The Bulletin

Vol. 31 no. 1 Spring 2006 www.bvws.org.uk

The Bulletin of the British Vintage Wireless Society £4.00 | free to members ISSN 0955-9345

Eighth page advertisements cost £22.50, quarter page advertisements cost £45, half page: £90 and full page: £180. Cheques made payable to 'BVWS' please

May 7th 2006

National Vintage Communications Fair

Now at The Warwickshire Exhibition Centre

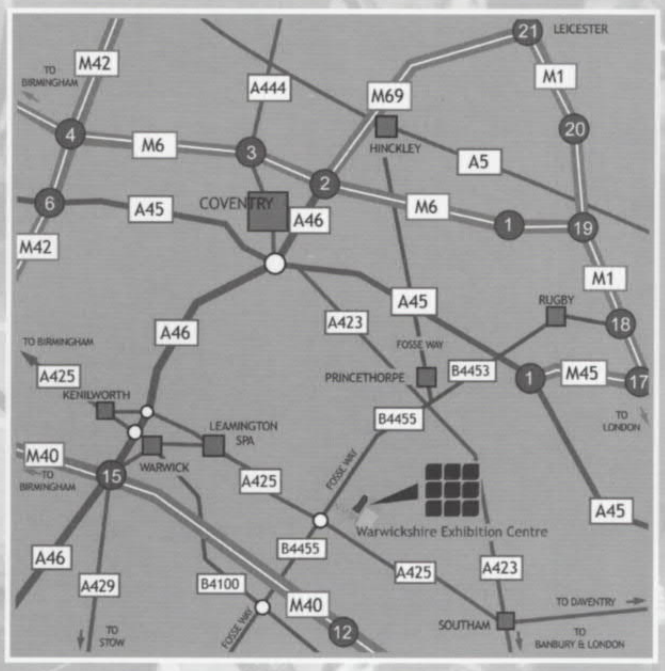
Now in our 13th year!

10.30 to 4.00 £5 admission
(under-14s Free),

early entry 9.00 at £20

300 Stallholders

Free carparking!

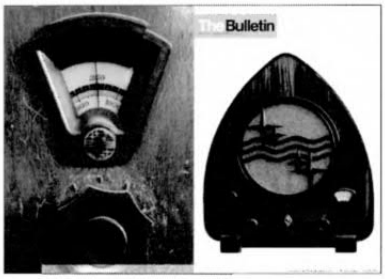


Stall bookings/Details
For any enquiries, please contact:
Post: NVCF, 13 Warneford Road,
Oxford OX4 1LT, UK
(please enclose an SAE)
Email: info@nvcf.org.uk
a downloadable booking form is available
from www.nvcf.org.uk

Bulletin of the British Vintage Wireless Society
Incorporating 405 Alive
Volume 31 No.1 Spring 2006

www.bvws.org.uk

Separations and Printing by Hastings Print



Front cover: Philips 'Local Station Receiver', 1931.
Rear cover: Detail of Philips 588, 1934.
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,
Ian Higginbottom and Peter Merriman

Contents

From the chair

This year is already flying by, what with the BVWS stall at the Audiojumble, where we were almost mobbed for some of the items we were selling, and now the Harpenden Auction a recent memory, it will soon be time for the drive down the M5 to the Willand meeting on the 9th of April. This is a particular favourite for me as I get to come away with my voice almost intact as Barrie Philips, who organises the meeting conducts the auction. Willand is a nice friendly meeting where I get a chance to catch up with a lot of members from Devon, Cornwall and Somerset that do not often venture as far as Harpenden. Do try to make it if you can, it is always worth the drive. The tea and cakes are excellent.

The NVCF table booking forms are now being returned and tables for the event are selling fast. Anyone regular to the event who has not booked yet should do so straight away, and with the very attractive table prices for BVWS members those who have thought about having a table but never tried, should be able to give it a go without financial worries. The new event location will be a great advantage to all those attending as stall holders and visitors due to the relaxed atmosphere and ease of getting there. A shuttle bus will run from Leamington Spa railway station to the Warwickshire Exhibition Centre on a regular basis throughout the day and there is more than ample FREE parking within easy walking distance of the hall. To keep up to date with the NVCF news, take a regular look at the NVCF website, www.nvcf.org.uk

BVWS 30th Anniversary.
Part 1: NVCF Display 7th May 2006
Please note the change to the advertised diary. There is no event on the 6th of May. Instead a display with a theme of "Televisions in your collection" will be held at the NVCF. The display will consist of all types of both pre and post war TV's and related equipment, many items being demonstrated throughout the day.

Part 2: Day 1, BVWS Garden Party 3rd June 2006
The usual Garden party will be held at the Vintage Wireless and Television Museum, Dulwich London. Apart from the regular attractions, there will also be some extra events scheduled on the day in way of talks and films. Guided tours of the Museum will be taken by Gerry Wells. This event will be completely FREE to all BVWS members who attend under the following condition:-

Please send an SAE to the Museum to get your FREE tickets for the day. This is important so that the Museum staff can arrange sufficient food and drinks. Make sure your SAE arrives no later than 14 days prior to the event!!! The Museum address is on their advert in this Bulletin.

Part 2: Day 2, Harpenden Meeting 4th June 2006
There will be a very special display of wartime equipment to include many Clandestine transmitters and receivers, wartime encryption equipment with working displays and an expert lecture on the subject by our very own John Elgar-Whinney.

There will be a BVWS 30th Anniversary commemorative lapel badge sent to every member with the Summer Bulletin. Various other displays and lectures are planned for the events later in the year. More news on those in the Summer Bulletin. Mike

French Meeting in Saint Fargeau

Dear Freinds and radio collectors, I am pleased to inform you that Radiofil will organise an exchange meeting of radio collectors on Sunday, April 2, 2006 between 8am and 1pm in Saint–Fargeau.

Entry is free to BVWS members. The meeting will stand in a sports centre set–up with tables, chairs and heating. Access paths will be indicated, around and inside the village.

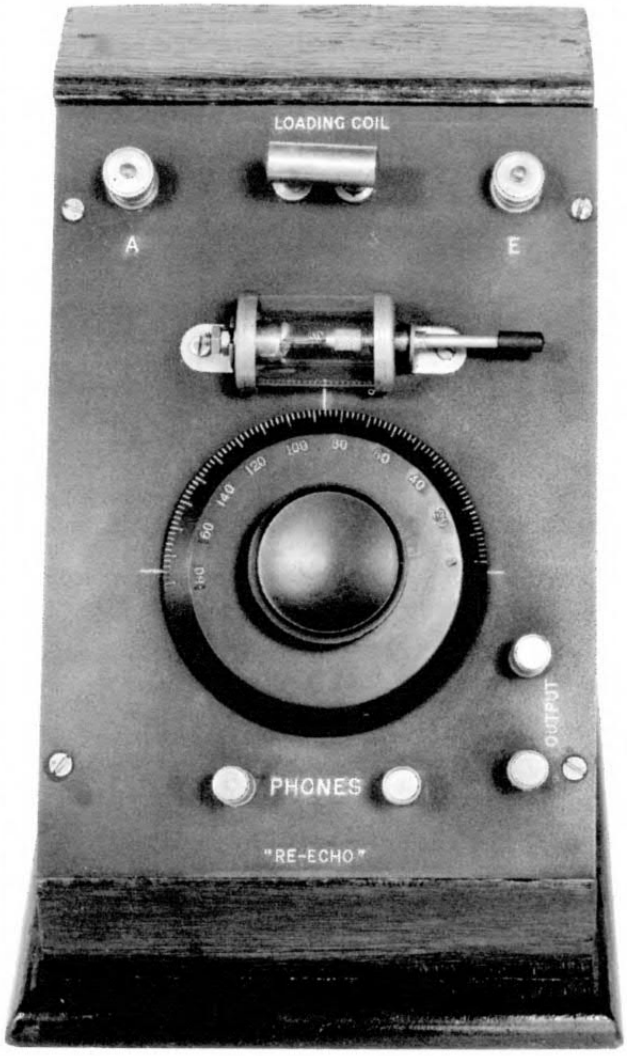
Saint Fargeau lies in West Bourgogne, 170 km South from Paris, 110 km Southeast from Orléans, 180 km West from Dijon. There is a beautiful and interesting museum in Saint Fargeau; The Musem of the Adventure of Sound. Inside, you can see many phonographs, vintage radios, speaking machines and important collections of vintage recordings (Edison cylinders, 78 rpm records). The museum is the headquarters of Radiofil.

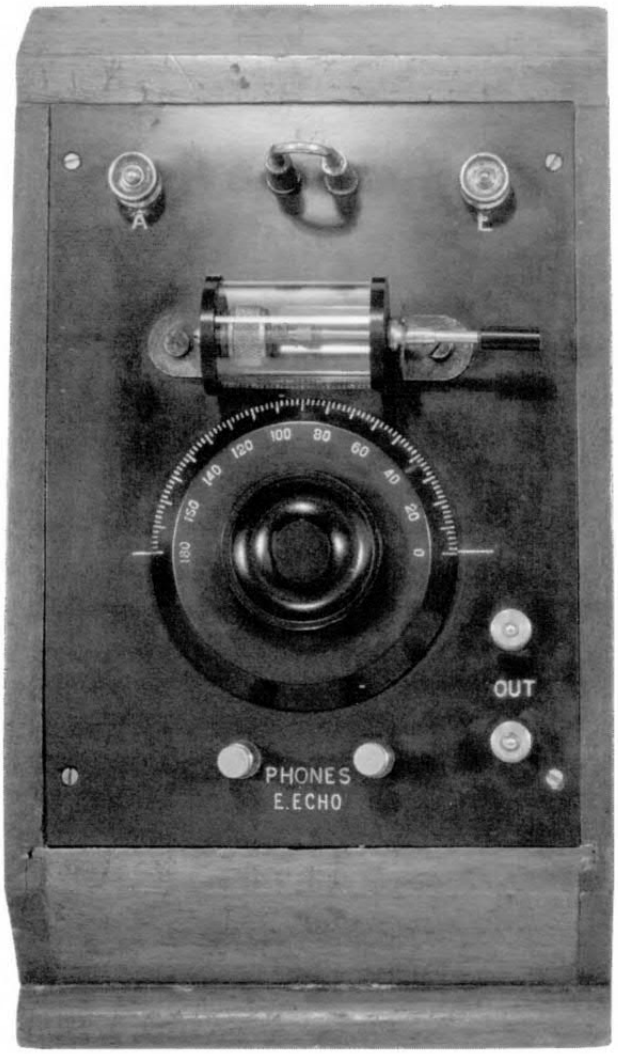
Your visit would be an honour for us, I send you my best radio friendship.

Jacques Caumeau,
Secrétaire Général Radiofil
Association Française des Amateurs
de TSF et Reproduction Du Son

"Re-Echo" Crystal Sets by Ian Sanders

Very little is known about the manufacturer of receivers bearing the "Re-Echo" name. Bussey[1] gives the company as the Re-Echo Electrical Manufacturing Company of 16, Hatton Wall, London, E.C.1., while an entry in the 1926 edition of the Wireless Trader Yearbook & Diary[2] shows the existence of the Re-Echo Radio Company with premises at 109, Marsham Street, Horseferry Road, London, S.W.1. In any event, the company behind the marque produced crystal, crystal-valve and valve sets between about 1924 and 1926, but they never seem to have been advertised in any of the popular journals of the day. The only known records of the sets are to be found in a few select wholesalers' catalogues such as those of the East London Rubber Company (ELR) and C. Gilbert and Company of Sheffield and Hull.





Left: the *'Re-Echo No.1'*

Above: Eagle Electrical Manufacturing Company's *'E. Echo No.1'*

Sloping panel, two- and three-valve receivers of typical early-broadcast period design were advertised in the ELR catalogue of 1925-26, along with smaller "*Junior*" versions of both sets. But the company evidently specialised in crystal sets, offering at least five different models. Two of the larger models, the *"Re-Echo" No.2 and No.3*, were available with a companion single-valve note magnifier inserted into the set's headphone compartment and designated the *Crystalve No.2* and *Crystalve No.3*. Unlike other manufacturers offering similar units, the note magnifier does not appear to have been sold separately.

The "Re-Echo" No.1 Crystal Set

The *Re-Echo No.1* was a simple, variometer-tuned set covering 180-600 metres with provision for a long-wave loading coil, permitting reception of 5XX, Chelmsford on 1,600 metres. The earliest models produced in 1924 carried the BBC stamp and GPO registration number, 671, but the majority of surviving examples are not numbered. With its sloping panel design and relatively crude construction, the *Re-Echo No.1* is stereotypical of 1920s crystal receivers. Most existing examples feature two extra terminals at the lower right of the panel to allow connection to a matching *Re-Echo No.1* one-valve amplifier. In 1925, the crystal set and amplifier (less valve) were priced at 17/6d. and £1 17s. 6d., respectively.

Two other manufacturers offered similar models to the *Re-Echo No.1* - Eagle Electrical Manufacturing

Right: 1925 Catalogue by Gilberts of Sheffield and Hull

Far right: *Popular Wireless and Wireless Review*, December 13th, 1924

Below: the *REC* model was somewhat larger than the *Re–Echo No.1* and was of a higher quality construction.

Below right: The 'Re–Echo No.1A'

THE "RE-ECHO" NO. 1 VARIOMETER CRYSTAL SET.

Trade No. REC/1301½ each.
Retail Price—£1/6 each.

Supplied in beautifully polished sloping cabinet, as illustrated. All metal parts heavily plated and polished.

CHELMSFORD.
This Set is designed to cover any wave length by merely plugging-in the appropriate coils. A No. 200 Igranic Coil is recommended for the new Chelmsford Station.
TUNING.
The famous Re-Echo All-ebonite Variometer (wave length 180-600 metres) is incorporated in this circuit.
CRYSTAL.
Shaw's genuine HERTZITE only is used in these Sets.

SPECIAL REDUCTIONS ON ALL OUR OWN GOODS DURING DECEMBER.

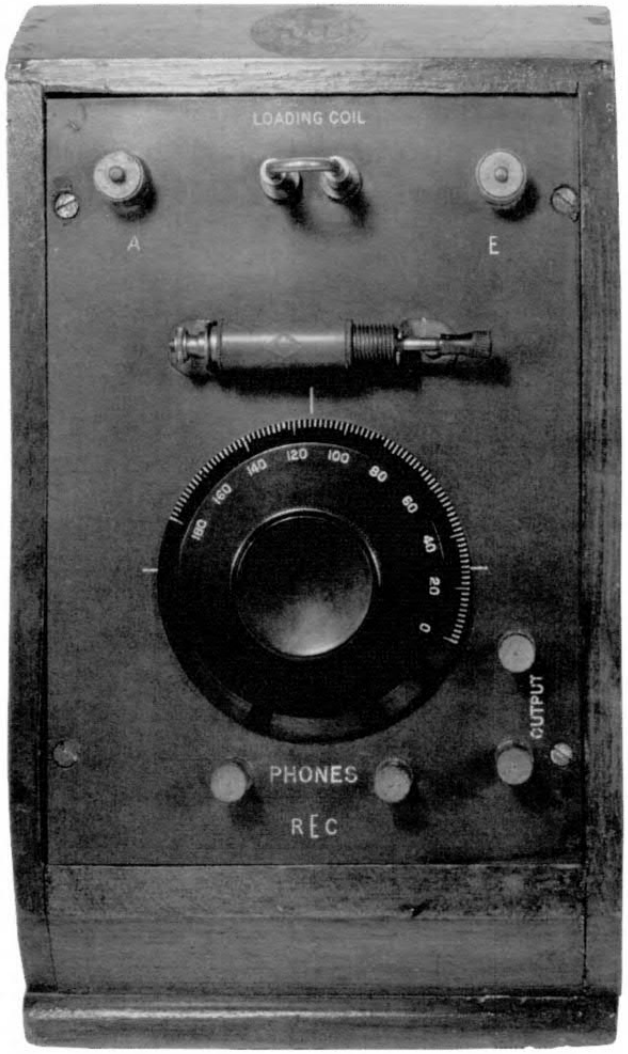
No. 1 "ECHO" CRYSTAL SET

A thoroughly reliable receiver with variometer tuning and provision for 5 X X and Paris, with dustproof detector, ebonite detector ends and easy fix crystal cups, in mahogany cabinet, all parts nickel-plated, handsome appearance. Price 17/6.
With condenser tuning, most efficient for 5 X X. Price 22/6.
L.F. Amplifier to match. Price 25/-.
Foth adjustable headphones, best value, 12/6.
The "Eagle" Echo Accumulator, fully guaranteed, money refunded if not satisfactory.

2 v. 40 amps. 9/6	4 v. 40 amps. 18/6	6 v. 40 amps. 25/-
2 „ 60 „ 12/-	4 „ 60 „ 22/-	6 „ 60 „ 32/6
2 „ 80 „ 15/-	4 „ 80 „ 29/-	6 „ 80 „ 42/-

H.T. Batteries fully guaranteed 60 volt. Price 9/6. First-class Ebonite Variometer, 3/6. Cheaper quality, 2/-.
Ask for List for Valve Sets and Accessories.

THE EAGLE ELECTRICAL MANUFACTURING Co., LTD.,
32, Charlotte Street, Fitzroy Sq., W.1.



Above: Detail of the REC transfer

Right: 1925 Catalogue by Gilberts of Sheffield and Hull

THE RE-ECHO NO. 1A VARIOMETER CRYSTAL SET.

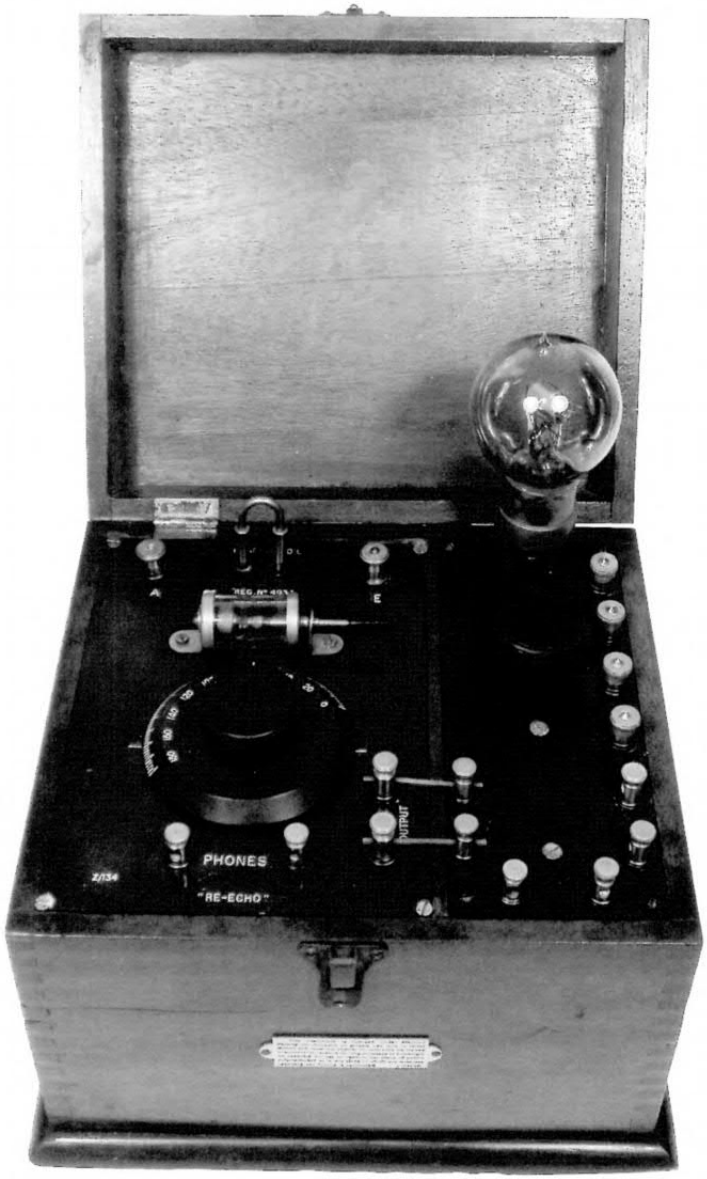
Trade No. RECA/1610½ each.
Retail Price—22/6 each.

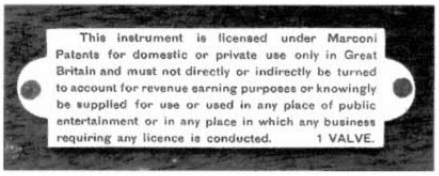
CHELMSFORD.
This Set is designed to cover any wave length by merely plugging-in the appropriate coils. A No. 200 Igranic Coil is recommended for the new Chelmsford Station.
TUNING.
The famous Re-Echo All-ebonite Variometer (wave length 180-600 metres) is incorporated in this circuit.
CRYSTAL.
Shaw's genuine HERTZITE only is used in this Set.

A Compact Cabinet and Dustproof.

Company and Radio Equipment Company. In the autumn of 1924, the Eagle Electrical Manufacturing Company of Charlotte Street, West London advertised their *No.1 "Echo"* crystal set. Identical to the *"Re-Echo" No.1*, except for the absence of the *"Re-Echo"* logo, some models carry the name *E.Echo* - presumably standing for *Eagle Echo*. Eagle Electrical, however, offered versions with either variometer or condenser tuning priced at 17/6d. and 22/6d., respectively, and like Re-Echo, they advertised a matching amplifier.

The only insight into the connection between the companies comes from an advertisement for the *"Echo"* appearing in *Popular Wireless Weekly* for August 9th, 1924. The copy states that the receiver was *"made by the designer of the famous "Re-Echo"*





set, which was chosen by the winner of the Brighter Britain Competition (recently promoted by the B.B.C.)", implying that the set was not manufactured by Eagle themselves. This is consistent with the fact that Eagle generally marketed its own receivers under the *Chakophone* brand name.

A set comparable to the *Re-Echo No.1* and carrying the "*REC*" logo exists and is believed to have been produced by the Radio Equipment Company of High Holborn. While the overall design of the two sets is the same, the REC version is slightly larger, of generally higher quality construction and was built into a more robust and better–finished mahogany cabinet. Other than the obvious fact that the companies share the same initials, no other connection is known.

The "Re-Echo" No.1A Crystal Set

A *Re-Echo No.1A* set was advertised in 1925, seemingly as a replacement for the company's No.1 crystal set. The wavelength coverage was the same range as the earlier model with provision for reception of *5XX*. Priced at £1 2s. 6d., it featured an enclosed mahogany cabinet with an ornate brass carrying handle and was most probably introduced after the Post Office registration period, as no examples with a BBC stamp are known.

The "Re-Echo" No.2 Crystal Set and "Re–Echo" No.2 Crystalve Set

The *Re-Echo No.2* crystal set was a larger model with tapped inductance tuning covering 200-500 metres. The receiver was built in a well-finished mahogany cabinet with a carrying handle and a headphone compartment at the side, and was generally of higher quality construction than the *No.1*. Although produced in early 1924, no evidence of any BBC registration is known for this model. A version, known as the *Crystalve No.2*, with a one-valve note magnifier permanently fixed into the headphone compartment was offered in 1925. The *Re-Echo No. 2* and *Crystalve No.2* (less valve) were priced at £1 10s. 0d. and £3 0s. 0d., respectively.

