large and small, comprising the British Broadcasting Company - the forerunner to the British Broadcasting Corporation. Illustrated. £10.95 (+ £2.50 p&p UK) £3.50 EEC (rest of world £5.50)

Slipcase to house the first three volumes of Tickling the Crystal £9.95 Buy all three and get slipcase free! (postage £12 UK, £35 EEC, £55 US) BVWS members buy two and save £12 (postage £9 UK, £24 EEC £28 US)
Cheques payable to British Vintage Wireless Society

Mike Barker, Pound Cottage, Coate, Devizes, Wiltshire, SN10 3LG

BVWS Books

The Bulletin back issues

All Bulletins and supplements are priced at £2.50 each + postage.

Postage: for individual Bulletins add £1.50, for all extra bulletins add £1 each. Cheques to be made payable to 'British Vintage Wireless Society'.

Mike Barker, Pound Cottage, Coate, Devizes, Wiltshire, SN10 3LG
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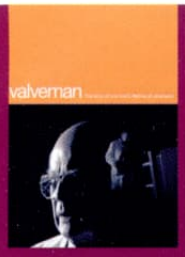

Out Now on DVD!

Valveman is the story of one man's lifetime of obsession.

Gerald Wells is Valveman. His life's work has been to amass one of the world's largest collection of valves, vintage radios and other early apparatus from the pioneering days of wireless communication. These are all kept in his house in London.

This documentary film innovatively blends, using a variety of motion design and filmed reenactments, the last hundred years since radio began through to the early days of television.

£12.00 (including p&p) £14.00 in EEC. Rest of world £15.00

Mike Barker, Pound Cottage, Coate, Devizes, Wiltshire, SN10 3LG
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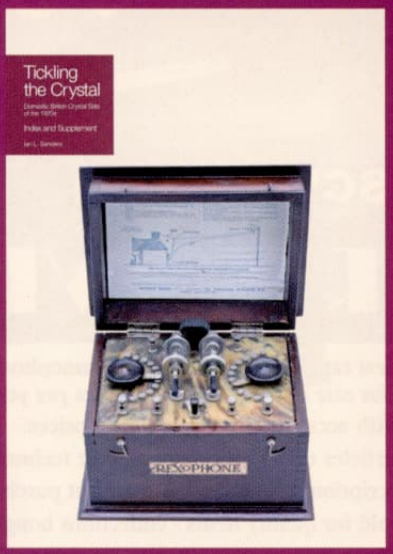
Out Now! Tickling the Crystal index and supplement

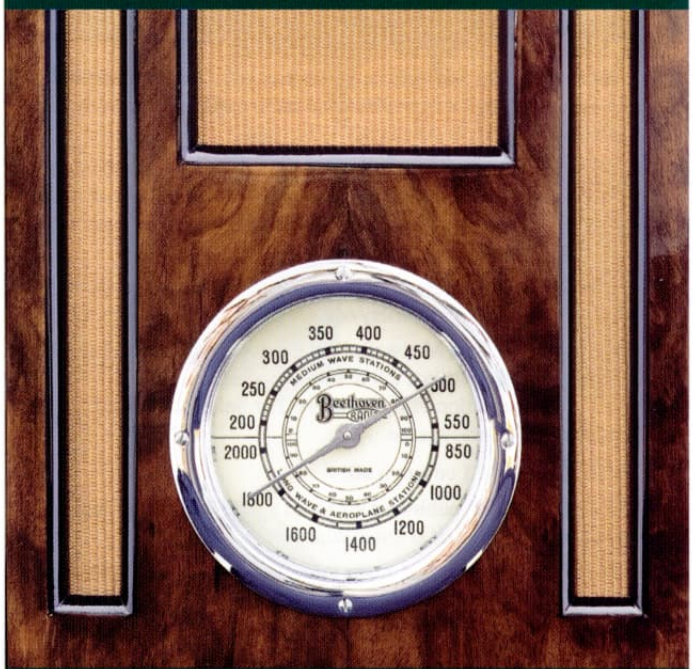


80 pages of GPO No. era British crystal sets. including comprehensive index listing sets in all five volumes of *Tickling the Crystal*

Price is £11.95, £9.95 to BVWS members.
(+ £2.50 p&p UK) £3.50 EEC (rest of world £5.50)
Cheques payable to British Vintage Wireless Society

Mike Barker, Pound Cottage, Coate, Devizes, Wiltshire, SN10 3LG
chairman@bvws.org.uk

April 6th Golborne Swapmeet



Golborne Parkside Sports & Community Club, Rivington Avenue, Golborne, Warrington. WA3 3HG
Contact Mark Ryding 07861 234364

News and Meetings

Martyn Bennett is the custodian of the BVWS GPO Registration Numbers list. As many members know, the project of assembling this list was started in the early days of the BVWS and was carried on by the late Pat Leggatt. Members are strongly urged to help build the list, whenever they get the opportunity, particularly as it is something that will help with the identification of vintage wireless in years to come. The list is by no means complete and the GPO no longer have a record of the numbers granted to wireless manufacturers. The BVWS Handbook contains the current listings - one in numerical order and one ordered by name. Please let Martyn have any additions, or suggestions for corrections, by mail or over the phone.