The "Re-Echo" No.3 Crystal Set and "Re-Echo" No.3 Crystalve Set

Described as a "*Super Reproduction of the No. 1A*", the *Re-Echo No.3* was a variometer-tuned set built into the same cabinet as the *Re-Echo No.2*. Apart from the panel layout, the only other difference from the *No. 1A* was the inclusion of an additional pair of "output" terminals for connection

Opposite page, left: The *'Crystalve No.3'* was a combination of the *'Re–Echo No.3'* crystal set with a note–magnifier fixed into the headphone department.

Opposite page, below left: Ivorine label confirming the set's compliance with Marconi patents for domestic use.

Opposite page, right: The *'Re–Echo No.1A'*

Left: The *'Re–Echo No.2*

Below: 1925–26 Catalogue by East London Rubber Co.

THE "RE-ECHO" No. 2 CRYSTALVE SET.

Alike in every respect to the No. 2 Crystal Set, but with one stage of low frequency amplification added.

Reception is wonderfully clear and free from distortion.

WL 130/4500 ... ... £3 0 0

Valves and accessories extra.

THE "RE-ECHO" No. 3 CRYSTALVE SET.

A facsimile of the popular No. 3 set, with a note magnifier inserted in the partition usually reserved for 'phones. Ten or more pairs of 'phones can comfortably be used on this set.

WL 131/4500 ... ... £3 0 0

Valves and accessories extra.

THE "RE-ECHO" No. 1 AMPLIFIER.

This low frequency unit is specially designed for use with the No. 1 Crystal Set, and will amplify ordinary signals to such an extent that ten or more pairs of 'phones can easily be used. The price does *not* include valve or other accessories.

WL 132/2803 ... ... 37/6

to a companion note magnifier. The set bore the late registration number 4934, suggesting that it was introduced sometime in the summer of 1924 and was priced at £1 7s. 6d. A *Crystalve No.3* receiver combined the crystal set with the same note-magnifier found in the *Crystalve No.2*, and was priced at £3 0s. 0d., less valve. As noted above, there is no record of the companion note-magnifier being sold separately.

The "Re-Echo" Crystal Set

A later crystal receiver with no model number and simply bearing the name *Re-Echo* engraved on the panel was likely produced in 1925 or 1926. Designed for reception of the broadcast band only and with an open detector (unlike all of the company's previous models which feature a glass-enclosed detector) – this set must have been a low-cost model intended to capture what was left of the dwindling crystal set market. No reference to this set has yet been found.

Crystal Set Amplifiers

A *"Re-Echo" No.1* one-valve and a "*Re-Echo*" two-valve amplifier were produced for use in conjunction with the company's crystal sets. The first was a sloping panel design matching the No. 1 crystal set, while the second, also of sloping panel design, resembled the company's valve receivers.

As far as is known, Re-Echo ceased to manufacture receivers during 1926, having been in business for little more than two years. Like many other firms entering into production at the beginning of broadcasting only to exit shortly thereafter, Re-Echo apparently was not able to compete in the face of growing competition from larger enterprises better suited to the rapidly changing market.

1. Bussey, Gordon: *Vintage Crystal Sets*. Published by IPC Business Press Ltd., London 1976.

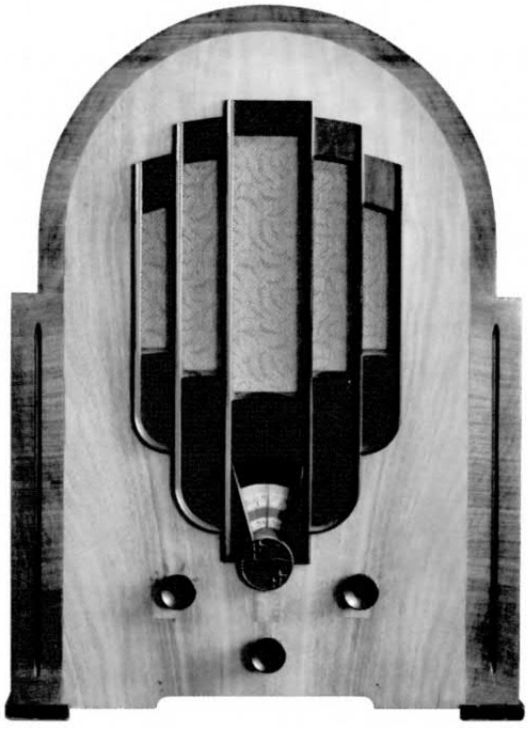
2. *The Wireless Trader Yearbook & Diary*. Published by The Trader Publishing Co. Ltd., London 1926.

Philips by Gerald Wells

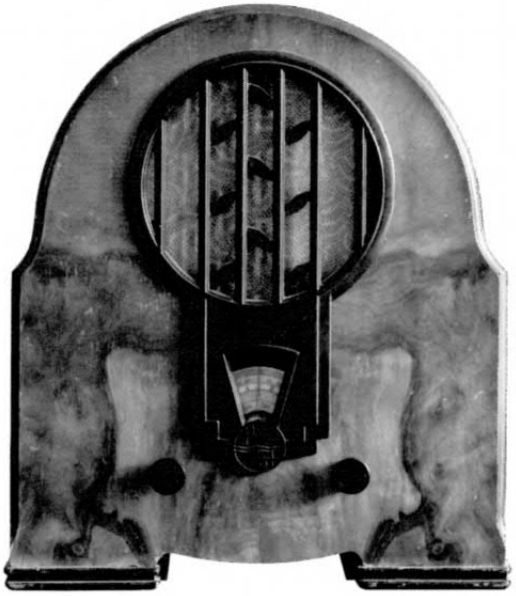
In the 1920's and 30's there were only three parts of the world where domestic radios were produced in any quantity: the United States of America, British Isles and of course, Holland.

The United States had an enormous manufacturing capability for domestic radio; it must have been as huge as its car industry. It supplied all America and surrounding countries as well as exporting to Australia and New Zealand. They even managed to get a small foothold in the UK. Trying to export anything other than films and music was rather like trying to sing the 'Red Flag' at a Conservative party conference.

Above: Anton Philips



Far left: Philips 'Superinductance' model 636A, 1933.



Left: 'Superinductance' model 634A, 1933.

Britain also had an enormous radio industry, with at least 100 manufacturers. We supplied all the British Isles as well as our vast far–flung empire. Of course UK radios cost more money than our overseas counterparts because we imposed a 'valve holder tax'. We had 'British Valve Association' and various kinds of manufacturers associations.

This meant that there was a 12/6 (62½p) tax on all receiving valve holders (rectifiers and barreters were exempt). The BVA were very anxious that no valve was sold for less than 50p and the manufacturers' association made sure that no radio was sold for less than £8.00.

In Holland things were different; for a start they were not British or American. They concentrated their whole radio industry in one area – Eindhoven. It must have been in the 1890s that a farsighted genius realised that mains electricity was spreading across Europe at a great rate. He also had the sense to see that there would be a demand for reasonably priced filament lamps. This farsighted Dutchman was Anton Philips. I believe that he was not only a chemist but a very good mechanical and electrical engineer with a good knowledge of vacuum technology. He set up a small workshop in Eindhoven producing light bulbs that were more reliable than those of his competitors'. His business grew at a great rate. Generating plants were springing up everywhere and even windmills had dynamos built into them so those remote districts could have electric light. In 1902 Anton Philips was approached by a man who wanted a light bulb with a small plate placed inside the glass next to the filament. It had to have a lead–out wire to the outside of the glass. Quite naturally Philips wanted to know what this device was to be used for. He was told that it was for the Marconi system of communication without wires and this device was in fact a diode valve. It is called a valve because it

Right: Philips factory, Croydon, 1957

Below top: Philips 'Superinductance' model 730A.

Below centre: Philips'Superinductance' model 630A, 1933.

Below bottom: Philips 'Superinductance' model 830A, 1933.

Below right: Philips model 2514, 1928 with model 2007 loudspeaker, 1928.

will only allow a flow of current in one direction so it is ideal for use as a detector of wireless signals.

In America a similar effect had been noted by Thomas Edison, when developing his early incandescent lamps. Fleming found it could be used as a detector. It was later developed into the triode valve by Captain Harry Round. Anton Philips was intrigued with this device and very rapidly got involved with wireless telegraphy. His idea was to manufacture components for this new miraculous toy. I don't think he could have realised what he was getting involved in. He soon became the leading maker of parts for radios. Making complete radios was only a short step. Philips supplied a great deal of the radio equipment for the 1914–1918 war. He also supplied parts for all the other countries of Europe. Not too many countries made complete radios but those that did tended to use Philips parts. After the First World War broadcasting stations were spreading fast across Europe. Every large city had its national broadcasting station, except the British Isles because of government regulation. We didn't hear the BBC until late 1922. The government of the day didn't like it and they still don't. When people say that Philips were 'Simply years ahead' you will agree, they were then and they probably are now. When it came to supplying radios to Europe it must have been like shooting fish in a barrel; they just couldn't go wrong.

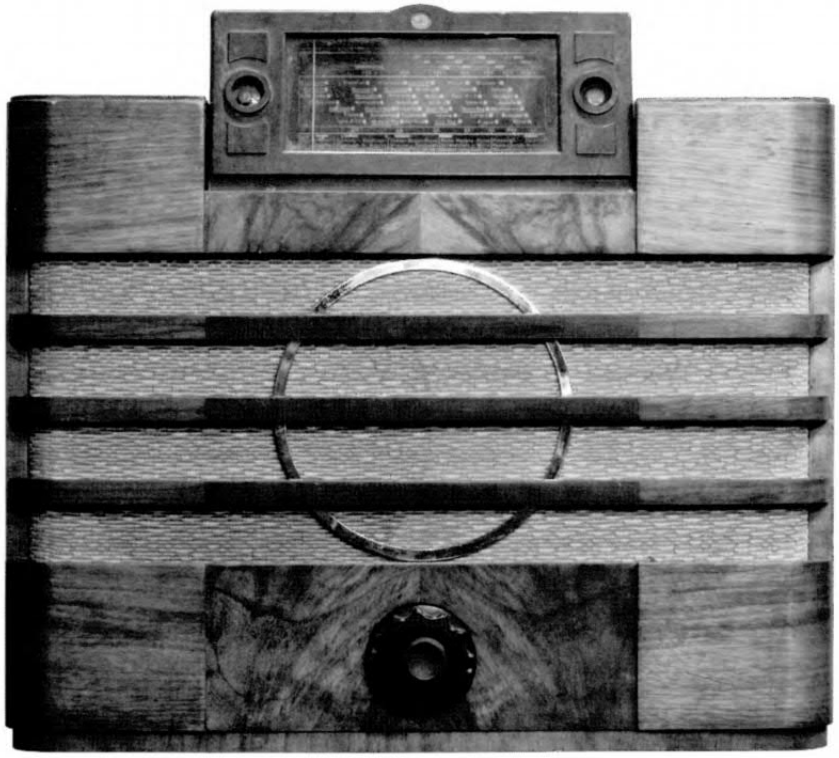
By 1928 they produced a small mains receiver that would work on any mains voltage from 100v–260v with only small adjustments. They came in a small neat metal box and had a separate speaker. They were reasonably priced and reliable. It was difficult to get one in this country because of English trade regulations. The only way Philips could get into this country was to open a factory at Mitcham and employ British labour, plus making friends with Stanley Mullard and using his name to sell Philips valves. Even so Philips were not allowed to have a stand at the Earls Court radio show. They had to have a large charabanc on the forecourt to show off their work.

The sets sold very well over here. The quality of sound was good and the general finish was pleasing to the eye. All very wonderful until they went wrong, this sorts the men out from the boys. Fortunately the average Philips set is very reliable but when it does go wrong you sense that it is totally different from anything you have met before.

The first thing that you have to do is to get inside it; the screws that hold it together are some sort of continental thread, I don't think it's metric. The slots in the screw heads are very narrow and need a screwdriver of high tensile steel with a razor–like blade. It also helps if it can go round corners. I have yet to find a box spanner that will fit any of the nuts, they seem to be a metric 4BA.

When you finally get to the underside of the chassis you are faced with a beautiful bit of engineering. All the condensers and resistors are mounted on little upright tag strips that clip into slots on the chassis.

The condensers are made of liquorice and probably start to leak after about 40 years of use. It is quite easy to unsolder them as they fit into little slots on the tag strips; the wire ends are usually set into little coils of wire known as 'Philips squiggles' and then soldered; this obviates any dry soldered joints. Once



you have removed the suspect part you try to work out the value. There are numbers on it but most are part numbers. The chance is that it has 50CM written on it this usually means .05 or 47nF. The resistances can be quite fun as well, by the time you have got them out you have rubbed all the numbers off.

The obvious thing to do is to get the service manual. This is easier said than done. For one thing the set you are working on is not on the Trader Sheets and trying to get help from Philips if you are not an authorised agent is very difficult, they are very stuffy when it comes to service manuals.

It is said that there are two different types of drive cords; Philips and everybody else's. The most notorious is the Philips V5A, a very pretty little set that was made in 1936; it sold for about seven pounds and worked very well. The set doesn't use a chassis, it has a very clever bakelite case with dozens of slots and grooves on the inside. The case is about six inches deep and about twelve inches high and fourteen inches wide. It is called the 'Theatrette' because the dial puts you in mind of a stage. The dial is almost the full width of the set and has all the main stations of the world marked on it, it is backlit and you can only see the pointer when it is lit up. The loudspeaker is placed in the middle of the set with a curved cloth grille in front of it.

The innards of the set are made on a jig, it is about four–feet long and is fed from the centre of the bottom of the cabinet. All the parts are held in place by hot tar after all the parts have been put into the appropriate slots. The mains transformer is mounted on a piece of (usually worm–eaten) plywood and clamped onto the bottom of the case. I must add that the drive cord and pointer mechanisms are put into the case first.

After fifty years of faithful service the drive cord breaks. How the hell do you replace it? You get out the service manual and it tells you nothing. In desperation you phone up Philips service on Purley Way and a very helpful chap tells you to take the set back to Philips and a very skilled young lady will unwind the innards from the cabinet and re–string the drive cord, then re–tar all the bits back in place. It would take half an hour and could be done while you wait, it would cost 30/-. Of course this was before the war. You are now on your own. You look inside the set, you notice that the two wet electrolytics have been sick and will need replacing. The piece of three eighth plywood that holds the mains transformer etc has either de–laminated or been eaten by woodworm and the wormholes have gradually filled up with the goo from the electrolytics. The only thing to do is to replace the ply base. The base is held in with two clamps, two nuts and screws onto the case. If you unsolder some of the wires you will find that the board and the transformer come away quite easily (in fact like a flock of sparrows) and behold! The drive system is now completely exposed. It is quite obvious how the drive cord works and can be replaced in minutes. The V5A doesn't hold any fears anymore.

In 1937 Philips decided to bring out the Monoknob. In 1937 many folk were complaining that some of the better class sets had more knobs than a hi–fi, they wanted something simple to operate. Philips came up with the answer in the 797 set. It was a five or six valve superhet with standard flip up and down dial (727) a pleasing walnut case with one big knob on the front with a skirt around it. If you turned the big round knob the dial pointer would glide gracefully across the well iluminated dial, if you moved it up and down the volume would alter and if you moved it from side to side or corner to corner you could alter the bandwidth and the tone. Truly a wonderful set. That is until one of the bowden cables jams up or breaks. They didn't have WD40 in those days. The wave–change switch and mains on/off are controlled by the outer ring. This usually seizes up solid but a quick squirt of that magic liquid makes it as good as new.

A few weeks ago whilst wondering what wildcat scheme I could get up to next, I spotted four big copper cans that were used in the Philips 634A or

Above left: Philips model 2531, 1930 with model 2007 loudspeaker, 1928

Top: Philips model 795A 'Monoknob', 1937

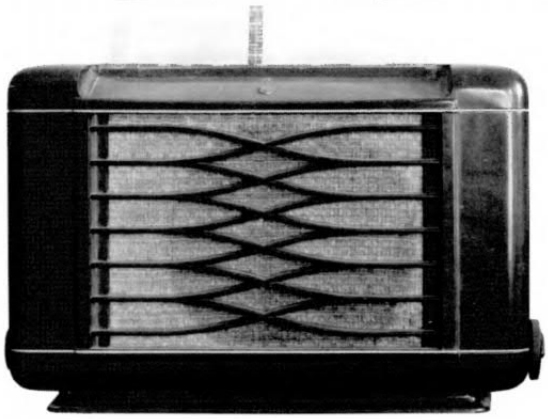
Above: Detail of 795A knob

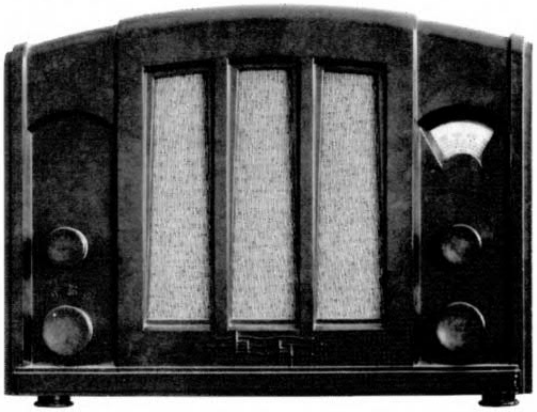
Right: Philips model 426A, 1947

Far right: Philips 'Local Station Receiver' model 930A, 1931

Below: Philips model 588, 1934

Below right: Philips model 940A, 1935





A few weeks ago whilst wondering what wildcat scheme I could get up to next, I spotted four big copper cans that were used in the Philips 634A or the 'Ovaltiney' as it was known. I could make an Ovaltiney!

the 'Ovaltiney' as it was known. I could make an Ovaltiney! I am sure that I can find and make most of the parts and it doesn't have a drive cord or bowden cables. I went upstairs to No.5 stores and found a four–gang Philips tuning condenser in No.2 stores and a speaker escutcheon in the main store.

I went up to the house and took our 634A down to the workshop. I removed the chassis and took the cabinet down to woodwork No.2. I examined it closely and found it would not be too difficult to copy. It is a cathedral cabinet with shoulders. The main shape is formed by several layers of plywood glued together cut to shape on the jig–saw. The front is cut quite easily out of three eighth plywood and glued onto the ply forming blocks that I prepared earlier. The bottom and sides are also fairly thick plywood. The top part is formed from one and a half millimetre modelling ply that has been soaked in water until it has 'learned' the shape and is then glued firmly onto the rest of the case before it has realised what has happened. I then leave the rest of the case for Geoff to finish off and polish.

The chassis was easy to make; it was a simple base chassis that you will find in any radio. The coils, tuning gang and tranformers etc went on very easily. This set has only two knobs on the front. The volume control and switch are on a sliding shaft which operates a local/distance switch. This took two days to make but it was good practice for the wavechange switch that operated on the same principal, you pushed it in for medium wave and pulled it out for long wave. When you turned the same shaft you operated the tuning condenser. This had two dials, one on top of the other. When the long wave was pulled out a shutter came round and blotted out the medium wave dial. I made up the wave change switch out of paxolin and the long contacts out of old Post Office relays. Making the wave change switch took two days. The drive mechanism uses gear wheels. I have never worked with gear wheels before and never will again. I took the whole tuning unit to pieces and copied every single part. The gear wheels I made by clamping the gear wheel from the original set onto a piece of brass of the right thickness and size; I put them into the vice and cut all the teeth by hand with a junior hacksaw and a very fine oval file. I think there were about a hundred teeth. The other four wheels were just as difficult but I got them right in the end. It only took a fortnight.

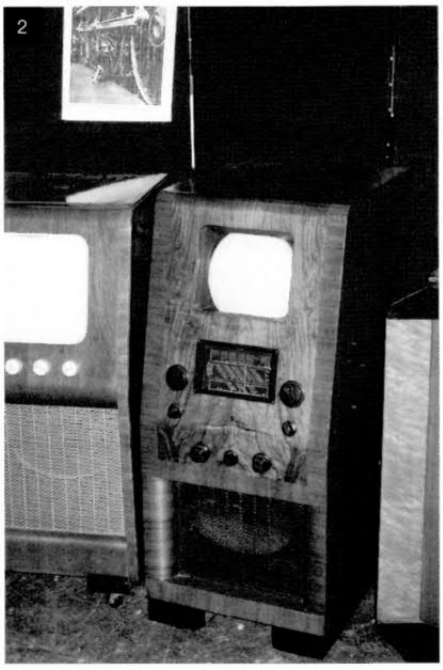
The rest of the set is fairly straightforward It is called the superinductance set because it was designed to have the sound quality of a straight set with the selectivity of a superhet. This is achieved by the use of special coils that are wound on glass formers with litz wire and then placed in large copper cans. The two front coils are in bandpass configuration and feed into a VM pentode. The third coil couples the VM pentode to the second valve (also VM pentode). The fourth coil couples the VM pentode into a strange valve specially designed for the job. It is a straight pentode with a diode incorporated; this gives AVC to the early stages. The sensitivity of the low frequency end of the dial is compensated by the potentiometer ganged to the end of the tuning condenser: this is connected to negative bias line and controls the gain of the first valve.

The dial light is worthy of note; it is a six–volt Austin Seven side light bulb. On four volts it works quite well giving a pleasant warm glow; it probably lasts forever. Although I love Philips sets I don't think I'll make another one. I will probably do a Premier kit set.

A visit to Alexandra Palace by Peter Carlton

On 15th June 2005 I was able to visit Alexandra Palace and see what conditions were like inside the BBC wing. It was a real privilege to be able to visit the Palace and to take the photographs, included with this article. It involved over a 4½-hour drive each way, so it was destined to be a long day.


1


2


3

We set out in the early hours of the morning, around 3.30am, and took a steady drive to AP. When we got near to the Palace the aerial could be seen from quite a few miles away. It was a thrilling feeling to be approaching the birthplace of the world's first regular high definition television service!

Approaching the Palace you cannot help thinking about all of the television pioneers and early presenters who worked at AP. Names such as Leslie Mitchell, Jasmine Bligh, Elizabeth Cowell, Sylvia Peters, McDonald Hobley, Mary Malcolm and so forth, plus of course all of those who worked behind the scenes, such as John Logie Baird for example. The Palace holds so much history. Thoughts of Muffin the Mule, Bill and Ben also bring a smile to your face, similarly thoughts of The Quatermass Experiment, transmitted live from Studio A can still send a chill down your spine.

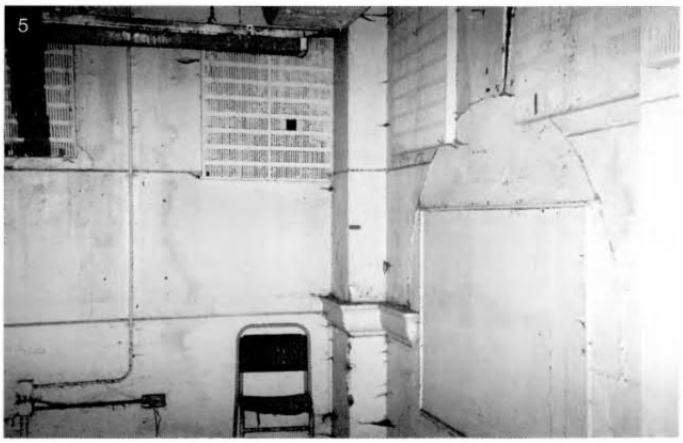
We arrived at the Palace after the long journey and made our way to the Phoenix Bar; it's very nice in there and the coffee was very good! After a while we looked around the Palm Court and took some photographs.

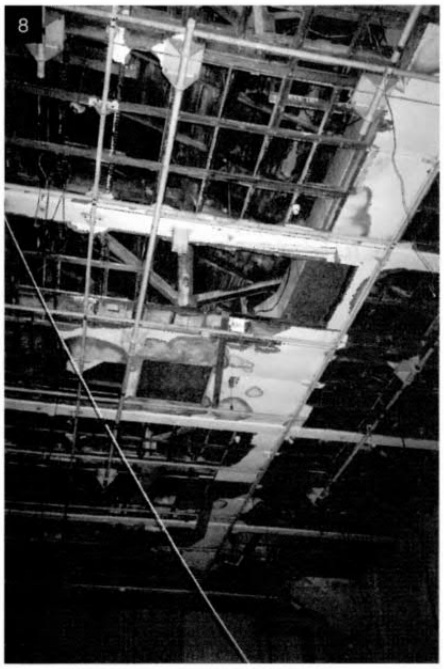
A short while later we made our way to the BBC Tower Reception. There was scaffolding up the day we were there as the outside of the Palace was being re-pointed – a good sign; hopefully this will lead to further restoration in the future!

We made our way up the staircase which goes around the original 1930's BBC lift and we arrived at the side door to Studio A. Simon Vaughan and John Thompson have been doing a superb job with Studio A and there are some brilliant displays in there; a great selection of television receivers and wireless sets, some real rarities, such as an original Baird Television Ltd Cathode Ray Tube, reproductions of the 1930's Emitron cameras and even a switchboard just like the one used for Picture Page way back in 1937. The walls also have various items of interest, many from the former television display in Bradford plus other items of interest found at Alexandra Palace itself. I was very sad to see that the original BBC "Staff Vacancies" notice board, which was still present when I visited in 1992 has now gone. Thank goodness I photographed it at the time!

Structurally Studio A looked pretty sound at present. The ventilation shafts had been sealed off due to a possible asbestos risk, which, I suspect, is very minuscule. The walls and ceiling all looked pretty good and the wall next to the original main corridor looked to have recently been re-covered in plasterboard. The studio doors complete with portholes are all present in Studio A and are great to see. Sadly they do not open at present, but at least they are still there. You cannot help but get a feeling of the hugely important role that AP played in television; echoes of Helen McKay and Adele Dixon can still be heard in your mind when you enter the studios. It also brings the BBC film "Television Comes To London" to life as you can so clearly

1: Aerial viewed from fire exit on studio floor
2: Prewar TV receiver
3: Mirror lid TV receiver (reproduction)
4: Main stairway
5: Control room above main studio
6: Main corridor
7: Equipment room for studio
8: Studio B ceiling





see the places featured on that film. There is also a very nice 1938 television receiver on display in Studio A which greatly adds to the feel and interest of the studio. Seeing television receivers in the studio, which would have actually received the transmissions from that very studio, really adds to the feeling of interest and importance that Alexandra Palace holds in the history of television.

From the far side of Studio A you then pass through a door which leads to the EMI control room. Here real decay can be seen which seems to get progressively worse the further down the building you go. The EMI control gallery is still in place but, aside from Studio A, the rest of the BBC wing seems to have been littered with unwanted desks, chairs, filing cabinets and office furniture, which is very sad, it has basically been used as a rubbish dump. Plaster is missing from the walls and vintage electrical controls and isolators can be seen in this and other areas of the BBC wing.

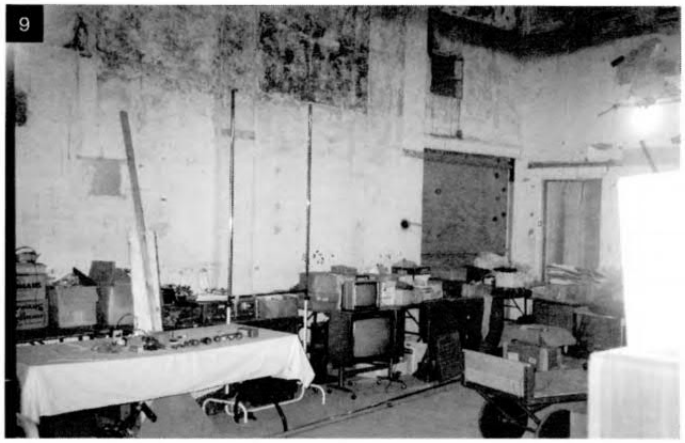
From the EMI control room you pass into the Baird Spotlight Studio. Conditions here are, again, quite poor. There are many signs of rain damage and pigeon damage, plaster has fallen off of the walls and ceiling in various places and lumps of plaster just hang waiting to fall in some places.

Next you enter the Baird Control Room. This is quite similar in condition to the Spotlight Studio and EMI Control Room. An original frieze can also still be seen on the wall. There are wires hanging down in various places where equipment has just been ripped out. Amazingly you can still access the balcony on the outside of AP between Studios A&B where some of the first outside broadcasts were performed before the war.

Next you enter Studio B; sadly this is probably in the worst condition of all, and the ceiling is virtually all down and exposing the roof space, the ventilation ducting and the roof. The walls are similarly bare and crumbling; however on the wall next to the original main corridor there are a number of original friezes dating back to the 1930's which, I suspect, were covered over with the asbestos soundproofing which has now been removed. At least these still thankfully survive. There are a number of small rooms to the front of Studio B; these are all in a poor way, wood is rotten and water can be heard dripping when it rains. It is so sad to see the birthplace of television so neglected.

The next area of great interest is the main corridor, which runs between the studios and the make-up and dressing rooms. This looks to have suffered some damage from water. A suspended ceiling was fitted, probably in the 1950's; this has all fallen down and now exposes the original ceiling which still has the original 1936 light fittings complete with shades and bulbs! The original BBC carpet still exists: sadly though it is covered in various piles of plaster where different parts of the ceiling have come down over the years since the BBC vacated Alexandra Palace in 1981. The original "On Air" lights can still be seen above all 3 doors to Studio A; however, sadly, the lights for Studio B have been stolen at some point, as have some of the portholes in other areas. Original 1930's light switches and isolators can still be seen in various places.

There are numerous rooms off the main corridor. The original make-up and dressing rooms still exist, they are pretty much stripped bare, but generally speaking condition is quite good with most walls and ceilings intact. One fascinating room is the original Power Distribution Room for the two studios. This houses a massive array of fuse boxes, switches and controls to feed the power to both studios. There is a dial and meter which shows the voltage being fed to the two studios, I was absolutely amazed to see that this was all still live!! The lighting in Studio A is fed by vulcanised rubber cables and


9


10


11


12

13

there are also a number of cloth covered cables to be seen. The vulcanised rubber cables still carry the current for the lighting and, I suspect, many of the other cables are still live as well. Similarly the lighting strung across the wall of Studio B is also powered by vulcanised rubber cable.

On the opposite side of the corridor there are various offices which, I expect, were probably used by the BBC until they vacated in 1981. There is evidence to show that various offices were used for news production and schedules still hang on the walls. There are also modern style phone sockets in the offices, which suggests that they were in use up until a few years ago. There is a group of offices which have a very 1960's look to them. I suspect these were refurbished by BBC Television News in the late 50's or early 60's.

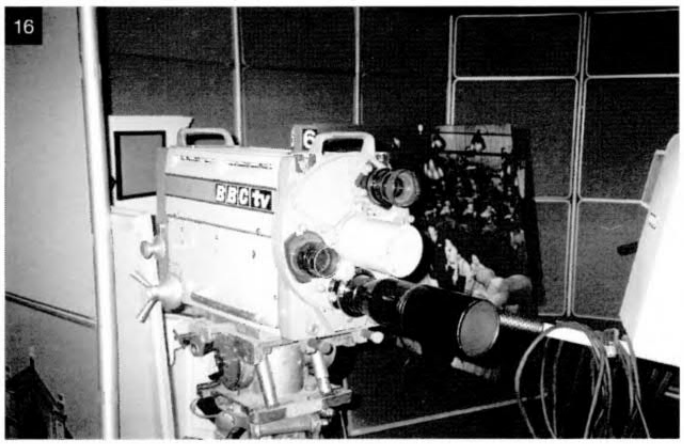
One very interesting, and also very sad thing to see, is the original main BBC staircase to the studios. It is still there and pretty much intact, but a huge heating shaft has been installed right up the centre with ducting going off in various directions. The staircase itself is a stunning one with beautiful wood turning. It's a miracle really that it has survived intact and wasn't ripped out when the updated heating was installed.

Off the staircase is a very interesting area. There is an original indoor Bowling Green complete with what looks like a small cafeteria. From what I have been able to find out, this was in use from the 1920's right through to the late 1980's and during the television years, members of the bowling club would occasionally wander in to the studios and associated areas used by the BBC. The floor of the bowling green is in a very bad way, being very rotten with various boards missing, but interestingly there are some very old theatre seats in there which, I did wonder, may perhaps have come from the Victorian Theatre at the back of the Palace? Another little interesting feature in this area is the original black GPO dial phone on the wall displaying the old London telephone number for the bowling club, namely 01 883 6067. Other scoring devices and markers and light fittings suggest to me that it was probably installed in the 1930's, perhaps around the same time as the BBC installed the television equipment or a few years earlier?

On departing from Studio A we then took a ride in the original BBC lift down to the ground floor. The lift is still totally original, complete with folding concertina doors and control knobs. It works very well and gives a very smooth ride. It's fascinating to ride in the lift and to think how many famous people have ridden in it before.

Aside from the studios, on lower floors there is also the original BBC staff canteen, the transmitter halls, the film viewing area/ cinema and the basement which is still full of vintage equipment including early television receivers and even an experimental 405-line NTSC colour receiver. One area which does look to have been restored are the offices in the BBC tower. I last visited the Palace back in 1991-2 and these were quite neglected; however, now they are in use by the staff at AP and look to be well cared for. Similarly the aerial is still used as a local relay for London and so, thankfully, that is also maintained and is in good order. The original outriggers have gone but everything else remains in original condition.

The whole of the BBC wing is fascinating; it's a little like being frozen in time. There is so much evidence of the original installation of 1936 still visible, and you can also see how things have changed over the years. The BBC were at Alexandra Palace from late 1935 right through until 1981. Originally the Palace was the headquarters for all television broadcasts, later it was used for BBC Television News and then



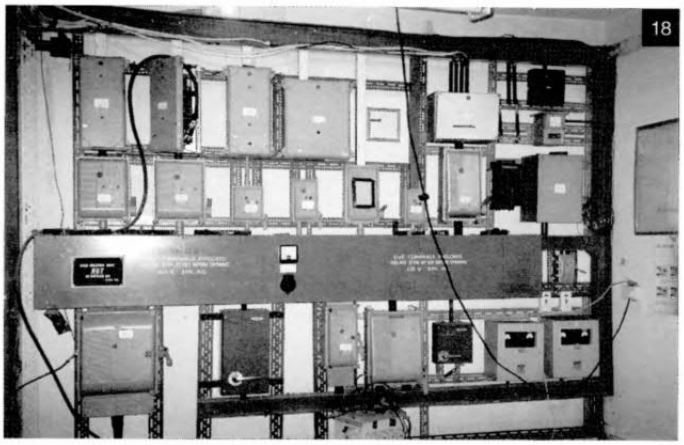
9: EMI control room showing exit to main corridor
10: EMI Control Room - Looking down from control gallery
11: Baird control room showing exit to main corridor
12: Baird spotlight studio showing exit to main corridor
13: BBC entrance to Alexandra Palace
14: Model of Alexandra Palace inside reception
15: Exhibits in Studio A
16: Original BBC studio camera in studio A
17: Display in Studio A

it was used for the Open University right up to 1981 when they left and moved to Milton Keynes. AP has seen a fascinating history and it plays a hugely important part in television history, because it wasn't simply the site of England's first television station, it was the site of the world's first regular high definition television station, and this is hugely important historically.

As things currently stand the television wing is in quite a poor way. Studio A looks great with the display of items historically important to television history, but what is really needed is for someone to step in and save the BBC Television Studios at Alexandra Palace. The studios and associated rooms need to be recognised for their historical importance before it is too late.

Currently Alexandra Palace is only Grade 2 listed, which means only the exterior shell is listed. This means that a developer could come along tomorrow and gut the building and turn it into flats, a night club, bar or whatever else they fancied; then the very birthplace of television would be lost forever. Similarly the Victorian Theatre at Alexandra Palace is an amazing survivor. It was used by the BBC to build props and it is amazingly intact, even down to the intricate stage machinery.

It is some miracle really that the studios and associated areas have survived these 70 years, but they are decaying, and, from the look of Studio B, quite quickly. The two studios and associated areas would make a perfect television museum, and really need recognition for what they are. At this stage the BBC wing of the Palace is not too far gone to be restored; how tragic it would be if things were left and it decayed beyond the point of being able to be saved, or if someone were to come along and gut the whole area of the Palace. The whole of the Palace has a wonderful mixture of the original Victorian features combined with the 1930's features installed by the BBC. Television really put Alexandra Palace on the map, and it is known all over the world as the birthplace of television. I really feel that positive work to turn it in to a television museum would be welcomed by people all over the world and it would, once again, put Alexandra Palace back on the map. It must be remembered here that what we have are the oldest High Definition television studios in the entire world, not just England, yet at the Palace you cannot even buy a postcard of this wonderful building. This is a vital piece of history, but currently, no one with any power to do anything about saving it, is stepping in. It would be a tragedy if these original studios were lost and only then, some years later, someone says "Why weren't they preserved???" It's very similar to the mass junking of the BBC and ITV archives which took place in the 1960's and 70's. By the time people thought about saving the programmes it was too late, they were gone. The studios at Alexandra Palace are still there, but only just. Some serious action needs to be taken BEFORE it is too late; crying about it once they are lost will not bring them back. I do not feel that it can be said too many times that these are the first High Definition Public Service Television Studios in the entire world and deserve preserving as much as any other historical building. Television is a part of so many people's lives, its beginnings need to be preserved. The birth of television only happened once, it will never happen again. It would be so good on 2nd November 2006 to see some positive commemoration of the 70 years of BBC Television at AP by some definite news and commitment by those able to preserve the studios. There have been plans to re-transmit 405 Line Television on the original frequencies of 45 mc/s for vision and 41.5 mc/s sound from Studio A at Alexandra Palace, this would be a superb



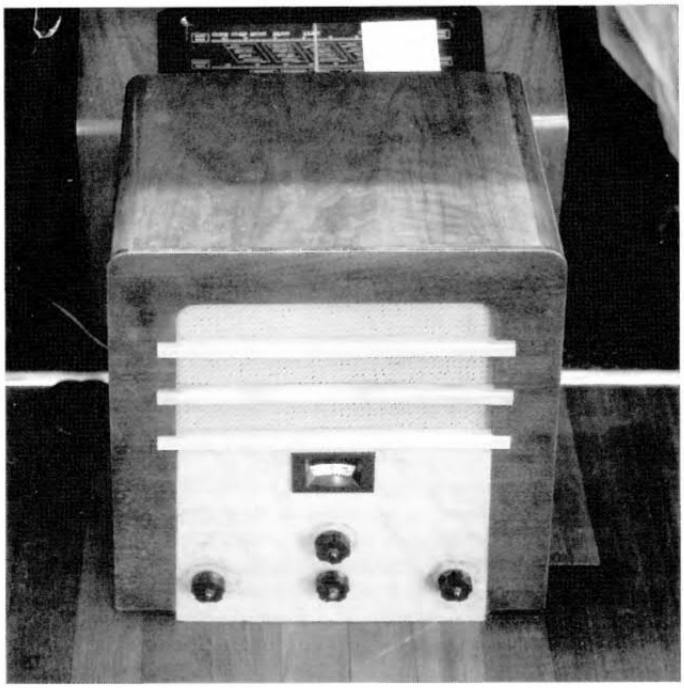
18: Power distribution board for studios A & B
19: Studio A Display
20: Changing room
21: Studio A display including switchboard and Emitron Cameras
22: Main door from inside studio A
23: Studio A

tribute to the inventors of modern television as we know it. It would preserve the heritage of British Television and it would also help to educate younger ones about the history of television and allow them to see, hands on, what television was like and how superb the 405 line system is. If 405 Line Television Heritage Transmissions from Alexandra Palace were to take place it would surely create a lot of interest from many groups and would bring more life to the studios as well as being a special feature of any future television museum at the Palace.

One final thought. It would also be very nice to see some form of video or DVD release of the surviving pre-war and early post-war TV related footage, such as "Here's Looking At You" (1936), "Television Comes to London" (1936), "Television Demonstration Film" (1937), "Televising The Coronation" (1937), "Television Dress Rehearsal" (1946), "Television Is Here Again" (1946), "How Television Came To The Midlands" (1949) and other such footage. I am sure this would be widely welcomed by other members and enthusiasts if these recordings were to be made available. This footage is all important history regarding Alexandra Palace and early television and many people will never have had the opportunity to see it. So many little gems from pre-war and early post-war television have turned up over recent years, sadly though for most people the chance never arises to see any of them.

Images from Harpenden, Winter 2005

by Carl Glover



A Quart from a pint pot part 1 by Anode Current

From the start, wireless constructors have tried to get the most from their expensive equipment. The valve with its royalties was costly for the ordinary amateur builder and, if it could do two jobs at once, that was a bonus. So, the reflex circuit became popular. With care, the valve could amplify separately the RF and AF (then called HF and LF) at the same time. For this to happen without mutual interference it had to be operated, as far as possible, on a linear or straight part of its curve. This meant it could not easily be used as a detector (rectifier). The usual crystal, therefore, still had a place in the circuit (Fig 1).

Later, reflex circuits were exploited commercially in low cost receivers, during the years of pre–war depression.

The wartime utility receiver saved an extra valve stage by similarly using a Westinghouse metal detector after the IF circuit.

Another way of getting more for your money was the popular use of reaction (regeneration in US writing). Here, a little of the valve's output would be fed back, to add to, and so boost its input. Steps had to be made to reverse its phase, to suit. (A positive going signal to the grid will appear negative going at the valve's anode). So done, one valve could at least equal two, – with the useful attraction of much sharper selectivity.

More out of the Pint pot!

The useful audio output of the first valve detectors was very limited and soon power valves were developed to improve this. Their low impedance (anode resistance through the valve) allowed more current to flow, and an easier match for the loudspeaker. However this meant a wider mesh grid and so less voltage amplification. Often an extra amplifying stage was needed. Alternately a high ratio intervalve transformer could be used but this was very expensive.

With mass production, the cost of valves and components became, in relation to the early days, much cheaper. As a consequence, and to make receivers more consumer friendly, wireless sets had more valves.

One handed tuning required ganged RF stages. For RF amplifying purposes the triode is limited. The capacity inside the valve between the anode and the grid, though small, allows RF feedback which reduces amplification, – and if associated with tuning circuits may cause self oscillation. The early cure, and most popular, was to reduce the gain of each stage by damping with resistors of just a few thousand ohms. This meant the gain per valve would be of the order of three times only. Several valve stages were clearly needed for a decent amplification. Yes, it was possible to feed back a negative going voltage just sufficient to cancel the initial problem, but this was troublesome.

The increased number of valves required more HT current, and this was a problem. Listeners with money to spare could purchase the rechargeable Milnes Unit. This was costly and required careful maintenance. There was no problem with mains driven sets, but battery receivers were still popular. The young son was routinely sent to the local garage on Saturday morning to bring the recharged LT 2 volt accumulator so that Dad could listen to the football in the afternoon. The HT battery remained an expense and had to be budgeted for.

To reduce the number of valves needed, the Screen grid was introduced. An extra grid was needed between the anode and the normal grid. It was kept positive to attract electrons – most of which were allowed through the grid towards the anode. From the RF point of view it was kept at earth

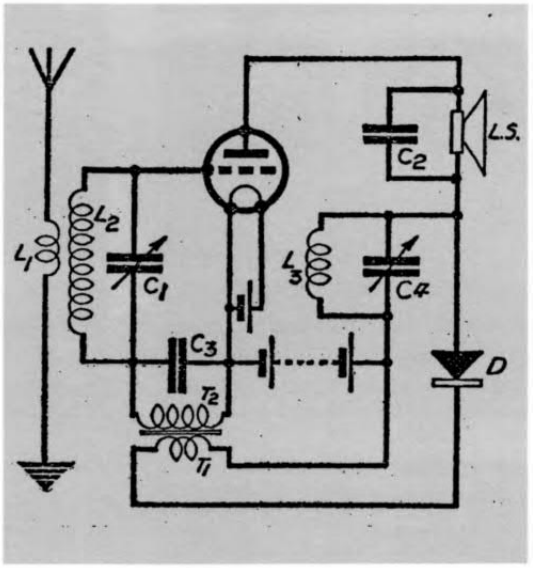


Fig 1: The incoming RF signal is tuned by L2 and C1 and is passed to the grid of the valve. An amplified version in L3 and C4 (via C2) is detected by the crystal, and the audio component passed back to the grid by the transformer, for further magnification.

Fig 2: (Below) Motif and trade mark on gold sprayed label.

The young son was routinely sent to the local garage on Saturday morning to bring the recharged LT 2 volt accumulator so that Dad could listen to the football in the afternoon.

potential by a condenser, or through the HT return.

Any feedback from the anode was intercepted by the screen, which therefore shielded the usual grid. A bonus to this was that the amplification factor was much higher than that of a triode. Since the anode was shielded from the input part of the valve, its load could be made high; many hundreds, instead of tens, or thousand ohms of the triode.

One good Screen Grid stage was ample for most wireless sets, replacing three or more triode stages.

A Quart from a Pint Pot!

The output valve was always operated as a Class A amplifier. To accommodate the negative going part of a signal, as well as the positive one, the valve was biased to operate at the centre of its best linear characteristic curve, the anode currents averageing out during alternate parts of the audio cycle. This means that there was always an anode current drain on the HT battery – regardless of output.

The typical Marconi and Osram LP2 consumes 10mA at 150 volts HT and manages 0.15 watt output. An anode input of 1.5 watt gives an anode efficiency of only 10%.

The need to reduce this wasting of anode current during quiet audio passages brought the development of the Class B valve. Here, the triode grid was arranged to give at zero (or near) bias a standing current of only a milliamp, or thereabouts. So, little wasteful drain.

The positive going signal would lift the bias and so allow a productive current to flow. But wait, another Class B triode, usually in the same glass envelope would then be needed to accommodate the negative part of the signal. Unfortunately, an extra driving stage would then be necessary to carry the grids above zero bias where they will have a finite resistance (conductance) and consume power.

In Class A audio use the grids, being negative, will have an input resistance of Megohms, and can be ignored from the power requirement point of view.

Nevertheless, an efficiency of 50% could be obtained, with overall saving in HT consumption. More for your money!