Martyn Bennett, 58 Church Road, Fleet, Hampshire GU13 8LB
telephone: 01252-613660 e-mail: martyb@globalnet.co.uk

New BVWS Regional Meeting.

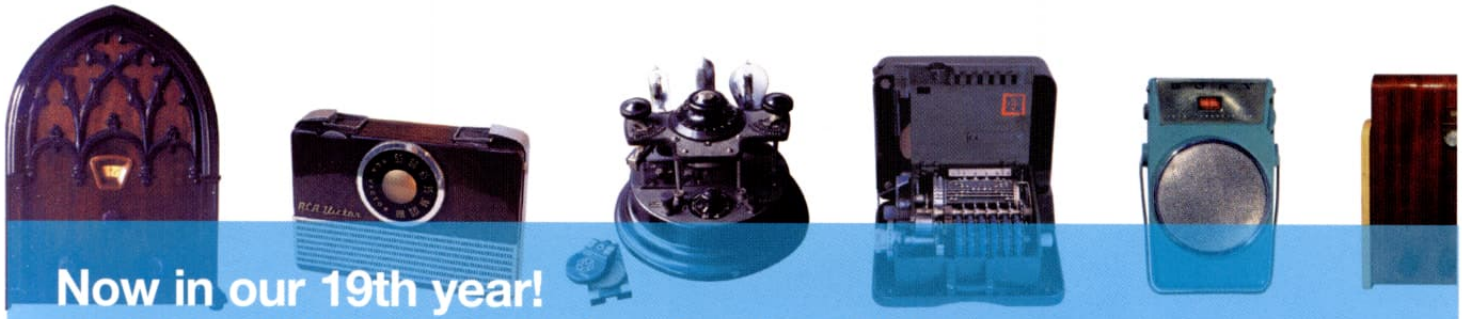
A new BVWS regional meeting has been arranged for August 2014. This meeting will be held in Punnetts Town Village Hall, Heathfield, East Sussex. The date is 10th August 2014 and it is expected to be a yearly event. This new meeting has been arranged by John Howes and his family and is a very welcome addition to the BVWS Calendar.

2014 Meetings

March 9th Harpenden
April 6th Golborne
May 11th National Vintage Communications Fair
May 31st Garden Party at The Vintage Wireless and Television Museum, West Dulwich
June 1st Harpenden
July 6th Wootton Bassett
August 10th NEW Punnetts Town, Heathfield, East Sussex
September 14th Murphy Day
September 28th Harpenden
October 5th Audiojumble
November 2nd Golborne
7th December Wootton Bassett

The British Vintage Wireless and Television Museum:
For location and phone see advert in Bulletin.
Harpenden: Harpenden Public Halls, Southdown Rd. Harpenden. Doors open at 9:30, tickets for sale from 09:00, Auction at 13:00. Contact Vic Williamson, 01582 593102
Audiojumble: The Angel Leisure Centre, Tonbridge, Kent. Enquiries, 01892 540022
NVCF: National Vintage Communications Fair
See advert in Bulletin. www.nvcf.co.uk
Wootton Bassett: The Memorial Hall, Station Rd. Wootton Bassett. Nr. Swindon (J16/M4). Doors open 10:00.
Contact Mike Barker, 01380 860787
Golborne: Golborne: Golborne Parkside Sports & Community Club. Rivington Avenue, Golborne, Warrington. WA3 3HG
contact Mark Ryding 07861 234364
Punnetts Town: Punnetts Town Village Hall, Heathfield, East Sussex TN21 9DS (opposite school)
Contact John Howes 01435 830736
Mill Green Museum: Bush Hall Lane, Mill Green, Hatfield, AL95PD
For more details with maps to locations see the BVWS Website:
www.bvws.org.uk/events/locations.htm

Sunday 11th May 2014
National Vintage Communications Fair



Now in our 19th year!
10.30 to 4.00 £8 admission (under-14s Free), early entry 9.00 at £25

Up to 250 Stallholders

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Event details plus downloadable stall booking form available at: www.nvcf.org.uk
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