The penalty for this is 'quantity, not quality'. The signal–change over, as one valve closes down and the other starts to conduct is not perfect. At this point, near zero bias, the characteristics

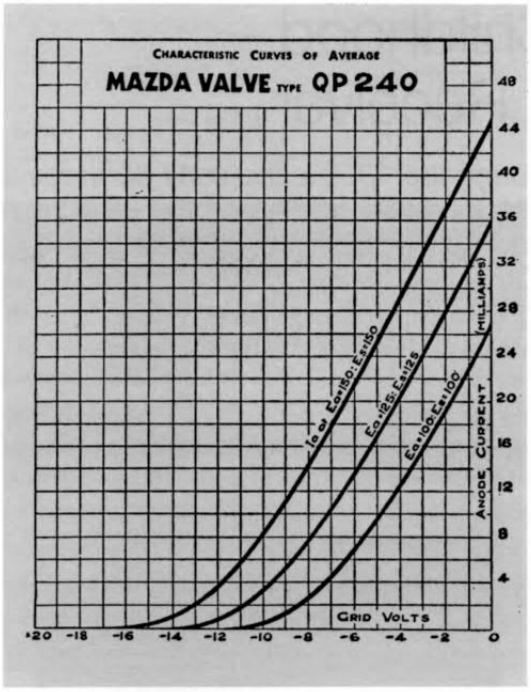


Fig 3: (Right) The 1934 Mazda Quiescent Push–Pull will give 2 watts output. The graph gives the anode current charecteristics of one half only, of the double valve. With a negative bias of 11.5 volts and a grid to grid swing of 23 volts, the positive going signal can cover almost all of the curve. An average of 24 milliamps is the maximum

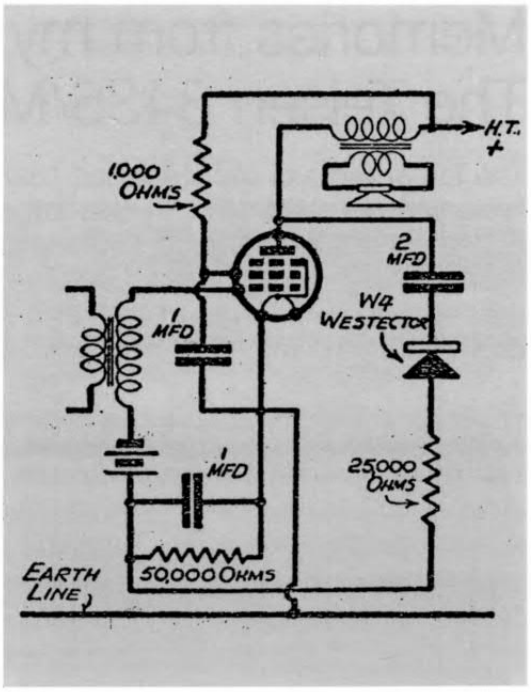


Fig 4: (Far Right) An economiser circuit using the Westinghouse Westector

A few years ago, public address amplifiers in use at sports days and field events, running from the loudspeaker van would well illustrate this. Often though, it was simply overloaded.

of the curve are not so linear as they should be. Fortunately, this distortion takes place at low volumes – which happens close to low grid volts.

A few years ago, public address amplifiers in use at sports days and field events, running from the loudspeaker van, would well illustrate this. Often though, it was simply overloaded.

A small diversion now. Before moving to another part of the country, the writer and Co. took a furnished flat. The landlady was exceedingly frugal. Part of the furnishings included a small battery radio. This was before the days of TV, it was a Vidor I think, about as big as a lunch box, the sort with a lift–up lid and miniature valves.

We were frequently encouraged to have the volume at no more than a whisper. It seemed that the lady disliked noise. Then the 'penny dropped'. It was, in her view, to conserve the battery. She obviously remembered the earlier days when more volume meant more HT consumption. Shades of Class B sets. I did say she was frugal!

From the screen grid the pentode valve was developed. The Screen Grid was good for RF stages, where the signal is small, but for audio purposes its output is limited. With large audio outputs the anode voltage – on load – could swing below the screen voltage. The screen now, being more attractive picks up some electron current which ordinarily would have gone to the anode. A third grid, added between the screen and anode and kept at earth (cathode) potential cancelled this problem.

Alternatively, beam plates or careful electrode spacing could be used as in Harries 'Critical Distance' valves and 'Kinkless Tetrodes' etc.

The popular Mullard Pentode PM22A consumes 5.6 mA at 135 volts HT and gives 0.34 watts of audio. The anode input is 0.756 watt and this is an efficiency of 45% which is good. However, the screen will also use HT current, which is a waste. Unfortunately, the downside for this is more distortion. The higher anode impedance (as for the screen grid) meant a consequent high output load. The output circuit, including a transformer and loudspeaker will have an inductive component. This will present an increasing load with the higher frequencies – and so, more 3rd harmonic additions etc.

(increasing the anode load of a triode improves its fidelity because the load–line uses a better part of its curve).

Worse, the high load, reflected through the loudspeaker means less damping of the pre–war loudspeaker resonances.

The partial cure was the tone correcting condenser, placed across the load. Hence the expression 'Pentode Tone' of yesteryear, Fig 2 a misnomer?

To get similar HT efficiencies as in Class B valves, but without the need for the extra driving stage, the quiescent Push–Pull valve came along. The valve grids were biased negatively to remove grid current as before, but the triodes were replaced by the much more sensitive pentodes. Again a class B valve, but without grid current and marketed as Quiescent Push–Pull (often described in valve books as: Class B^1), the penalty again being some distortion.

A good representative of this development is the Mazda QP240. This gives the remarkable output of 2.25 watts, which is as good as the contemporary mains receiver (Fig 3).

The no signal current, with 150 volt HT would be about 2mA and up to 24mA for its rated output. The anode input at 150 volts is 3.6 watts, giving an efficiency of 62.5%. But don't forget – also a screen drain loss of about a watt.

The development by Westinghouse, in the early thirties, of a small metal rectifier for higher frequencies, offered another solution to getting more out of your HT battery (fig 4).

A portion of the power valve's audio output was rectified to provide a direct voltage. The value of this depended on the amount of sound required.

The valve was overbiased negatively to leave a small standing current – sufficient for low volumes. The rectified DC voltage produced by an increased sound output was arranged to reduce this over biasing.

This allowed the anode current to rise to more normal values, enough to handle the louder passages. 'Pulling itself up by its bootlaces' – no less.

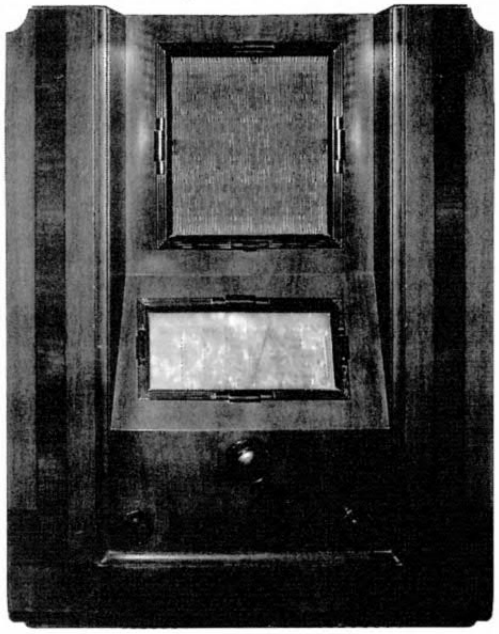
With these economies, a three valve battery receiver with reaction, or a small four valve superhet would give quite adequate sitting–room reception in broadcast service areas, and easy on the batteries.

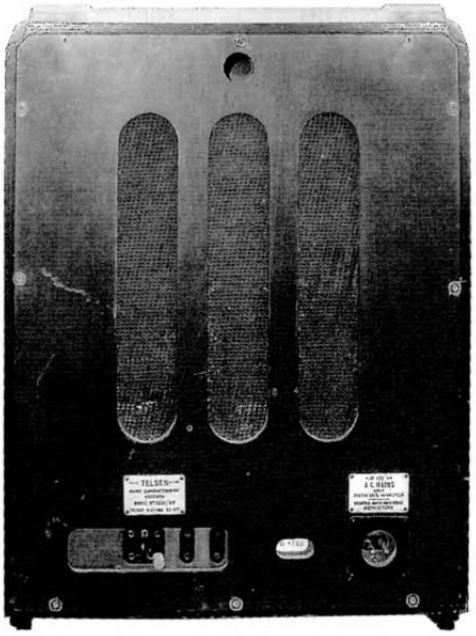
Getting a quart from a pint pot, or should it be getting a quart into a pint pot?

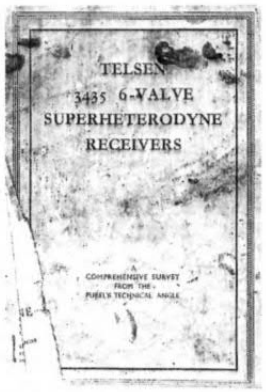
Memories from my Childhood – The Telsen 3435/MV Receiver

by Mike Butt

The family radio of my childhood years during the 1950's and early 60's was a Telsen Model 3435/MV. My late father obtained this set, secondhand, from a country house sale around 1950. Installed on a shelf specially provided for it in the front room of my parents' cottage in Devon, it was switched on first thing in the morning and, tuned to the Light Programme on Long Wave, would remain on until the evening (until bedtime, before we had a T.V. in the mid-50's).



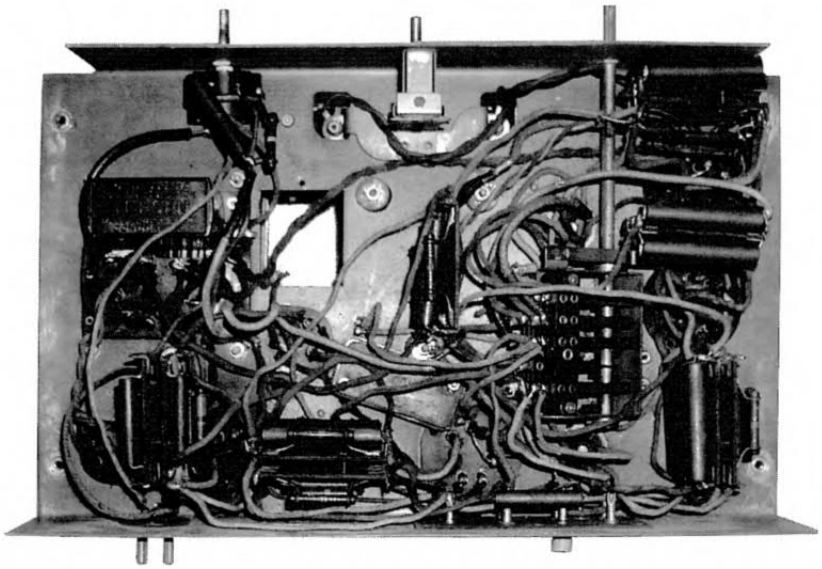




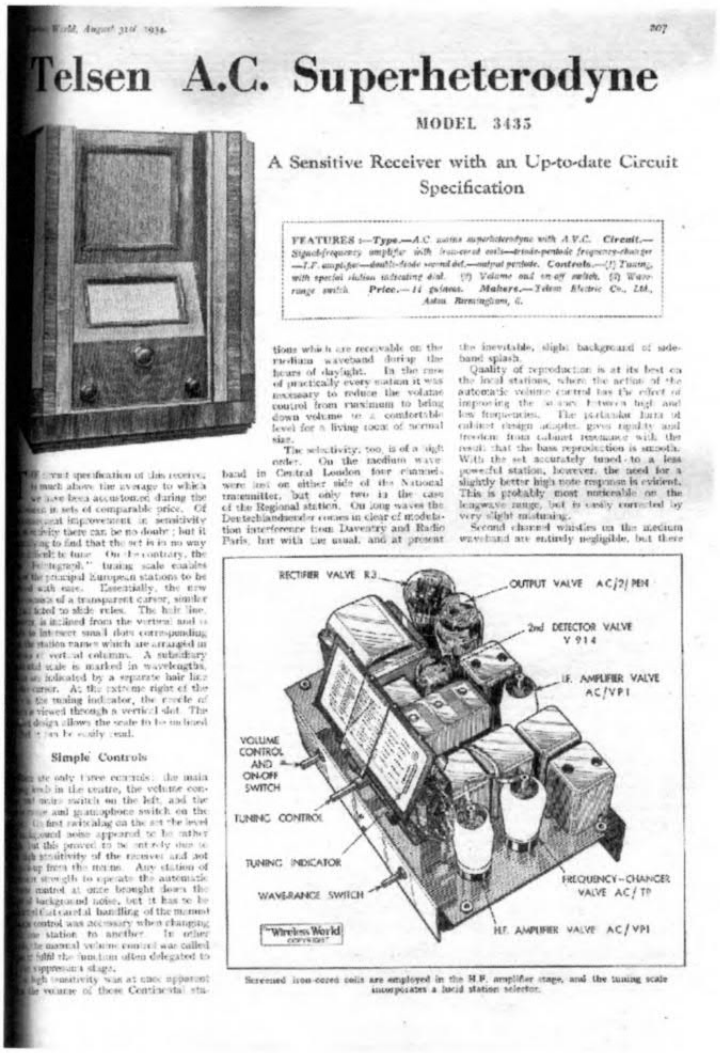
It would bring us all the well-remembered programmes of the time. I can remember Children's Hour, Workers' Playtime, etc. Later, I was told, and believed , that it would not get Radio Luxembourg as this was below the tuning range; as Luxembourg was on 208m and the set went down to 200m this was probably one of my Dad's "stories", as he would not have liked that type of music at all. The aerial was a vertical long wire which led through the corner of the nearest window to the chimney on the end of the cottage, attached at the top to a conical wire cage about 18 inches high which was screwed to the chimney.

The set lasted until early 1965, when something went wrong with it and my Uncle, who repaired radios, had a look and declared it not worth repairing. I had begun to take an interest in radio and electronics shortly before and so was given the set to take apart, the cabinet being used for fire wood. I don't believe there was much really wrong with it, the mains transformer was O.K. as I used it in a power supply. Valves were still in general use at the time, but I didn't have any information about the ancient ones in the set. I also remember being amazed by their size and the size of the I.F. cans compared with the more modern ones I had been taking out of T.V. chassis. I still have the two AC/VP1's from the set. When I started collecting radios, I wanted to find a replacement 3435, but as the set seems fairly rare nowadays, it took me some years to obtain one at a Harpenden swapmeet.

The set was made by the Telsen Electric Co, of Aston, Birmingham. This company became involved in producing radio components for the home constructor's market in the mid 1920's, the range of 'Radiogrand' intervalve transformers being especially popular,



judging by the number that survive. In the early 1930's the company made a few radio models, for example the model 474 and 'MacNamara' (both mains TRF's in wooden cabinets, the latter being named after the managing director) and a range of 3 battery sets (S91, S92,S93) in ornate Bakelite cabinets. The 3435 range of superhets, released in 1934,must have been the last, as the company was wound up in the same year. There were five models in the series, two mains and two battery receivers in horizontal and vertical style wooden cabinets and a mains radiogram. My family's set was



Telsen A.C. Superheterodyne

MODEL 3435

A Sensitive Receiver with an Up-to-date Circuit Specification

FEATURES :—*Type.—A.C. mains superheterodyne with A.V.C. Circuit.—Signal-frequency amplifier with two-speed tuning—triode-pentode frequency-changer—I.F. amplifier—double-diode second det.—output pentode. Controls.—*(1) *Tuning, with special station indicating dial.* (2) *Volume and on-off switch.* (3) *Wave-range switch. Price.—11 guineas. Makers.—Telsen Electric Co., Ltd., Aston, Birmingham, 6.*

tions which are receivable on the medium waveband during the hours of daylight. In the case of practically every station it was necessary to reduce the volume control from maximum to bring down volume to a comfortable level for a living room of normal size.

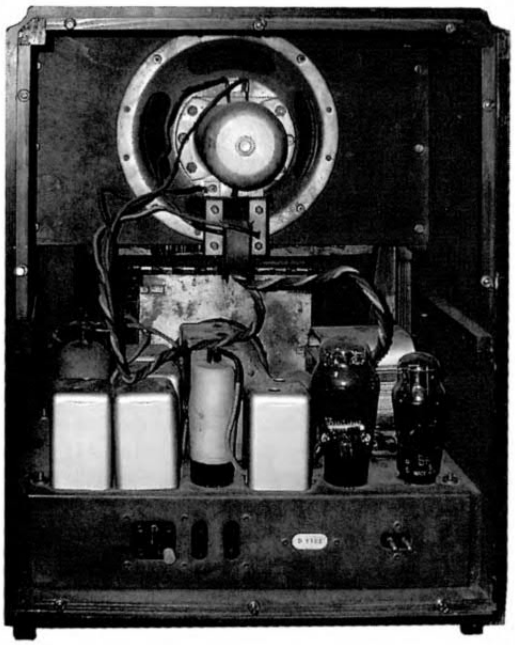
The selectivity, too, is of a high order. On the medium waveband in Central London four channels were lost on either side of the National transmitter, but only two in the case of the Regional station. On long waves the Deutschlandsender comes in clear of modulation interference from Daventry and Radio Paris, but with the usual, and at present the inevitable, slight background of sideband splash.

Quality of reproduction is at its best on the local stations, where the action of the automatic volume control has the effect of improving the already fuller bass and less frequencies. The particular form of cabinet resign adopted gives rigidity and freedom from cabinet resonance with the result that the bass reproduction is smooth. With the set accurately tuned to a less powerful station, however, the need for a slightly better high note response is evident. This is probably most noticeable on the long-wave range, but is easily corrected by very slight mistuning.

Second channel whistles on the medium waveband are entirely negligible, but there

Screened iron-cored coils are employed in the H.F. amplifier stage, and the tuning scale incorporates a lucid station selector.

Simple Controls



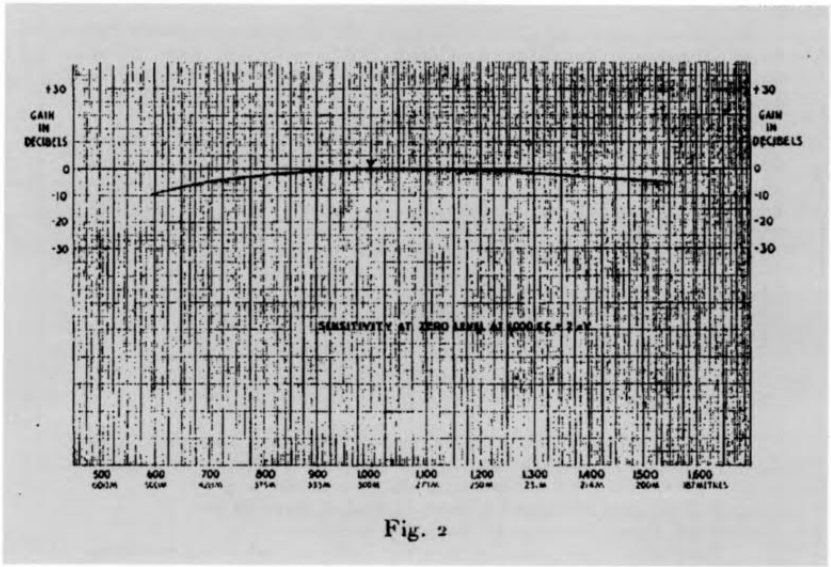


Fig. 2

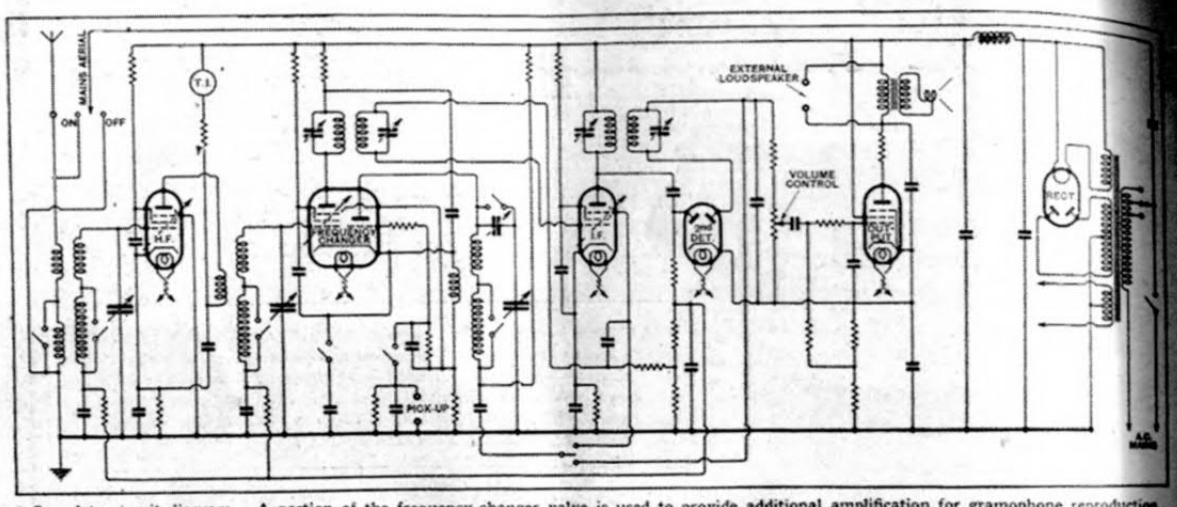
a vertical style mains model (3435/MV). The set was a five valve + rectifier superhet, using the latest range of Mazda valves in the signal stages. The first stage was an R.F. amplifier (AC/VP1) followed by a triode-pentode frequency Changer (AC/TP) , an I.F. amplifier (110kc/s, AC/VP1) which fed a double-diode detector, one diode providing A.V.C. for the previous stages, the other the audio feed to the high-slope output pentode (AC2/PEN). The rectifier was a S.T.C. R2, the only non-Mazda type.

A tuning meter was connected to the anode feed to the R.F. stage. (I was always puzzled by the vertical scale on right hand side of the dial of my parents' set. This puzzle was solved when I dismantled the chassis and found the remains of a badly damaged meter with no pointer!).

Telsen published a technical booklet about this receiver range (Sub-title "A Comprehensive Survey from the Purely Technical Angle") which gave, rather unusually, an overview of the circuits employed, with a circuit diagram of the mains models and specifications, and graphs for selectivity and sensitivity, stating "For the first time, detailed information of the performance of a commercial receiver is placed before the public". Sensitivity for the mains models was given as an impressive–sounding 2 microvolts at 300 metres ("comparison has shown that the sensitivity is more than twice that of the best receiver of similar type hitherto available"), for what output or signal-to-noise ratio not stated. It was stated that a local/distant switch or control, used on other sets of the period, was not needed as the set did not overload until the input signal was well over the 1 volt level.

The mains model was also reviewed in the August 31st, 1934 edition of "Wireless World" ("A Sensitive Receiver with an Up-to-Date Circuit Specification"). The review was, as usual with "WW" reviews of the time, very favourable, the high-note response was criticized for lower strength stations, especially on L.W., slight mis-tuning being recommended to improve this! There is also a "Trader" sheet for the mains models, number 592.

The replacement 3435 I bought at Harpenden was in generally good condition, the cabinet had no woodworm and did not need refinishing. The LW/MW/gram knob had split and had been glued together, and the volume knob



Complete circuit diagram. A portion of the frequency-changer valve is used to provide additional amplification for gramophone reproduction.

was an isolated whistle of moderate strength at about 1,250 metres on the long-wave range, probably due to the second harmonic of the I.F. oscillator.

phone reproduction has been solved by utilising the triode oscillator portion of the frequency-changer valve as an amplifier. Oscillation is suppressed by connecting a

The use of iron-cored coils in association with the signal frequency amplifying stage is noteworthy. The oscillator coils, however, are of the air-cored type.

was incorrect, only the large tuning knob was right. I have since found a wave change knob in good condition, but still have to find the right volume knob (marked "Off" and "Vol" on two of the side faces, so if anybody has one!). I have replaced it with the nearest match I could find, the original knobs had grub screws but no metal collar, and sometimes split when the screw was tightened.

The original smoothing electrolytic pack had been replaced, not surprisingly, with two grey plastic covered 50's RS type individual capacitors, but everything else seemed untouched on the chassis. On preliminary testing, however, I found that the mains transformer had shorted turns and would need rewinding. I had access to a fairly basic coil-winder at my place of work at the time, Thorn-EMI Electronics at Wells, and so stripped down and rewound the transformer with the nearest gauge enamelled wire to the original windings I could find at four turns per volt (determined from the turns on the heater windings).

The other components that I tested in the set, were, somewhat surprisingly, in good order, with the exception of the tuning meter coil, which measured open-circuit. Most of the resistors and capacitors (condensers!) are mounted on square black tagboards, four components per board. The resistors have flat spills at each end which are held to the contacts on the board by solder alone; the capacitors are contained within thick S.R.B.P. tubes, I haven't seen this style of component on any other set, presumably they are of Telsen's own manufacture.

After re-installing the rewound transformer and testing the valves, which were serviceable, I gingerly powered the chassis up via a Variac and the set came to life, the tuning meter coil having magically reconnected itself; presumably the end connections had become oxidised. The set performed reasonably well, the replacement electrolytics are still usable, the only component which gave trouble was the wave change switch, a substantial-looking assembly of individual contacts which after all my attempts to clean and adjust, still is occasionally troublesome.

Overall, however, the set works well and I am pleased to have in my collection an example of the radio that I remember from my childhood days. I have even installed one of the AC/VP1 valves I saved. The emission of this valve was 100% when tested after more than 30 years of daily use!

Specification for Models 3435/MV and 3435/MH

Multi-stage all electric superheterodyne embodying seven tuned circuits for A.C. Mains 200/260 v. 25/40 and 40/100 cycles; Consumption 80 watts. Six indirectly heated valves, Mains Rectifier, H.F. Pentode, Triode Pentode, I.F. Pentode, Duo Diode and High Slope Output Pentode giving a maximum undistorted output of 3½ watts.

Available in two types of cabinet. Upright Table Model 3435/MV and Horizontal Table Model 3435/MH. A Pedestal to carry the Horizontal Model can also be supplied.

The circuit (diagram at foot of page 16) comprises a preselector High Frequency Amplifier employing highly selective iron cored inductances followed by a Triode Pentode frequency changer, the tuning of the oscillator section being ganged to the preselector circuits. After mixing, the signals are Band Pass coupled to a Pentode Intermediate Frequency Amplifier. This is in turn Band Pass coupled to two diodes, one of which provides full delayed automatic volume control of all three previous valves. The other diode constitutes a distortionless second detector which provides the signal input for the high slope power pentode output valve. This valve feeds a powerful built-in Dynamic Loudspeaker of the field energised type.

1. **Sensitivity 2 microvolts.**
2. **Preselector high frequency amplifier.**
3. **Iron cored preselector coils.**
4. **9 K.C. separation.**
5. **No re-radiation.**
6. **High signal to noise ratio.**
7. **Silent visual tuning.**
8. **The Pointograph, an exclusive and entirely new interchangeable illuminated nacreous station chart, calibrated for 100 European stations and all medium and long wavelengths.**
9. **Full delayed automatic volume control of three valves.**
10. **Band Pass intermediate frequency couplings.**
11. **Four latest type pentodes, new duodiode and full wave rectifying valves.**
12. **Powerful signal handling capacity. No local distant switch necessary on Mains receiver.**
13. **Freedom from image frequency and second channel interference.**
14. **Only three controls.**
15. **Output 3 watts.**
16. **Manual volume control operating on both radio and gramophone.**
17. **Gramophone switching so that pickup can be permanently connected.**
18. **External loudspeaker sockets.**
19. **Screened mains transformer eliminates mains interference.**
20. **Built to the Regulations of the Institution of Electrical Engineers.**

page three

It pays to keep your eyes open Dicky Howett reports.

I visited recently (after a break of about 20 years), London's famous Science Museum, situated in Exhibition Road, South Kensington. It was the Christmas holidays, so the place was heaving, but a merry time was had by all. However, it wasn't all fun and games. Of the many impressive exhibits, one was entitled, 'Making The Modern World'. This section featured 'everyday' objects which would have been available to you and me throughout industrial times, (light bulbs, hair driers, mangles, ipods etc). However, certain displays appeared a little unsure of themselves, especially as the captioned information on some seemed to me to be quite wrong. As a self-appointed know-all, I contacted the museum by email (they issue a 'visitors comments' contact address). Below is (a): my email and (b); their reply. My italics have been inserted subsequently for clarification.

Dear Science Museum
Subject: MUSEUM VISIT COMMENTS. INCORRECT LABELLING
Date of visit. 30th Dec 2005. 2pm.

A few items caught my eye as being misleading or incorrectly labelled.

'Age Of The Mass'. 1914-1939. Exhibit 23. The Newman Sinclair 35mm movie camera is facing the wrong way. Turn it 180 deg and we see the front with the 'taking' lens and the top viewfinder port. What we have at the moment is a rear view. *(This would seem perhaps obvious, but the display looked entirely pointless showing the back end of an aluminium box perched on a high shelf, partially obscured by a box of cornflakes. As I own a similar camera, it was only myself who had a clue of what I was looking at.)*

'Technology In Everyday Life' 1880-1939. Exhibit 188. This microphone was not used in BBC production studios as indicated. It has the vague 'shape' of a BBC Marconi AXBT ribbon mic but this EMI microphone is really only a cheap public address/ amateur mic of the period. *(This mistake would be similar to that of attributing a Pye Lynx industrial vidicon camera as being a 1960s BBC TV Centre image orthicon studio model!)*

Ditto above. 1939-1968. Exhibit 159. The caption attached to the Bush TV 22 set seems to imply that BBC television had a network of five channels. In 1951 the BBC had one tv 'network' and three national radio 'network' channels. There were of course many regional frequencies including television, but these in 1951 were not 'networks'. The Bush tv set had its tuner so it could be used in London to tune to the Alexandra Palace transmitter or the Midlands (1949) from the Sutton Coldfield transmitter. Of course by 1955, tv sets needed tuners in order to receive ITV. *(The caption stated that the Bush TV 22, because it had the first tuner, could receive in 1951, all 5 BBC network channels. Why the figure '5' is mentioned remains a mystery).*

Also, a little disappointed that the two 'shops' *(one, a Science Museum novelty shop: the other a bookshop run by Ottakars)* at the museum had no DVDs on sale. It would have been nice to see those old technology instruction films, wartime propaganda subjects, science subjects, or anything really. Also no 'primer' books on television techology. *(There was only one tv book on sale and that a reprint of Baird's ' Sermons, Soap & Television'. I didn't point out that my own tv book will soon hit the stands! However, it does seem strange, indeed perhaps a lost opportunity, that several London museums, including the Imperial War Museum, are loathe to offer for sale audio or video material from their carefully–hoarded collections. I would really appreciate being able to see some of those wonderful GPO or Crown Film Unit documentaries, of which only tantalizing clips are shown-usually at the wrong aspect ratio- on tv.)*

Reply

Dear Mr Howett,
Thank you for your comments. As one of the project team responsible for 'Making the Modern World' I'm always interested in visitor reaction to it. The gallery covers a wide range of technologies and the small team of curators (about six) each had to deal with subjects not always of their particular specialisms. Sometimes this resulted in the kind of misidentification of the kind you've spotted - I don't think there's many of them, though.

The microphone label is indeed a howler. I wish I'd noticed this at the time the labels were being proofed, but this particular showcase was developed by a colleague whose specialism was the medical collections. The microphone is one of a large collection of objects used for the teaching of psychology at Bedford College, and was conveniently available when he did his object selection for the showcase. If the curator of Radio at the time had been asked to provide a microphone representing broadcasting then I'm sure something more suitable would have been made available. A similar situation occurred with the TV22. Unfortunately, at the time I wasn't responsible for the Telecoms collections so wasn't asked to check the text of the labels.

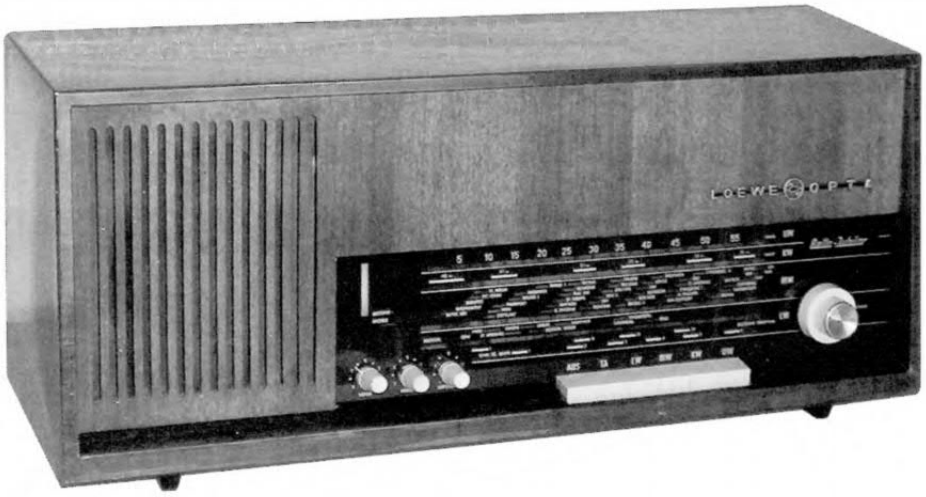
Your comment re the Newman-Sinclair camera is interesting. I'm not sure if the arrangement of the camera was deliberate or not, but it does seem sensible to see the front rather than the back. I'll open up the showcase and have a look at the next convenient moment. The shop stock is beyond my responsibility but I hope your comments will find their way to the buyer.

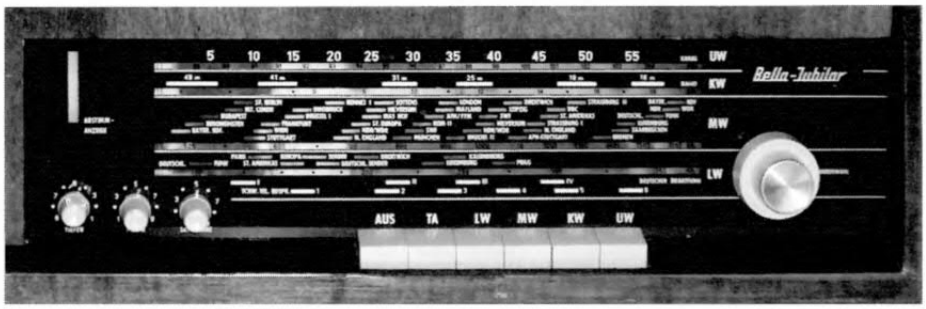
Thanks again for raising these points, which can easily get overlooked when so many other things are going on.

John Liffen, Curator of Communications, Science Museum, London, SW7 2DD
6 January 2006

Loewe Opta 42019 by Paul Stenning

I purchased this interesting German set a few years ago, so it had been awaiting attention for some time. After moving house, we had an ideal position for it to live – on a shelf in an alcove in the lounge, above the fish tank – so it moved straight to the top of the list!





The set has piano-key waveband selection, and includes SW as well as the usual MW, LW and VHF. Separate bass and treble controls are provided. The tuning scale is fairly long and the action is quite slow, allowing accurate tuning. It is, of course, entirely labelled in German.

The cabinet finish was looking rather tired, and there was some slight damage due to wear-and-tear. The chassis appeared to be largely untouched, although there was some signs that the alignment had been fiddled with.

This is clearly quite a late valve set – I would estimate that it was made in the mid-1960s. The components are good quality, with no wax-paper capacitors to worry about. All the valves, with the possible exception of the magic eye, appear to be the original Telefunken branded components. The magic eye is a Tunsgram. The valve lineup is completely conventional – ECC85, ECH81, EF89, EABC80, EL84, and the set uses a contact-cooled metal full-wave rectifier. The tuning indicator is an EM84 – this is the straight-line type used on many tape recorders, and has a more modern look that fits the style of the set.

Although the set uses a solid metal chassis, much of the circuitry is contained on two PCBs (printed circuit boards). One contains the VHF front-end, and the other contains the complete AM front-end, IF, detection and audio amplification. The output stage is built separately on the chassis. There are also two small PCBs underneath the chassis, containing the tone control components. Behind the piano-key switches are a bunch of components such as the local oscillator coils and capacitors, and a number of wires and components link between this and the PCB. The standard of construction is generally very good, although some sections are difficult to access for servicing.

Repair

The chassis was removed, and then the tuning scale was removed for safety. This was a bit tricky as all the piano-keys needed to be pressed simultaneously before it can clear the support bushes around two of the control shafts. It would have been easier if I could have removed the buttons from the switches, but they were glued solidly in place and I didn't want to break anything.

After cleaning out all the cobwebs, I carried out some preliminary checks such as measuring the resistance of the mains and output transformer windings. Everything seemed OK. I then connected my capacitor reformer to the main smoothing capacitor, and soon established that this was fine too. I noticed a capacitor that was looking rather sorry for itself, connected between one side of the incoming mains and the chassis. Since I intended to earth the chassis later, I removed the capacitor and did not replace it.

Time for a test. I connected a test meter to the HT, a speaker to the output transformer, and switched on. The HT immediately rose to about 300V (metal rectifier – remember!), and after a few seconds dropped gradually to about 250V. The set appeared to work fairly well on MW, LW and SW, but VHF was dead. In fact with the volume turned up, VHF produced a rustling sound that suggested switch tracking.

Mains Voltage

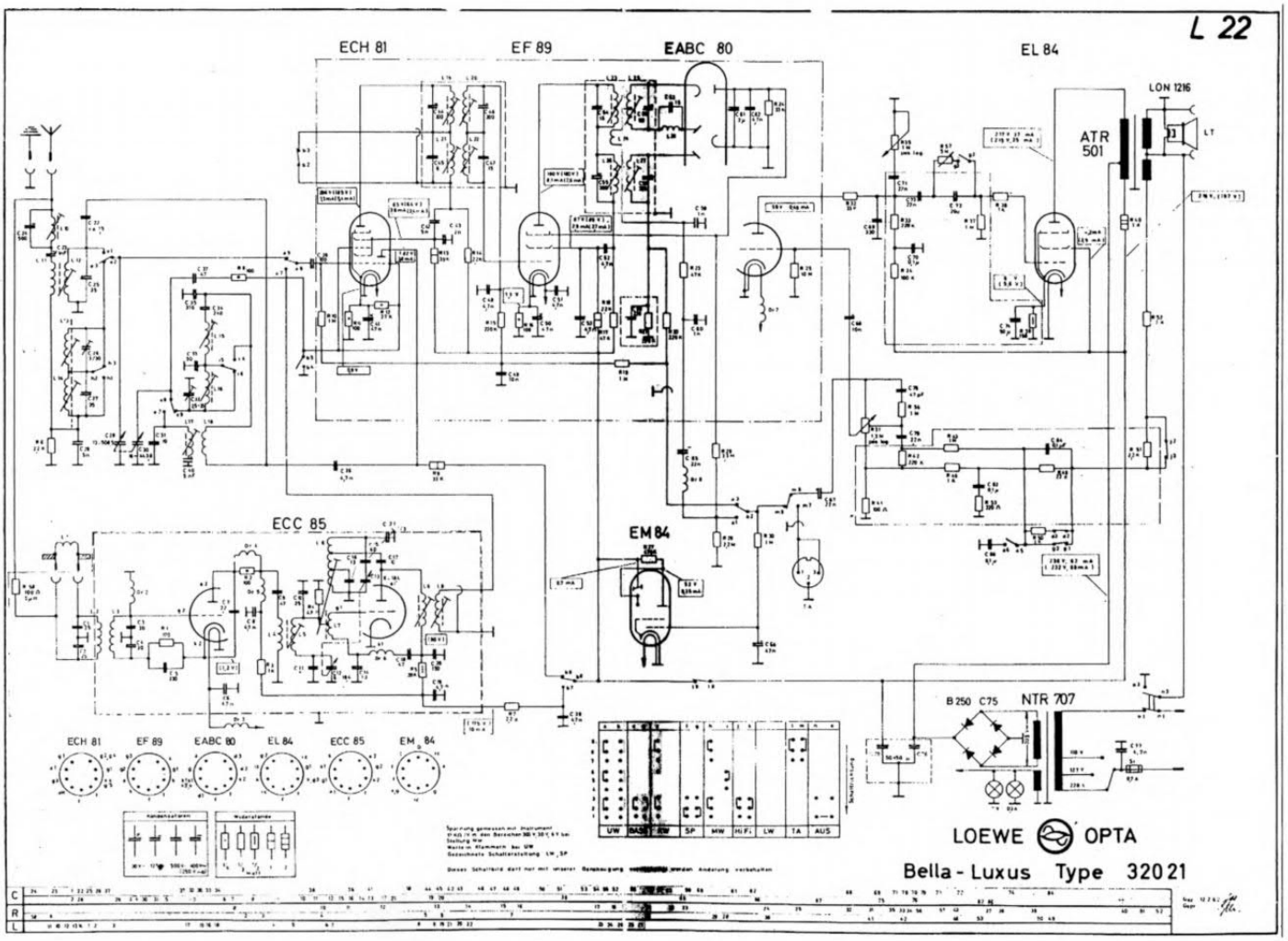
However, before I investigated that further there was a more pressing matter to deal with. Being a European set, the voltage selector had options for 110V, 127V and 220V. I was using the 220V setting, but the mains voltage here is around 245V. This sort of overload would be irrelevant with modern equipment, but with valve equipment we need to be more careful. A meter check confirmed that the valve heaters were being run at almost 7V – far too high for 6.3V The generally accepted tolerance is +/- 5%, which gives a maximum of about 6.6V.

A few quick experiments with a handful of wirewound resistors soon established that 120R in series with the mains input dropped about 22V and gave a heater voltage of 6.4V. The set worked just as well with this resistor in circuit. The actual mounting of the resistor under the chassis was left until after the other work was done, so for now a 10W component was temporarily connected in series with the mains lead using choc-block connectors, and positioned carefully out of the way.

Further Repairs

The pots and switches were treated with some contact cleaner before the next test. With the set tuned to a weak station on MW the IF adjustments were carefully trimmed. Although this was not an exact alignment it gave a significant improvement in reception quality. The tuning indicator (which, surprisingly was still bright) reflected the improvement too.

It was now time to investigate the problem on VHF. There are only five connections to the VHF front-end, all of which could be easily identified by following through the wiring. These are HT, heater, ground, IF out and AGC. A signal generator was connected to the IF out connection, and set to 10.7MHz. Even with the signal output turned right up the signal strength indicated by the tuning indicator was minimal. A test meter connected to the tuning indicator showed it was receiving around about 2V positive on its control grid, whereas it should be several volts negative depending on the signal strength. Transferring the meter to the small electrolytic capacitor in the ratio detector showed a good negative voltage, which could be peaked up nicely by trimming the IF adjustments. This narrowed down the area of the problem to the waveband switching and a few AGC decoupling components.



I did not have a circuit diagram for the set, so I had to trace the relevant sections of circuit as I progressed. I now have a diagram for the 32021, which is very similar and is reproduced here.

The signal from the ratio detector is connected to a section on the VHF waveband switch via a 3M3 resistor and a length of screened cable. A further resistor (2M2) is connected from this point to chassis. The switch selects whether this signal, or one from the AM detector, is connected to the tuning indicator and the AF amplifier. The same switch also switches the HT to the VHF front end. It appeared that tracking on this switch was likely, but there were no signs of discolouration. While poking around I found that the rustling sound completely disappeared when the 2M2 resistor was moved. Closer inspection showed that the body of the resistor was pressing against one of the HT switch tags. The voltage across the thin insulated coating on the resistor had become somewhat conductive, causing the problem. I fitted a new resistor, on slightly longer leads to avoid a repeat of the problem.

VHF

Although this solved the rustling noise, and allowed the tuning indicator to respond to an IF signal from the signal generator, there was still no reception. I connected a signal generator to the aerial input and tuned it across the VHF band, but even with the level right up there were no results. A replacement ECC85 valve had no effect. Clearly there was a fault in the VHF front-end.

On this set the VHF front-end is contained in a metal box, and the cover is retained with one screw. This allows access to the bottom and sides of the PCB. There were no visible problems so I checked the voltages on the valve pins with a meter. I was expecting the cathodes to be at around 0V, the grids to be slightly negative and the anodes to be 150V or so positive. Everything was correct, apart from one anode, which was at zero. From examination I found that the anode should be connected to HT via a coil and a 39K decoupling resistor. A meter check showed that the resistor was open-circuit. There were no shorts from the other side of the resistor to ground, or anything else to explain the failure, so I fitted a replacement, which solved the problem.

Alignment

The next job was to set the IF alignment more accurately. Until now I had only been setting it approximately to prove whether things were working. The RF alignment showed no signs of being disturbed so I decided to leave it alone. The VHF alignment was simply set by ear and by watching the tuning indicator with the set tuned to Radio 2. The set was then tried on various other stations on VHF and sounded fine.

The AM alignment was carried out in a similar manner and peaked up very well. However the results were not quite so pleasing – in particular treble seemed to be lacking. This would be fair enough for a cheaper set, but I felt this set should be able to do better. The IF adjustments should probably have been adjusted at slightly different frequencies, giving a flatter IF response, but since I do not have the alignment instructions or a sufficiently accurate signal generator this would be difficult to do properly. Instead I stuck with the alignment-by-ear approach and attempted to slightly detune some of the IF cans in an attempt to improve the treble response without affecting the sensitivity too much. It is easy to detune too much, making the set sound like it is not tuned in properly, but after some experimentation I managed to achieve an alignment that sounded good. Basically all four adjustments (top and bottom of both cans) were peaked, then the two top adjustments were very slightly detuned, one in each direction. The detuning was very slight, just to the point where the magic eye indication dropped fractionally.

The final job on the electrical side was to mount the 120R mains dropper resistor properly. I found an RS dropper section of the correct value. This is rated at 0.3A so it is comfortably under-run in this application. These are round resistors with a fixing hole through the middle. I found a convenient place under the chassis next to the mains transformer and drilled a 4mm diameter hole. The dropper was mounted using a 4mm screw and nut, together with a 12mm long spacer to hold the resistor away from the chassis. The 2-core mains flex was replaced with new 3-core cable, the earth being connected to the chassis.

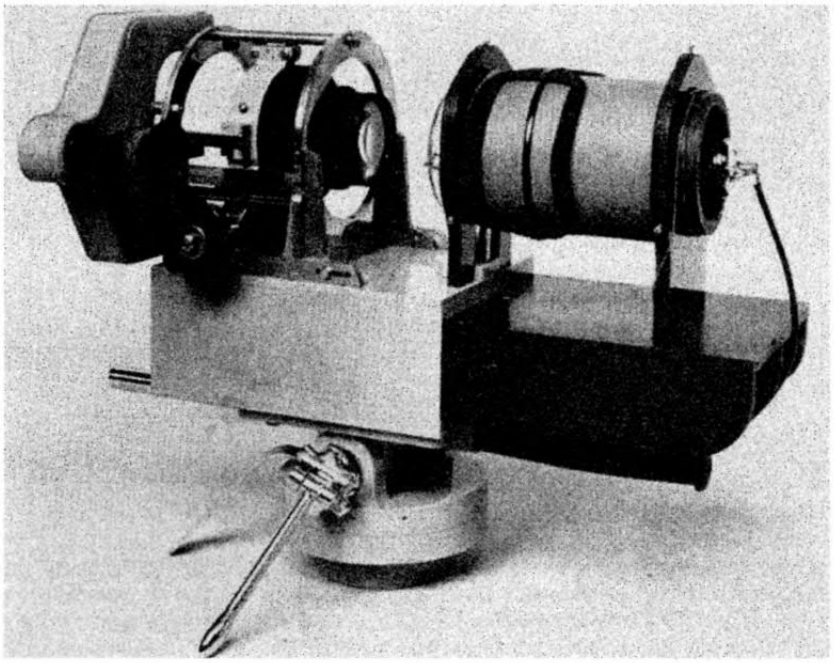
Article continued on page 27

Television comes in threes By Dicky Howett

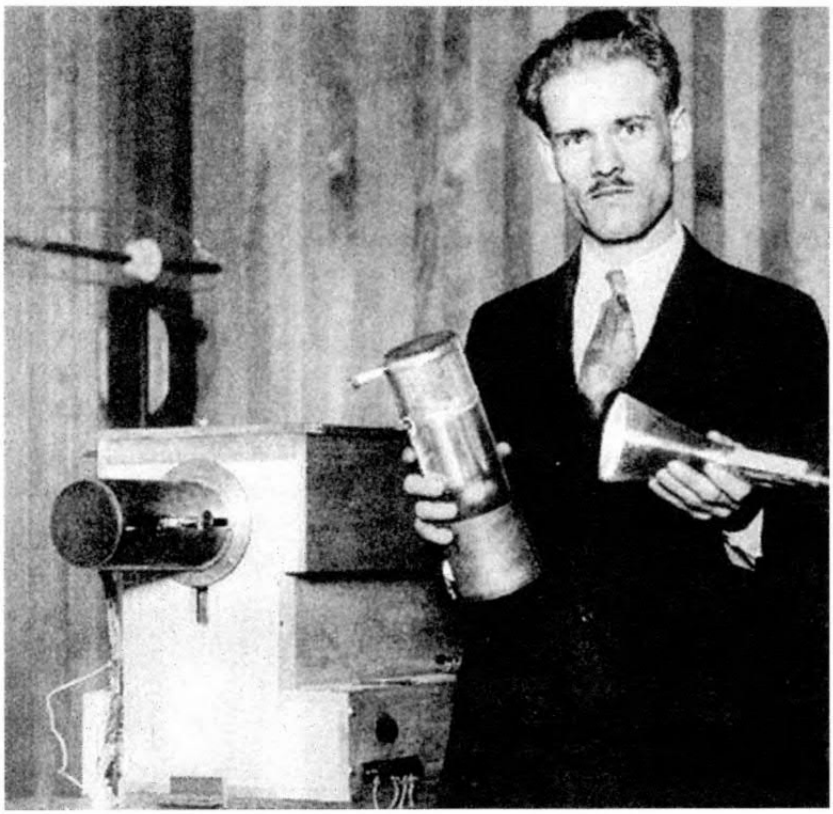
No single individual invented television. During the 19th century, many important ideas and theories were formulated involving the key technologies of the telephone and telegraphy. Thus, the first 'television' notions (which actually predate motion pictures) involved systems of wire picture transmission, sending facsimile images down the phone line. Only later at the beginning of the 20th century did 'electric' pictures attempt to move via Nipkow discs and photo-electric cells. To illustrate the interdependency of television inventions and the actual execution of the idea, I've listed below three formative interconnections, (in this instance John Logie Baird, the BBC and Philo Taylor Farnsworth), which, for me illustrate that certain special beginnings can become a means to an end.

John Logie BAIRD. (1888-1946)
Although Scotland's amazing pioneer lost the 'race' for television, Baird's drive and energy (especially for a man who suffered poor health most of his life) resulted during the 1920s and 1930s in many exciting, and in some cases astonishing television developments. Baird's ideas were based on mechanical applications, but they included ground breaking innovations such as outside broadcasting, colour television, stereoscopic television, video disc recording, theatre (large screen) projection television and even 'night vision'. This was Baird's 'Noctovision' system, devised in 1926 using the principles of infrared in order to 'see' in the dark. The British Admiralty was interested and in 1927 were given a demonstration at Motograph House. In 1929, Baird sought (pestered would be nearer the mark) permission to use the BBC's medium wave transmitter in Oxford Street, London for a series of experimental and scheduled transmissions from his Long Acre studios. (Because only one BBC transmitter was available, sight and sound had to be alternated in two minute snatches). Three years later, Baird installed equipment and provided engineers for the BBC's official 30-line-12½ fps mechanical 'first regular' television service (this time using two simultaneous transmitters- one for sound the other for vision) which began from basement studios in the recently opened Broadcasting House on August 22nd 1932. These BBC programmes, which contained genuine entertainment value and received good reviews, continued four evenings a week (11pm-11.30pm) until September 11th 1935. In the UK alone, an estimated 7,000 mechanical receivers were being used to view the service. (An important reason why Baird wanted the monopoly broadcaster BBC to begin television was so that he could sell his Televisors). Baird knew that the future prosperity of his 'invention' lay in the sale of receivers, and for those 7,000 at least, television broadcasting by the fireside was a demonstrable reality.

BBC TELEVISION (1932-)
Still one of the world's leaders in television programme production, debate has always surrounded the BBC's claim that it started the world's first 'high-definition' television service. This inauguration occurred on the afternoon of November 2nd 1936, witnessed by an estimated 400 viewers dotted around London. However, the BBC's 'first' claim has a legitimate foundation, based on several important points; one being that any television system must be out of the experimental stage and authorised as a service by the relevant national authorities and also, that such a service must be capable of being received electronically and not mechanically *in the home by cathode ray tube receivers on general sale.* (my italics). This was indeed the case and by June of 1936, 17 receivers by 10 different manufacturers could be purchased (or rented) from between 85 to 120 guineas (the actual price of a small car). Because two conflicting and incompatible transmission systems were to be used, those very expensive tv receivers needed to be dual-standard , capable of receiving Baird's 240-line mechanically generated signals and EMI's 405-line all-electronic signals. As it turned out, it was Baird's lower standard mechanical scanning system that was used first on Monday 2nd November 1936 to officially open the service. Baird's half hour programme (only a sound recording exists of the event) consisted of a few short official speeches, a current Movietone newsreel, singer Adele Dixon singing 'Magic Rays Of Light' and an American variety act called Buck and Bubbles. (Chinese plate-spinning jugglers called the Lai Founs were scheduled to appear-although billed in the Radio Times- but were dropped for reasons of programme length). That same afternoon at 4pm, after a short break, the competing EMI system re-officially opened the service using the same line-up and three electronic cameras. For the next three months, the BBC's high-definition service (two or three hours a day) alternated weekly between Baird's 240-line non-interlaced 25 pictures-per-second



Above: A Farnsworth Image Dissector camera, one of two installed in 1936 by Baird at Alexandra Palace. This camera needed at least 1000 ft-candles to produce any sort of picture. Described as being 'somewhat precarious' in performance, the cameras (one of which was present at the opening ceremony but not used) are said to have cost the Baird Company over £5,000 each.



Philo Taylor Farnsworth holding his 1928 dissector and picture tubes

(spotlight disc, intermediate film and a Farnsworth image dissector camera) and the all-electronic 405-line interlaced at 50th sec Marconi/EMI/Iconoscope system. By February 1937, the Baird system was totally abandoned by the BBC (not helped when Baird suffered at the end of 1936 a disastrous fire at his Crystal Palace laboratories which destroyed all of his spare studio equipment and infrastructure) in favour of the more flexible and future-proof EMI system.

Philo Taylor FARNSWORTH (1906-1971)

Described as 'the boy who invented television', Philo Taylor Farnsworth was a self-educated, farm-dwelling, Mormon Utah-born inventor, working with little money but plenty of ideas. Despite these quaint and romantic beginnings, Philo Farnsworth can be credited as being the first to demonstrate 'all electronic' television, encompassing the entire chain from camera to receiver. His 'Image Dissector' camera had a workable pick-up tube but it was very insensitive, produced distorted and noisy images and crucially, it was of a non-storage type. Despite these drawbacks, Farnsworth by 1928 succeeded in transmitting (not over the air but to a receiver within the same building in his Green Street laboratory, Los Angeles), all-electronic, light and shade coherent images, including a $ sign, films and a photograph of his brother-in-law. By 1935, Farnsworth had greatly improved his electronic systems and in 1936 he sold an image dissector camera (plus spare) to Baird, for use in his studio (B) at Alexandra Palace. Reports indicate that this image dissector camera operated barely at all, with only moderate success. However, Farnsworth's camera tube design (particularly the way in which the image was scanned within the tube) was of sufficient technical importance to interest the giant Radio Corporation of America. In September 1939, at the end of a long battle, RCA were forced, (against their usual policy- they only bought licences and patents), into an expensive cross-licensing agreement with Farnsworth. This agreement enabled RCA to proceed with improved television systems and camera tubes such as the image iconoscope of which some North American key patents were held by Farnsworth. It has been suggested that this time-consuming patent wrangle was one reason why US television as a public service was so late in starting (officially April 20th 1939 at the New York World's Fair). This in comparison to some European television services (particularly in Germany using technology contributed by Baird and Farnsworth) which had been transmitting since 1935.

Loewe Opta 42019 continued from page 25

The top, sides and front bezel are coated with a very thick coat of clear shiny lacquer – where it is chipped it appears that the coating is around 0.5mm thick.

Cabinet

Although the cabinet looked rather tired, it definitely did not need stripping and refinishing. The original finish was in fairly good condition under the dirt, so a good clean and polish was called for.

The loudspeaker was removed to prevent damage, and then the dust and cobwebs were cleaned out before the whole outside was cleaned. I started with foam cleaner, but although this removed the dirt and grime, it did not remove the paint spots (why didn't people cover their sets when decorating?). Isopropyl Alcohol was much more effective here. The top, sides and front bezel are coated with a very thick coat of clear shiny lacquer – where it is chipped it appears that the coating is around 0.5mm thick. There were a couple of what appear to be cracks in the lacquer on the top of the cabinet, but I decided that any attempt to repair these would probably make matters worse (they would not be visible when the set is on its shelf anyway). It appears that the coating is so thick and rigid that it could not cope with the inevitable expansion and contraction of the wood.

By contrast, the front of the cabinet appears not to have been treated at all, although it probably had a thin covering of a matt finish. This looked rather sad and clearly needed some sort of refinishing. Before starting, I removed the Loewe Opta logo, which was retained with three bent-over pins inside the cabinet. After cleaning the front of the cabinet, I applied two coats of Ronseal Mahogany All-In-One Wood Finish with a soft rag, allowing 24 hours for each coat to dry. This product contains a colourant and protection, and is described as producing a sheen finish. Unlike wax-based finishes, it dries hard and does not need buffing. The product worked well, and brought back some colour and life to the wood, without leaving it too glossy.

Finishing Off

I gave the knobs and logo a wash in warm soapy water, and cleaned the outside of the tuning scale with car windscreen cleaner. I also cleaned the piano-key buttons with foam cleaner. These were glued to the switches and could not be removed, so they had to be cleaned in-situ. The valves and other chassis components were carefully cleaned where possible. The IF PCB appeared to have been sprayed with a thin coating of wax, which now had a coat of dust stuck to it. I tried to clean this with a toothbrush and Isopropyl Alcohol, but there was too much risk of damaging components so I did not persist with this idea. I did, however, manage to clean the bodies of the resistors and some other components, which makes the whole assembly look more presentable.

Once the cabinet refinishing had thoroughly dried, the only job remaining was to reassemble everything and make sure the finished set worked. Fortunately this was uneventful. The finished set gives very good performance on all bands.

Notes from the Past – An unofficial history of broadcast television Part 5 Coming of Age

by John Holloway

Readers of previous episodes in this unofficial history will recall that they are based on some anonymous notes found at the back of a filing cabinet during an office clear out. They are understood to be the research notes for a project started when the person concerned was a student at the London College of Printing. They also appear to be in part the recollections of one man, Charles Parrott who was a lecturer at the LCP following a career at the BBC, both pre and post war.

The period from 1950 saw tremendous changes brought about in part by technology and also by the growing reliability of the equipment and the confidence of those people working in television. From the faltering steps of the mid thirties a great many lessons were learnt and an increasing gloss was being added to the programmes on offer.

Dance was one area which had been tried early on with invitations to the Royal Ballet to appear before the cameras at Alexandra Palace. Cecil Madden had brought the Chorus Line into focus and by 1950 a corps of dancers were employed on a trial contract which provided all forms of dance including classical ballet. The group, under Felicity Gray, also featured on Children's Hour's Ballet for Beginners. From that original group the producer, Richard Afton, chose the dancers for a variety show who were named by him The Television Toppers.

In 1951, Ronnie Waldman, who had been the presenter of a magazine programme called Kaleidoscope became Chief of Light Entertainment. His appointment came as a surprise to the viewers. This was almost the first time a popular presenter had been kicked upstairs. He went on to become General Manager of BBC TV Promotions.

In February the BBC bought a recording by CBS of America which honoured Bing Crosby's 20 years in show business. A host of stars included Judy Garland, Bob Hope, Edgar Bergen and Charlie McCarthy, Amos & Andy, Louis Armstrong and Jack Teagarden. It was to be the beginning of a regular, though for many years, one way trade in top flight shows screened by the BBC featuring Perry Como, Dean Martin, Frank Sinatra and carried on by stars like Andy Williams and others. At this time, shows were tele-recorded or as the Americans called them, kinescopes.

The search was still on for a better means of recording and experiments were underway both in the BBC itself and in commercial companies to achieve a more flexible medium than film. The Americans in particular wanted to be able to schedule a show to run across the country at a given time in the evening despite the time difference. The pressure from advertisers to be able to target viewers based on demographic data was becoming a science and the time differential was being shown to be a real problem for the marketing men in the US.

In the UK the Beveridge committee's report on broadcasting recommended the renewal of the BBC's charter, more regional autonomy and increased licence fee. The government commenting on the report referred to the possibility of an alternative television service funded by advertising and provided by private enterprise.

As part of the celebrations for the Festival of Britain, April saw the beginning of five 90minute shows covering the last 50 years of show business. Named 'The Passing Show' it was an enormous undertaking but was typical of the growing confidence and budgets

1: 'Animal Vegetable Mineral'

2: 'Bill and Ben', 1952

3: 'Before Your Very Eyes' starring Arthur Askey with Dickie Henderson and Diana Decker

4: '1984' starring Peter Cushing

5: 'Dixon of Dock Green', 1955

6: Philip Harben, 1950

8


9


7


10


11

7: 'Billy Bunter'

8: 'BBC Television News', 1954

9: 'Morning Departure' with Nigel Patrick, December 1946

10: Opening ceremony, 1948 Olympics

11: 'Panorama' with Richard Dimbleby

that were becoming available. In addition, the Drama Department mounted a series of Special Festival Theatre productions for plays which ran for the 5 month period of the Festival. One of these was by Terence Rattigan entitled The Final Test and starred Patrick Barr and John Witty along with John Arlott, Rex Alston, Brian Johnston, Bill Edrich and Alec Bedser as themselves. Interestingly, all television seemed to do 50 years on to celebrate the millennium was for its reporters to carp (justifiably maybe) about the Millennium Dome. No truly spectacular programming was commissioned and certainly drama seems to have been replaced in the main by soaps and series.

On July 16th 1951 the first edition of a new panel game devised by Mark Goodson and Bill Todman hit our screens. It was to prove an enormous success. Barbara Kelly, Ted Cavanagh (the writer of ITMA) and Jerry Desmond were on the panel with Eamonn Andrews in the chair. Gilbert Harding was unable to appear in that first edition and in fact chaired the second. Eventually, things settled down and Andrews and Harding became fixtures in a show that was to become an intrinsic part of the nation's viewing habits for years to come.

By 1952 the transmitters at Wenvoe and Kirk O'Shotts were now on line in time to relay pictures of the Proclamation of Accession of the present Queen and the funeral of her father King George VI. Later in the year the Lord Mayor of London's Banquet from the Guildhall was covered.

The Owl of the Remove, Billy Bunter with Kynaston Reeves as Mr Quelch arrived in February 1952. The series was a great success; so much so that Gerald Campion who played Bunter was typecast as the character. March 12th saw the end of Picture Page, the programme that was such a strong link to the early days of television. The gap on Wednesdays was filled by a new programme also hosted by Joan Gilbert that ran for a further six years. Whirligig with Humphrey Lestocq and Mr Turnip entertained children on Saturday afternoons. Also appearing on the programme was Steve Race and the animated adventures of Hank and Mexican Pete the creation of Francis Coudrill. The Superintendent of London Zoo, George Cansdale became well known for bringing in various animals and talking about them.

During May 1952 the BBC carried out a test programme in six Middlesex secondary schools to evaluate the use of films in schools. The Corporation hoped to start a second series of schools television programmes available to the whole country by 1953. However, it was not until 1957 that the BBC inaugurated an experimental school's television service. Two years later it announced it would double its budget to £200,000 and that it would become a permanent service.

It wasn't all plain sailing for the new medium. Many of the established turns were still very much opposed

12: 'Sportsview' with Peter Dimmock interviewing Sir Stanley Rouse

13: 'The Grove Family', 1954

14: The Coronation

15: 'The Inch Man' with Robert Ayres and Lana Morris

to coverage of their own efforts by TV. But support was at hand in the shape of Claude Langdon, the MD of Earls Court. After Puss in Boots on Ice had been televised on 30 December 1951, over 20,000 telephone calls were received by the box office to book seats. The demand was so great that the show was booked for a further two weeks, bringing in an additional £50,000 worth of business. On the basis of that experience Mr Langdon said that television was welcome at anytime. His enthusiasm for the medium was further reinforced when he discovered that two thirds of an audience watching a boxing match at the venue were watching their first fight because of seeing the sport on TV.

Bookies also saw a benefit in the coverage of racing by television. They estimated that, due to the coverage of two days at Kempton Park at Easter, viewers had placed over £100k in bets.

Eurovision provided a week of programming in July with viewers in France and Britain sharing a number of programmes in the care of Etienne Lalon, Jacqueline Joubert, Sylvia Peters and Richard Dimbleby. This was the first time programming was shared with French programmes and vice versa. The converted signals were carried over radio links and co-axial cable in eight stages, Paris-Villiers-Cotterets- Peronne-Lille-Cassel-Alembon-Dover-Wrotham-London with our own Ralph Barrett in the thick of it.

By August the network of transmitters had brought three quarters of the population into the fold and the BBC's audience research found that the average viewer was watching 50% of the evening's programming. One week, a quarter of the evening programmes were achieving audiences of 2 million viewers. Just for the record and to prompt some memories those programmes were What's my Line? Ralph Reader's Gang Show, Kaleidoscope, Though Fire and Water, Top Hat Rendezvous and a six part serial, The Inch Man, starring Robert Ayres playing an hotel detective whose gimmick was flicking a flexible rule.

The Coronation in 1953 proved to be an enormous spur to increased TV license holders and the trend continued into the following year with an increase of one million over 1952. In 1947 there were 14,560, and by 1954 the figure had risen to 3,248,892 by 1960 it was 10 million.

But to return to 1953. The man in charge of the BBC's coverage of the Coronation was Peter Dimmock. From a control area in the Abbey itself he controlled the 21 cameras and 120 strong crew. Space for the cameras themselves within the Abbey was at a premium. The BBC wanted to place a camera behind the organ console. The only way of achieving this was to find the smallest cameraman, a Mr Flanagan, and seat him beneath the camera in order to turn the turret lens.

Add the fact that some of the musicians were also placed in this area and one had the cellist Eugene Pini bowing immediately under the camera lens with the point of the cello placed between the cameraman's feet!

The route of the return procession was over 5 miles long with cameras outside the Abbey, Buckingham Palace, on the Embankment and at Hyde Park. This element alone caused a tremendous amount of work from the GPO and Ministry of Works.

It was decided to relay to France, Holland and what was then West Germany. The problem was made all the more difficult because there were TV standards different from those in the UK. Signals were relayed by 3 radio links in tandem to a point of the French Coast near Cap Griz Nes. From this point the signals were carried by radio Mont Cassel and from there to Paris over a radio link provided by the French Post Office. These signals were still 405 lines and now had to be converted to 819 for the French service and 625 for Belgium and Holland. This feed was then provided to West Germany in the British Zone,

French commentators in the UK were able to commentate using independent mikes and lines fed to Broadcasting House thence by line to Paris. The commentators from other countries used the pictures being received at the local TV station in their home countries to give their commentary. They had all been in London over the previous few days in order to capture the atmosphere of the event so that they could convey the mood of the people, A 7 hour tele-recording of the event was also made.

On the great day the call time for the crew was 07.00 hours and Sylvia Peters came on screen at 10.15 to announce the Coronation broadcast. The Queen was crowned at 12.34pm and at 21.00hours that evening she spoke to the nation from Buckingham Palace. It was estimated that 11.75 million people listened in and nearly 20.25 million viewers watched it on television with a further 1.5million joining them in Europe.

The Royal Air Force flew tele-recordings

16: 'What's My Line'

17: The first of many Benny Hill shows, 1955

18: 'The Quatermass Experiment', 1953

19: 'The Final Test' with Patrick Barr and John Witty

across the Atlantic at 13.40hr, 15.15hrs and 18.26hrs. Each trip took approximately 5 hours and at 16.15 local time a full recording of the BBC TV programme was transmitted by stations in Ottawa, Toronto and Montreal. The USA networks of NBC and ABC took the telerecording via a TV link from Montreal to Buffalo. About 80,000 feet of cine film was used.

That week Radio times sold over 9 million copies, the largest sale of a weekly magazine.

Apart from the excitement of the Coronation, this year saw a number of other highlights. March saw the transmission of the Service of Remembrance for Queen Mary from Queen's Chapel at Marlborough House. TV was relayed from the Coronation Review of the fleet by Her Majesty from Spithead and High Mass from the Basilica of St Denis in Paris. The move from Alexandra Palace to White City was begun in August and at the end of the year there was a flurry of new panel games with Peter West hosting 'Guess my Story' and Margaret Lockwood 'Down you Go' creeping in at the beginning of 1954.

Television Personality of that year was Barbara Kelly. Italy and Denmark began regular television services, transmissions were made from the Lord Warden ferry while at sea and the Eurovision link up was complete to eight countries. 1954 also saw the start of the first Television News service and in March 'Thank you Ally Pally' was produced to commemorate the closing down of AP as a main studio centre. News continued to be produced from AP until 1961. 'Sportsview' started in April introduced by Peter Dimmock and in November the celebration of Sir Winston Churchill's eightieth birthday was transmitted from Westminster Hill.

The BBC also embarked on a buying spree in America, This is Your life, I married Joan, Burns and Allen and the Jack Benny Show and You'll Get rich, starring Phil Silvers.

There was the arrival of some home grown talent as well. Most significant was the beginning of Dixon of Dock Green, Written by Ted Willis (later to become Lord Ted Willis) it picked up a character from a previous script for the film The Blue Lamp starring Jack Warner and the young Dirk Bogard. The character George Dixon was killed off in the film but the TV series resurrected him, perhaps one of the first prequels in the history of film and television.

The series went on to win the hearts of viewers across the country and in 1960 was achieving an audience of 11million viewers on a Saturday night.

With the imminent arrival of commercial television in September 1955 the country was on the brink of a complete change in viewing choices. But before we look at these, some figures. Costs for programmes, engineering and ancillary services in 1954/55 were just over £5m. Programme production costs were £852.00 per hour. By 1956/57 these had nearly doubled to £1,538.00.

The arrival of ITV caused the BBC considerable staffing problems, especially on the technical side. Many members of staff were made generous offers to move across to one or other of the new companies. Some increases were as much as 100%. In addition, many BBC staffers went into commercials production and again the Corporation lost valuable staff to this area. However like all large organisations the changes being imposed from without caused a great deal of rethinking and the BBC reacted by meeting the challenge head on, streamlining programming and developing new talent.

Following the controversial bill proposing the introduction of a commercial television service in 1954 two independent bodies were formed. The National Television council which opposed the introduction of commercial television and the Popular Television Council was founded to opposed the BBC monopoly. The battle raged with the Labour Opposition stating that it would change any legislation if it returned to power. Needless to say this did not happed and commercial television commenced transmission in September 1st 1955 with BBC choosing that precise time to kill off Grace Archer in a stables fire – a total coincidence of course! [see letters, Volume 29 No. 4, page 66 – Editor]

Programmes ceased to overrun, there was a less formal attitude both on and off screen. One of the major changes in programming was the arrival of the in-depth and authoritative documentary.

The permanent London-Dover Eurovision link was now on line and in October the Queen and Prince Philip visited the studios at Lime Grove. Ealing Studios were also purchased by the BBC, colour tests were carried out and each region had its own Outside Broadcast Unit. 1955 also saw the arrival of the Roving Eye. All in all, the early fifities brought about a fundamental change for the medium and one that would alter the face of broadcasting in the UK for ever.

Next time, ITV begins to make its mark and television moves out of its cosy period into an era of fierce competition and a growing ability to bring the whole world into the living rooms of the nation.

The HMV 520

by Geoffrey Dixon–Nuttall

This was the first HMV Radiogram, being issued in 1930. It is in fact not completely HMV, as the radio chassis is a Marconiphone 47, with modifications. It is contained in an upright cabinet, made to the highest HMV standards. The record deck is a standard HMV type, and the pickup is a model 7A. This set, which was before the formation of EMI, was the first collaboration of HMV and Marconiphone.

The circuit is not yet drawn in the familiar EMI style, which gave their diagrams a family likeness up to the end. It completely ignores the loudspeaker and its power supply.

The modifications to the radio chassis consist of fitting a changeover switch for the pickup, and the substitution of a choke for the resistor as the anode load of the audio stage, presumably to increase bass. A volume control is fitted, and this is switched from the pickup input to the aerial input. This is a good idea anyway, as the model 47 can be uncontrollably loud. All the wiring was carried out in rubber flex, and was probably done by HMV, judging by its untidiness!

The original speaker was an energised type, with its own power supply. This was missing from my set, and a modern elliptical type had been fitted, very badly. The speaker mains transformer was O/C, and it was too difficult to find another suitable speaker. This transformer also supplies 6 volts for the dial bulb, so a neon had been fitted, which was quite a good idea.

Luckily I found a suitable EMI period permanent magnet speaker, which fitted nicely (Lucky as EMI permanent magnet speakers are very rare). I gutted the power supply, which was a can containing the transformer, the reservoir capacitor, and a lump of wood to fill up the can. This provided space for a small mains transformer to light the dial bulb. Two large antique porcelain fuses are provided. The valve rectifier is still there, but is a dummy.

The radio chassis was in good condition apart from the capacitor block, which was re–filled. This chassis makes me suspicious that it was not made by Marconiphone at all; it doesn't look like any of their chassis, and the neat assembly and brown painted chassis looks very continental. Perhaps Telefunken helped them out.

The circuit diagram contains one or two mysteries. Why is R14 optional, and what are R16, 17 and 18 doing?

This set is very tedious to work on. The chassis, power supply, and record deck are all separately mounted in the cabinet and wired up with plugs and sockets. All the cabling was rubber, and had to go. The original radio chassis is covered by a case to provide mounting for the new volume control and switch, so more screws to undo.

The pickup works well, so I have left it alone, on the principle that if it ain't broke you don't fix it. The rubbers are probably perished, but it makes a good noise.

The motor worked well after greasing. The instructions say it should be greased every three months, so it was about twenty years overdue.

The cabinet, luckily, was in almost perfect condition.

Warnings

Don't leave the instrument unlocked when not in use.

Don't allow unauthorised persons to operate this instrument.

Don't jolt or move the cabinet violently.

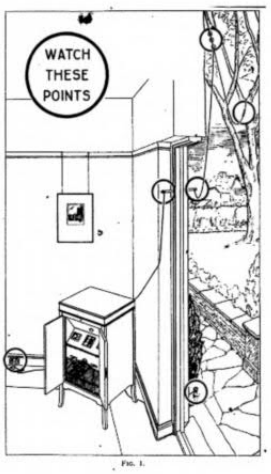
Don't move the instrument from room to room, or perhaps house to house, without removing the valves, noting their positions and packing them carefully.

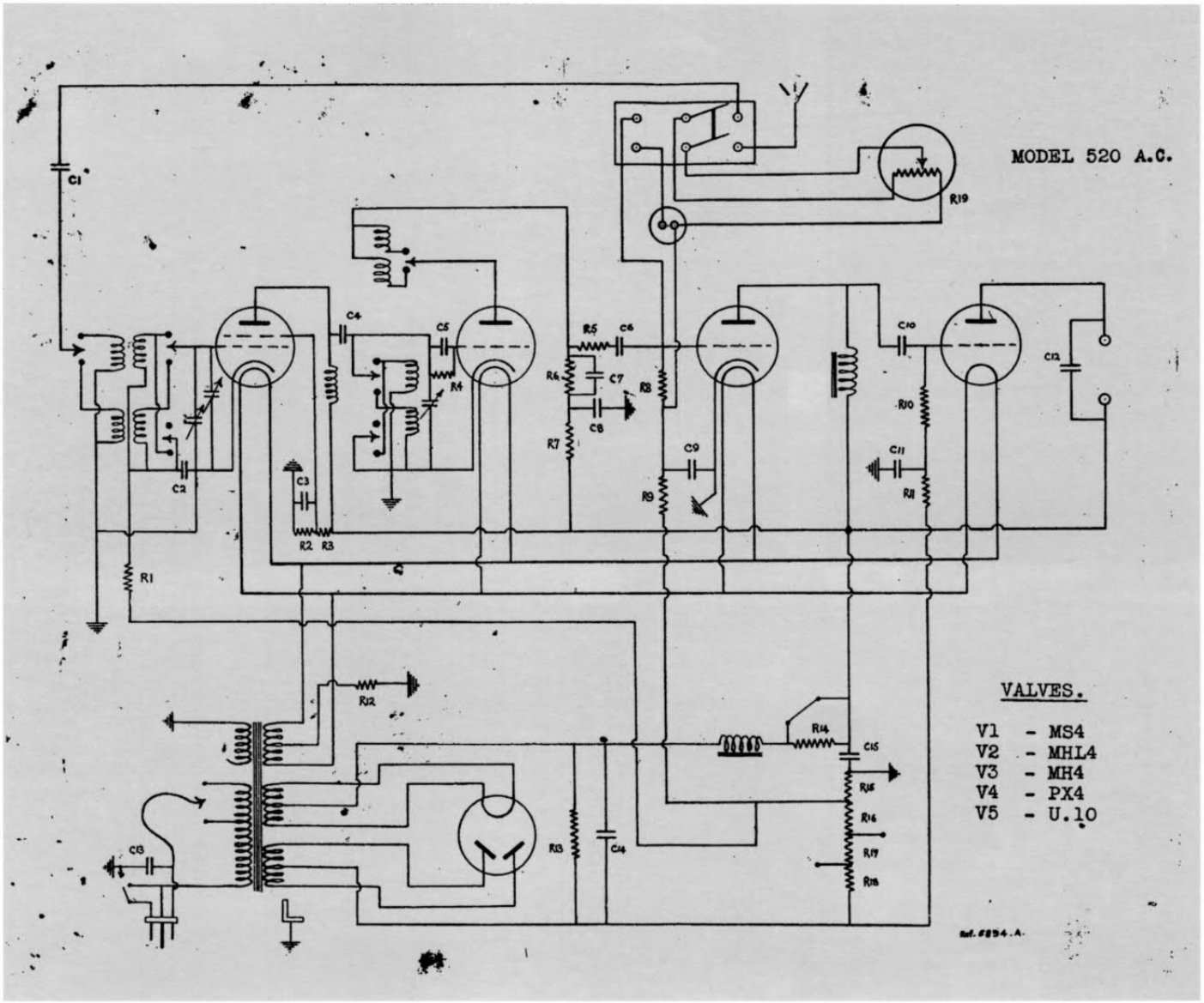
Don't omit to carry a spare set of valves.

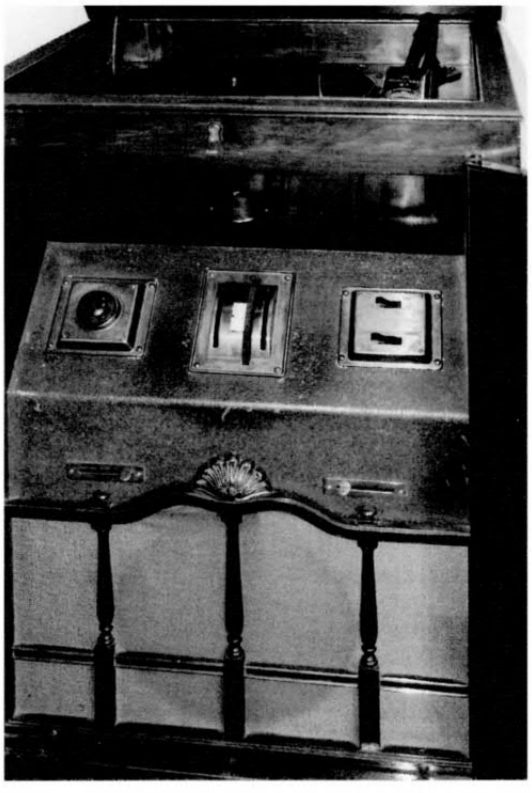
Don't forget to switch off the supply of electricity to the instrument when you have finished playing it.

Don't leave the lid open while the instrument is playing records.

Don't forget that the "Five-Twenty" is worth looking after and that no instrument will serve you well unless it gets the attention it deserves.







Nobody had ever put a flower arrangement on the quarter–veneered lid. The doors are nicely hung on hinges with all the screw head slots pointing the same way, and the mating edges of the doors are chamfered to make them shut easily, a nice touch being the specially chamfered lock to go with them. The lid has very effective balancing arrangement so that it will not slam if you let it go in any position.

Along with this set came the original instructions, which are very explicit, because it is quite likely that the purchaser had not seen a radiogram before. It contains a warning to keep the instrument locked when not in use, presumably because of the servants. I also have the service information (Service Manual No. 1) which is carefully worded, because it too was the first of its kind. It contains a set of helpful flow charts of possible faults, and typical voltages.

The radio chassis with the addition of the extra volume control and its switch, has a Scott Taggart proliferation of controls. The main tuning control is flanked by sliders, for aerial and reaction coupling. The volume control and its switch are on each side of these, and below them are switches for waveband and fine tuning.

This set makes a good sound, particularly on period 78s. Of course there isn't all that much top, but the scratch is low too. The radio is good, but not very user–friendly, as they say nowadays. The weight of the whole thing is quite alarming, particularly for those spindly legs.

Wootton Bassett swapmeet December 2005

photographs by Mike Barker

Book Review

Tickling The Crystal Vol. 3 by Ian L. Sanders with Photography by Carl Glover.

BVWS Books 2006
ISBN0-0-9547043-3-9
240 pp Reviewed by Anthony Constable

The crystal set must surely be the quintessential collector's item for anyone interested in wireless history. There remains a romantic view that the crystal set was the poor man's wonder radio; anybody could afford one. But when glancing through period advertisements, such as reproduced in this excellent 3rd volume of Ian Sanders' new book, it soon becomes apparent that a vast amount of additional equipment was available to further tempt those who embarked on this route to the world of wireless.

There was the crystal set itself which could range from a few day's pay to a month's wages. When the new set was brought home the buyer may well have parted with a week's wages, including a Royalty, and was then faced with having to buy a BBC licence and to erect a standard 100 ft Post Office aerial and an earth plate. Headphones were required and, to show off one's new found toy, customers were persuaded to buy additional headphones and a distribution box. Perhaps we are wrong to think of the crystal set as cheap as there were countless people for whom even this humble radio receiver was beyond their means. For those who drifted into the habits of the intrepid spendthrift, there was also the temptation to buy a Brown type electromechanical amplifier and a loudspeaker, not to mention a second crystal set claimed to have a far better performance than the first or, heaven forbid, a valve amplifier and its accompanying array of batteries. There was no end. Before long, the initial outlay of a mere week's wages had grown into 10% of annual income. Technological developments may not always have been what they claimed to be but the questionable claims of 1920's advertising sent many an innocent 'listener' down the slippery road in style. All these peripherals are to be found lurking in the seductive pages of this splendid book.

Most of us wireless historians and collectors first heard about crystal sets from our parents or grandparents. "Crystal-clear", they would say", "...not like modern sets with valves, crackle and hum", unaware perhaps that the phrase "crystal-clear" pre-dates the age of the crystal set by centuries. No matter, this excellent third volume by Ian Sanders and Carl Glover, with its informative text and superlative photography, really is crystal-clear.

In the text we read a little more on the question of the special symbol all wireless receivers in this country had to carry between 1922 and 1924, a "Type Approved" stamp issued by the Post Master General. The stamp with an allotted registration number signified that the manufacturer had sent a prototype of the set to the GPO for approval and that approval had been granted. Sanders suggests crystal sets had a high chance of passing the GPO test as they could not set up offending oscillations in the aerial circuit. We can't help wondering what sort of exhaustive test routine crystal sets underwent at the General Post Office (West). Did the engineers really give the set a proper wave-meter calibration to ensure adequate reception sensitivity over the broadcast range of 350-425 metres? Historians have little to go on apart from a few remarks in the popular press and far fewer primary documents. Some of us once spent long hours in the old GPO archives looking for primary source material such as internally issued PO test procedures or lists of registration numbers issued on successful test completion. Alas, no worthwhile GPO sources have yet been found. But we don't despair that one day such a list may emerge. More intriguingly, an elusive document might suddenly come to light stating that the original GPO records were destroyed for reasons we can now only guess at. A little bit of mystery thus adds further to the romance of the crystal set. The current list of registration numbers is included in an appendix (p.229/30) and it is fascinating to see how much it has grown since those heady days when the first list was published in the fledgling BVWS Bulletin of December 1976.

Modern collectors can use their hard won crystal sets to receive voice and music from currently available AM stations and can subject them to simple scientific performance tests, but they can never recreate the old conditions that prevailed when low-powered BBC transmitters were sparsely distributed about the country. Nor is it possible, except in the imagination, to re-live the wonder of a smitten 1920s public experiencing the thrill of hearing voices or music from afar by tickling a galena crystal with a 'cat's whisker'. We, in this age of technological sophistication, can only immerse ourselves into the period through contemporary advertisements and through handling one or two expensive vintage crystal sets.

But, we can now go a step further. We can immerse ourselves in Ian Sanders' book(s) and become acquainted with numerous set makers and the host of peripherals that emerged on a booming market in the post-1922 BBC age. In this most recent volume the author has gathered together in chapter six an impressive amount of material from each of a selection of manufacturers arranged in alphabetical order from Blackadda to Ward and Goldstone in which it seems to me that everything ever produced by them relevant to the crystal set has been unearthed for us. The delight of reading the book is raised to a very high level by the incredible quality of the illustrations. The technical knowledge and artistic skill of the photographer, Carl Glover, is something all BVWS members are familiar with through his editorship of the Bulletin and the quality of the illustrations that are now so much a part of it. Carl's illustrations in this book, whether black and white or faithful colour, are more than mere photographs, they are exhibition quality pictures.

Chapter 12 entitled 'Pictorial Dictionary of Crystal sets' complements similar Pictorial Dictionaries in the previous two volumes and, when the 78 new illustrations are added to those already published, we now have a massive collection of 392 pages devoted to fine quality illustrations of the ubiquitous crystal set. This calculation does not include those numerous illustrations gracing other pages. The 254 pages of the current volume bring the total number in all three to a 712 pages of crystal history. While there are the inevitable repetitions between the volumes every page is a well thought out design package for which the authorship team can be justly proud.

Strictly Limited Edition.
Only 500 copies printed
£29.95 (£24.95 for BVWS members)
plus £7 p&p for UK, £13 EEC (rest of world £15)
Slipcase to house all 3 volumes £9.95.
Buy all 3 and get slipcase free! (postage £12 UK, £35 EEC £55 US)

A brief resumé of British (and several overseas) finished goods & component manufacturers (as at May 2005) part 8 by Dave Hazell

HAC Short Wave Products, Old Bond Street, London. "Heard All Continents". Maker of Short Wave radio kits (at least by the 1950's).

HC (letters inside a diamond) – Hung Chang Products Co Ltd, of Seoul, Korea (in 1979). Makers of jacks, pots, meters, multimeters, etc.

HDF. HDF Ltd, Tower Works, Lowestoft (circa 1963-5). Maker of UHF & VHF TV tuners as used in Pye & Ekco TV sets of the time. A Pye subsidiary?

HH Electronic, Industrial Site, Milton, Cambridge (in 1968 & 70). Maker of high power audio amplifiers and variable frequency oscillator.

HMV – see EMI.

Hackbridge Cable. In 1964, operating from a new office at Brewery Street, Smethwick, Birmingham 41. Associated companies at the same location were Bryce Transformers, Bryce Capacitors and Siemens-Schukert. Possibly acquired by AEI in 1967 – when they took over Hackbridge Holdings Ltd.

Hacker Radio Ltd, Norreys Drive, Cox Green, Maidenhead, Berks (in 1961 – this new site was built in 1960). Established by RH & AG Hacker – late of Dynatron Radio Ltd. Maker of radios and HiFi, but also industrial electronics (e.g. for UKAEA – in 1969). Circa 1975, the firm went into liquidation and was bought – the new company was called Hacker Sound Ltd. Not long after, this company was bought by Motoradio Ltd of Blackburn (In Car Entertainment manufacturers). Production was then transferred from Maidenhead to Motoradio's plant in 83-95 Stanley Road, Bournemouth. How long did this last for - into the 80's?

Haffenden (W W) Ltd, Richborough Rubber Works, Ramsgate Road, Sandwich, Kent (in 1964). Original maker of "Duraplug" shock resistant plugtops, trailing sockets, etc. By 1982, Haffenden Richborough Ltd. Now part of Caradon MK Electric Ltd.

Halcyon – Halcyon Wireless Supply Co Ltd, London. Supplier of radios/components? Also, in 1938 & 44, Halcyon Radio Ltd, Sterling Works, Dagenham, Essex – radio manufacturer (Utility set man'f'r code U17). In 1934, Halcyon Radio Ltd, Valetta Road, London, NW3.

Hallam, Sleigh & Cheston Ltd. P O Box 133, Widney Works, Bagot Street, Birmingham (in 1964 & 82). In 1958, producers of "Widney-Dorlec" cabinet systems.

Hallicrafters (The) Inc, Indiana Avenue, Chicago (established in 1933). Subsequently had several owners up to 1980. Hallicrafters Co, 600 Hicks Road, Rolling Meadows, Illinois (in 1971). Earlier made by Devega City Radio Stores, 63, Cortland Street, New York, NY phone BARCLAY 7-1948. Maker of communications transmitter-receivers.

Haltron. Brand name of Hall Electric Ltd, Haltron House, Anglers Lane, London, NW5 (in 1961, 65 & 69). Supplier of valves, for export.

Hameg Ltd, 74-78 Collingdon Street, Luton, Beds (established in the UK in 1979). The UK subsidiary of Hameg K Hartmann KG of Germany. Oscilloscope manufacturer.

Hamlin Electronics Inc, Wisconcin, USA (in 1971). Maker of Reed switches, mercury wetted relays, etc. In 1971, they acquired Inter-Market Services Ltd (in the UK) and renamed it Hamlin Electronics Ltd (located at Diss, Norfolk?).

Hammarlund Manufacturing Co Inc, 424-438 West 33rd Street, New York, NY (circa 1940's). Manufacturer of variable capacitors.

Harman International (in 1976), one-time owners of Tannoy and JBL (speakers). Took over Ortophon (of Denmark) in 1976. Ortophon used to make speakers until then, but thereafter, only their cartridges.

Harmer & Simmons Ltd, Peregrine Road, Hainault, Ilfords, Essex (in 1964). Battery chargers, power supplies transformers, etc. Used "Cycloc" brand name. In 2002, same location but part of Alcatel.

Harmsworth, Townley & Co. In 1961, at 2 Jordan Street, Manchester 15. In 1965, at 2 Harehill, Todmorden, Lancs. Makers of power transformers, transformer-rectifier sets, etc.

Harris Overseas Ltd, established in 1963 (as an importer of foreign made radios, etc.?). In 1970, it built a new HQ at Barking, Essex. In 1982, the company became Harvard International and acquired Alba. It went on to acquire: Hinari, Goodmans (not the loudspeakers operations), Bush and Roadstar brands.

Harting. Foreign (?) maker of tape decks, incorporated into Dulci and Wyndsor tape recorders of the 1950's.

Hartley Baird Ltd, Lancelot Road, Wembley, Middx (in 1954). Maker of TV sets. In 1964 "Trader" yearbook, shown at: 31 Throgmorton Street, London, EC2, with "service" at 205-207 Great Portland Street, London, W1. See also Camp-Bird and R N Fitton.

Hartley Electromotives Ltd, Octopus Works, Monkmoor, Shrewsbury (in 1964 & 68). Manufacturer of the "Taperiter" dictation system in 1968. See also Camp-Bird and R N Fitton.

Harwin Engineers Ltd, Rodney Road, Portsmouth, Hants (in 1964). In 1967, at Fitzherbert Road, Farlington, Portsmouth, Hants. Manufacturer of pins, lugs, inserts, etc., for the electronics industry.

Hatfield Instruments Ltd, 175 Uxbridge Road, Hanwell, London, W7 (in 1953). In 1964 & 70, Burrington Way, Plymouth, Devon. Originally a seller of refurbished test equipment. In 1953, they made a VHF Tx output meter and in 1970 baluns, hybrid transformers, multicouplers and radio transceivers. In 1967, they also made high frequency ac power supplies. In 1964, they distributed a field strength meter made by Prestel SRL of Milan, Italy. Taken over by Wandel & Golterman – by 1982 and renamed W&G Instruments Ltd, Plymouth. W&G merged with Wavetek in the 1990's. Following a further merger circa 2000, now called called Acterna.

Hawker Siddeley

Hawker Siddeley Dynamics Ltd, Gunnelswood Road, Stevenage, Herts (in 1970). In 1973 at Hatfield, Herts.

In 1980, Hawker Siddeley Group owned many companies, including:

Westinghouse Brake & Signal Co Ltd, Chippenham.

Crompton Parkinson

Brush Electrical Machines

Tungstone Batteries

Oldham Batteries.

In the 1990's, Hawker Siddeley was taken over by BTR plc (a UK conglomerate) and broken up.

Hawkins (L G) Co Ltd. Established at least by the mid-1930's. Maker of small electrical appliances, such as kettles and the "Hostess" heated food container range. Became a Pye subsidiary. L G Hawkins was a director of Pye Ltd for many years. In 1964, at Drury Lane, Hastings, Sussex. By 1968, merged with similar Ekco activities to form Ekco-Hawkins. The company later became Philips Small Appliances, but was closed down in the late 1990's, due to overseas competition.

Hayden Laboratories Ltd, East House, Chiltern Avenue, Amersham, Bucks (in 1969). UK distributor for Nagra, etc. In 1974, at Hayden House, 17 Chesham Road, Amersham, Bucks – UK distributor for Fisher Radio (of the US). In 1981, at Chiltern Hill, Chalfont St Peter, Gerrards Cross, Bucks. UK distributors for Dual and Sennheiser?

Haynes ("HR"). Haynes Radio Ltd, Queensway, Enfield, Middlesex (in 1947 and 58). Maker of radio and specialist television components, complete sets, transformers and chokes.

Hazelhurst Designs Ltd, 186 Brompton Road, London, SW3 (in 1949). Maker of an EHT unit for TV receivers.

Heathkit. The Heath Company, Benton Harbor 15, Michigan (in 1955). Established in 1926 by Edward B Heath. In 1955, it was a subsidiary of Daystrom Inc, who were taken over by Schlumberger in 1962. Maker of home build electronic kits. Daystrom Inc (a Schlumberger subsidiary), sold Heath to Zenith Radio Corporation, in 1980. In 2003, only Heathkit Educational Systems survives (a training provider company), still at Benton Harbor, although they still sell copies of the Heathkit manuals.

Heatrae Ltd, Heatrae Works, Norwich (in 1948 & 64). Maker electric tabletop cooker (in 1948) and other electrical appliances (water heaters, oil heaters, immersion heaters, urns, towell rails, airing cupboard heaters, flameproof heating apparatus, breakfast cookers, electric fires, food trolleys, warming plates and air heaters – in 1959). Later merged with Sadia (water heaters).

Heatrae Sadia Heating Ltd, Hurricane Way, Norwich Airport, Norwich, Norfolk (in 1982). Maker of electric water heaters, etc. Formerly two separate companies.

Heatstore Ltd, 22 Chapel Lane, Pinner, Middx (in 1964). Maker of electric storage heaters. In 1968 (now part of the Central Wagon group), the company relocated to Wigan.

Heayberd – F C Heayberd & Co, 10 Finsbury Street, London, EC2 (in 1938). By 1964, at: Greenwich South Street, London, SE10. Maker of transformer-rectifier sets (including some for use by British Rail in their signalling equipment rooms.), battery chargers, transformers (also used in railway signalling power supplies). In 1935, they made battery eliminators for radios.

Heimann GmbH, Weisbaden, W Germany (in 1971). Maker of vidicon tubes.

Hellerman. Hellerman Electric Co. Ltd. of Goodtric Works, Brewer Street, Oxford (in 1948). The UK offshoot of Paul Hellerman GmbH, of Germany? Bowthorpe Holdings Ltd acquired Paul Hellerman GmbH in 1957.

In 1957, **Hellerman Ltd**, Crawley, Sussex. The extrusions division introduced a range of equipment handles.

In 1967, **Hellermann Electric Ltd**, Gatwick Road, Crawley, Sussex – a member of the Bowthorpe Holdings Ltd group of companies. "Hellashrink" tape, tubing, sleeves, end caps and markers.

By 1970. **Hellerman Electric** (division of Bowthorpe-Hellerman Ltd), Gatwick Road, Crawley, Sussex. Long-time manufacturer of expandable, elastic sleeving (much favoured by Bush), heat shrinkable sleeving, cable wrap and lacing cord.

By 1970, **Insuloid Manufacturing Co**, Leestone Road, Wythenshawe, Manchester, was a division of Bowthorpe-Hellerman Ltd. The Bowthorpe group renamed itself Spirent plc circa 2000.

From 1962 to the 1980's – **Hellerman Deutsch Ltd**, set up by Bowthorpe Holdings Ltd (parent of Hellermann) and the Deutsch Company of Banning, California – in 1962. Bowthorpe had a 51% interest. The company absorbed the connectors division of Hellermann Ltd. A maker of miniature relays, and other electromechanical products. The company was intending (in 1961) to establish a new factory at East Grinstead. Now known (2002) as Deutsch Ltd.

In 1975, **Hellerman Electronic Components**, Imberhorne Way, East Grinstead, Sussex. For example, LCD connectors.

Hengstler GB Ltd, Nazeing New Road, Broxbourne, Herts (in 1974). In 1965, J Hengstler Co (Great Britain) Ltd, Highbridge Street, Waltham Abbey, Essex. In 1967, at Brooker Road, Waltham Abeey. UK subsidiary of the German company making electromechanical counters and electronic counting systems. By 2001, a division of Danaher Corporation of America – the same one that owns Fluke.

Henley's (W T) Telegraph Works Co Ltd., Holborn Viaduct, London, EC1 (London office in 1937). Engineering Dept., Milton Court, Westcott, Dorking, Surrey (in 1945) and 51-53 Hatton Garden, London, EC1 (offices ? in 1947). Main works in Gravesend, Kent. Maker (at least since 1937) of the Henley "Solon" soldering irons, winding wires, and coaxial cables for TV aerial installations. In 1911, W T Henley's Telegraph Works Co Ltd, Bloomfield Street, London, EC. Founded in 1837, in London, by William Thomas Henley. Originally, a maker of submarine cables at its Woolwich factory (badly damaged during WW2 and closed – to be replaced by a factory at Birtley, Co Durham). A major factory at Gravesend was opened in 1906. Taken over by AEI in 1958.

Hewlett Packard Inc. (USA). Founded in 1939 (?) by W R Hewlett and D Packard. Originally, a maker of test equipment. In 1966, the UK operation was based in Dallas Road, Bedford. Their new factory, at South Queensferry, near Edinburgh, opened in March 1966. In 2002, it merged with Compaq. The test equipment business was spun off in the later 1990's as Agilent Technologies. In 2002, Hewlett-Packard merged with Compaq Corporation.

Heyco Manufacturing Co Ltd, Uddens Trading Estate, Nr Wimbourne, Dorset (in 1977). Manufacturer of plastic cable glands, ties, etc.

Hiatt & Co, Baltimore Road, Great Barr, Birmingham, B42 1DN (in 1964 & 82). Maker of cable clips, etc.

High Definition Films Ltd, 24, Old Broad Street, London, EC2 (in 1952). A Pye company, formed to promote the use of electronics in the film industry.

High Definition Television Ltd, St Andrews Road, Cambridge (in 1964 "Trader" yearbook). A Pye subsidiary.

Highgate Acoustics Ltd, 71-73 Great Portland Street, London, W1 (in 1963 & 64). In 1964, UK distributors for: Loewe Opta, Ingelen & Klarad.

Highland Electronics Ltd, 26-28 Underwood Street, London, N1 (in 1965). Maker of reed switches.

Hilger & Watts Ltd, 98 St Pancras Way, Camden Road, London, NW1 (in 1955). In 1957, 123 Camberwell Road, London, SE5. Maker of scientific instruments. In 1962, they owned Microwave Instruments Ltd. Taken over by Rank Organisation in 1968.

Hinchley. Hinchley Engineering Co Ltd. Established in 1949. Based in Southgate House, Pans Lane, Devizes (in 1958 and 1973). Manufacturers of wound products, particularly mains transformers, for many years. Part of the Pye group, then CEI. Sold to a Japanese firm in the late 1980s and now known as Tamura Hinchley. Still in Devizes in 2003.

Hirschmann. German company which manufactures telescopic aerials, connectors.

Hitachi. Japanese multinational company, founded in 1910 by Namihei Odaira, to manufacture electric motors. The name Hitachi means sunrise.

Hivac. The High Vacuum Valve Co Ltd, 113-117 Farringdon Road, London, EC1 (in 1938). It appears that Pye Ltd (of Cambridge) acquired an interest in Hivac in the 1930's. By 1948, Hivac Ltd., Greenhill Crescent, Harrow-on-the-Hill, Middlesex (in 1948). In 1955 and 1970, at Stonefield Way, Victoria Road, South Ruislip, Middx. In 1970, the HQ of General Instrument (UK) Ltd, was at this address! Hivac made miniature valve, "Nixie" tubes and neon indicator lamps. They also made miniature transistors (e.g. for hearing aids), using Ge junction elements supplied by BT-H. They were bought by AT&E of Liverpool (the telephone equipment manufacturing company) in the early 1950's. In 1967, Hivac Ltd was a Plessey company, but its status changed to being simply the Hivac division of the Plessey Components Group. Later still, Hivac was bought by General Instrument (by 1970, it appears) and merged with Vitality Bulbs on 1st March 1972, to form Vitality Ltd. Later, this company merged with Chicago Miniature Lamp Works, to form VCH. Thereafter, see under Vitality.

However, in 1975 (WW June 75, p294), a firm called Hivac Ltd, of Asheridge Road, Chesham, Bucks, offered a range of cold cathode reference voltage tubes...

Holsun / Pertrix. In 1935, Pertrix accumulators and dry batteries were made by Britannia Batteries Ltd, Redditch, Worcs. In 1948, Holsun Batteries Ltd, 137 Victoria Street, London, SW1 (in 1948) - maker of accumulators, Inc. 'Pertrix' accumulators.

Hopt, of Rotweil, W. Germany (in 1968). Manufacturer of tuning gangs, VHF (FM) front ends and TV tuners. One notable use of a Hopt pushbutton integrated UHF/VHF tuner was the in Pye 31/36 and 40 series dual standard monochrome hybrid sets of the mid-60's. In 1967, their UK operation was Hopt Electronics Ltd, Bull Hill Industrial Estate, Clacton-on-Sea, Essex – when they introduced varicap diode tuned TV tuners (UHF & VHF).

Hounslow (C.) & Co Ltd, Chalex Works, Southwick, Sussex (in 1948). Maker electric tabletop cookers.

Holmes Bros (London) Ltd, cabinet manufacturers (in 1964).

Hoover Ltd, Western Avenue, Perivale, Greenford, Middx and at Merthyr Tydfil, South Wales. US based domestic appliance maker. In 1907, Murray Spangler from Ohio, invented

a vacuum cleaning device. He knew Susan Hoover, wife of William Hoover, a leathergoods trader and sold William the patent in 1908. The machines were produced in North Canton, Ohio and still are as of 2004. The art-deco building on the North Circular Road became a Tesco supermarket in the 1990's (frontage retained). Their main factory was in Merthyr Tydfil (also in Cambuslang, Scotland). Hoover was later taken over by Maytag (USA) up to their free airline tickets prommotion fiasco in the 1990's, when Hoover (Europe) was sold to Candy of Italy.

Hotpoint – domestic appliance brand. Pre-WW2, made by British Thomson Houston, Rugby (originally, the UK offshoot of GE (USA)). In 1945, the products were sold by Hotpoint Electric Appliance Co Ltd, Crown House, Aldwych, London, WC2. In 1953, Hotpoint Electric Appliance Co Ltd, Fletton, Yorkshire. Brand used by AEI-Hotpoint Ltd in the 1950-60's, then British Domestic Appliances, then Hotpoint Ltd. In Jan 2002, Marconi plc (the re-named GEC plc) sold its 50% stake in Hotpoint Ltd to Merloni of Milan, Italy (owners of the Indesit and Ariston brand names) – the other half is owned by GE (USA). In 2002, the company is known as General Domestic Appliances Ltd. For many years, Hotpoint was based at Celta Road, Peterborough, Cambs. Now based in North Wales.

Howells Radio Ltd, Mulberry Street, Manchester (in 1966). Transformer manufacturer, metalwork, chassis, cabinets and electronic assembly.

Hubbell. Brand name of Harvey Hubbell, a US maker of power connectors, including domestic types, etc. In the 1960's and early 80's, they had a UK operation in Hopcott Road, Minehead, Somerset (formerly Grelco).

Hudson Electronics Ltd, Peall Road, Croydon, Surrey, CR9 3AX (in 1967) – an STC company. Design and devlopment of mobile radio equipment. In 1963, Hudson Electronic Devices Ltd, 4 Sydenham Hill, London, SE26 – maker of radiotelephones.

Hughes Aircraft Corporation. R&D at Culver City, Los Angeles, Calif (in 1955). Hughes also made semiconductors.

Hunts. A H. Hunt Ltd., Bendon Valley, Garrett Lane, London, SW18 (in 1937, 47 & 67). Hunts made a wide range of capacitor types (established in 1901) interference filters and electronic test equipment (including a C-R bridge). Cyril H Hunt, the son of A H Hunt (the founder) was chairman and MD up to his sudden death at 50, in 1948. In 1950, Sydney S Bird & Sons Ltd acquired the trimmer capacitor product ranges. Hunts had factories in Wandsworth (London), Surrey (Vulcan Way, New Addington, Croydon – in 1964), Sussex and Wrexham. Circa 1952, the name changed to A. H. Hunt (Capacitors) Ltd. The electronic components business of Hunts was taken over by Erie (UK) in 1968, when the words "a member of the Erie group of companies" appeared in Hunts adverts. Apparently, Hunts continued as a manufacturer of power factor correction capacitors (but what happened to them?). In the same year, the usual Wandsworth address changed to South Denes, Great Yarmouth (the Erie UK HQ). Erie UK were in turn taken over by ITT (STC) in the 1970's.

Hytron – Hytron Corporation, Salem and Newburyport, Massachusetts, USA (in 1944). Maker of radio valves. Later taken over by CBS.Maker of test equipment, including a 'scope – in 1937. By 1957, 57 Clarendon Road, Watford, Herts. In 1964, at 47 Theobold Street, Boreham Wood, Herts. Futec, Future Technologies, Osaka, Japan (in 1981). Maker of consumer electronics.

ICW – Industrial Capacitors (Wrexham) Ltd, Miners Road, Llay Industrial Estate, Wrexham (in 2001) – tel. 01978 853805. Established in 1974. By 2003, owned by Sevcon Tech Ops Inc (USA).

ILP Electronics Ltd, Graham Bell House, Roper Close, Canterbury, Kent (in 1980). Maker of toroidal transformers and audio modules.

IMF Electronics Ltd, Westbourne Street, High Wycombe, Bucks (in 1977). Monitor loudspeakers.

IMI. Imperial Metal Industries (Kynoch) Ltd. A metal bashing firm, based in Witton, Birmingham. In the 1960's and early 1970's, IMI made the sectioned metal housing and cover for many British made UHF tuners.

IQD – Interface Quartz Devices Ltd, 29 Markey Street, Crewkerne, Somerset (in 1979). Crystals.

IR – see International Rectifier.

IRC. Brand of the International Resistance Co, 401 N. Broad Street, Philadelphia, Pa (in 1955). Maker of resistors (mainly wirewound types?).

ITA – Industrial Tape Applications, 5 Pratt Street, London, NW1 (in 1974). UK agents for Revox (Germany) and Otari (Japan).

ITT

The International Telephone & Telegraph Corporation, USA. Founded circa 1924 by Sosthenes Behn (from the US Virgin Islands). Prior to this Behn and his brother Hernan had co-founded The Puerto Rico Telephone Company. ITT bought International Western Electric from American Telephone & Telegraph in 1925. In the UK, Western Electric therefore changed its name to Standard Telephones and Cables Ltd (STC), in 1925.

In 1951, ITT bought a controlling stake in the Kellogg Switchboard & Supply Company (founded 1897). The following year it took over Kellogg completely and renamed it ITT Kellogg. ITT then merged another of its subidiaries, Federal Telephone and Telegraph Company, with ITT Kellogg and renamed the merged entity ITT Telecommunications.. In 1959, Harold Geneen was elected Chief Executive Officer of ITT and under his leadership, ITT became a very diverse group, with interests far removed from telecommunications and electronics (e.g. "Sherleys" pet care products, "Avis" car rental, "Rimmel" cosmetics, Hertford Insurance, Continental Baking Co and Sheraton hotels). ITT Semiconductors encompassed its various subsidiaries in the US, UK (STC) and West Germany (Intermetall). In the UK, circa 1975, ITT also acquired Erie Electronics (and thereby Hunts capacitors) and Daly Condensers. See the entry under STC. Geneen left ITT in 1977.

By the mid 1980's, ITT had divested itself of most of its telecoms interests, including the sale of most of its European telecoms interests to Alcatel (of France). However, in the UK, ITT set up its Standard Telephones & Cables subsidiary as a plc and sold shares. A few years later, it sold all its shares and this led to STC's takeover by Northern Telecom of Canada. In 1995, ITT split itself up into three separately quoted companies: ITT Industries (industrial, including "Cannon" connectors), ITT Hartford (insurance) and ITT Corporation (leisure).

ITT "TAG" range of resin dipped, solid tantalum bead capacitors. (1970)

ITT Components Group Europe, Equipment Products Division, Thornton Ind Est, Milford Haven, Dyfed (in 1975). For example, pneumatic wire stripper.

ITT Components Group Europe, Capacitor Division, Brixham Road, Paignton, Devon (in 1970). Formerly the valve and capacitor divisions of STC.

ITT Components Group Europe, Valve Product Division, Brixham Road, Paignton, Devon (in 1970).

ITT Components Group Europe, Power Components Division, West Road, Harlow, Essex 9in 1970). Maker of reed relays, etc.

ITT Consumer Products Services Ltd, Footscray, Sidcup, Kent. Tel Footscray 3333. (late 1960's to mid 1970's).

ITT Consumer Products (UK) Ltd, Theaklen Drive, Hastings, Sussex (in 1973 and 1979). Colour TV factory. In the 1950's, the fatory was owned by L.P.S. Electrical Co Ltd. A firm called Knightshades Ltd (probably an STC company) made lightshades at Silverhill Works, Theaklen Drive, St Leonards-on-Sea, Sussex, in 1968 – same place? It is not clear when KB/STC/ITT took it over. In 1973, there was also a test/assembly plant at Radlett Works, Colney Street, St Albans, Herts (in 1972, ITT Mobile Communications Ltd was at this location – ITT "Starphone" mobile radio handsets). By 1978, also at Chester Hall Lane, Basildon, Essex (in part of an STC factory). The Hastings factory closed in June 1980 (last set made was the 16" CP340 (CVC40 chassis). Thereafter, ITT-SEL designed sets were assembled at Basildon, from kits imported from Germany. Production at Basildon ended in the mid-1980's. Thereafter, complete sets came from Bochum (Standard Elektik Lorenz) in Germany. With the sale of ITT's European businesses, Nokia acquired the consumer electronics operations and the ITT brand was eventually displaced by Nokia – in the same way that ITT displaced KB in the late 1960's. In 1996, Nokia sold its consumer operations (except for satellite receivers) to

Semi-Tech (Global) Company Ltd – a subsidiary of Semi-Tech Corporation of Canada.

ITT Creed Ltd, Hollingbury, Brighton, Sussex (in 1974 and 1980). Maker of teleprinters, etc.

ITT Electronic Services, Edinburgh Way, Harlow, Essex (in 1970). The "big yellow book" – component distributor.

ITT Mercator, South Denes, Great Yarmouth, Norfolk (in 1978). New name for Erie Electronics Ltd – as the UK distributor for Eire (North America) professional and military components (filters, resistors, feed-throughs, crystal oscillators, etc.).

ITT Semiconductors, Footscray, Sidcup, Kent (in 1970).

ITT Sealectro Ltd. Matrix panels and connectors.

ITW Paktron (in 1973). Plastic film capacitors. ITW Electronic Division, 263 Farnham Road, Slough, Berks (in 1973).

IVC – International Video Corporation, 675 Almanor Avenue, Sunnyvale, California 94086 (in 1972). VTR and other broadcast TV equipment maker.

Igranic. Igranic Electric Co Ltd. (Igranic Works, Elstow Road, Bedford) in 1925, 1946 & 1957. In 1920/30s, they had a London office at 149 Queen Victoria Street. Made coils for radio sets in the 1920's. Maker of jack plugs and sockets, potentiometers, rheostats (in 1950). Became part of the Metal Industries Group circa 1957 – as did Avo and Taylor, later on. MI Group was later taken over by Thorn. Merged (in the 1960's?) with Brookhirst Switchgear Ltd of Chester, to form Brookhirst Igranic Ltd. BHI was later taken over by, or sold to, Cutler-Hammer Inc, of the US. C-H were in turn taken over by the Eaton Corporation. Today (2002), Igranic Ltd, is restored and based at the same Bedford location.

Imhof (Alfred) Ltd, 112 New Oxford Street, London, WC1 (in 1947). Maker of equipment cases, cabinets and racking. In 1965, at Ashley Works, Cowley Mill Road, Uxbridge, Middx. By 1969 it was a subsidiary of Parnell Investments Ltd. In 1969, it was merged with Bedco Ltd and re-named Imhof-Bedco Ltd. By 1976 Imhof-Bedco Standard Products Ltd, Ashley Road, Uxbridge, Middx. Taken over by BICC-Vero Electronics Ltd, in the 1980's.

Imperial – brand name of German radio, radiogram and dictating machine maker Continental-Rundfunk GmbH, Stassfurt, W. Germany. In 1955, Jason Finance Co Ltd, set up a new company, Continental Radio & Electronics Ltd, to market their products in the UK. Continental Electronics Ltd, 3 Farringdon Road, London, EC1.

Indesit Ltd, 292 Streatham High Road, London, SW16 (in 1964). UK offices of the Italian domestic appliances and (one-time) TV manufacturer.

Industrial Instruments Ltd. In 1965 & 70, sales and development at Stanley Road, Bromley, Kent (factory at Ponswood Industrial Estate, Hastings, Sussex in 1970). Maker of "Transipack" Uninterruptible Power Supplies, regulated power units, etc. In 1961, Transipack, 29 Burnt Ash Hill, London, SE12. In 1982, there was a firm called WK Electronics Ltd, Napier Rroad, Bromley, who made Transipillars (spacers) and Transiblock (insulated mounts for heatsinks.

Industrial Electronics, 229 Hale Lane, Edgware, Middx (in 1947) and 99 Grays Inn Road, London, WC1 (in 1950 – office?). Maker of test equipment (e.g. oscilloscope) and industrial controls.

Instanta Ltd (in 1947). Kaker of Instanta relays. Acquired by Magnetic Controls Ltd, 48 Old Church Street, Chelsea, London, SW3, in the same year.

Insulators Ltd, Leopold Road, Angel Road, Edmonton, London, N18 (in 1965). Injection, compression and fiberglass mouldings for the consumer electronics, electrical appliance and other industries. They made the plastic case for the Bush TR114 radio.

Insuloid See Hellerman

Intel Corporation, 365 Middlefield Road, Mountain View, California (in 1971). Semiconductor maker – inventor of the microprocessor. Set up by Gordon Moore and Robert Noyce, after they left Fairchild Semiconductor.

Intermetall GmbH. A German semiconductor manufacturer. By 1965, it was a subsidiary of the Clevite Corporation (USA). In the same year, ITT acquired Clevite's US based semiconductor businesses, as well as Intermetall and the semiconductor interests of Brush-Clevite, Southampton, UK. The UK Brush-Clevite interests were transferred to STC (ITT's UK company)

International Aeradio Ltd (IAL), 40 Park Street, London, W1 (in 1953). Maker of avionics.

International Computers Ltd (ICL), Cavendish Road, Stevenage. Herts (in 1969). ICL was formed by merger of International Computers & Tabulators and English Electric Computers, in 1968. Later taken over by STC (1984), then sold to Fujitsu of Japan. International Computers Ltd, Kidgsgrove, Stoke-on-Trent, Staffs (in 1970). Fujitsu dropped the ICL brand in the 1990's.

International Computers and Tabulators (ICT) was formed, circa 1958, by the merger of British Tabulating Machine Company and Powers-Samas. ICT absorbed the computing interests of GEC (1961), EMI (1962) and Ferranti (1963). ICT merged with English Electric Computers, in 1968, to form International Computers Limited (ICL).

International Marine Radio Company Ltd, 1 Peall Road, Croydon (in 1966 & 73). An STC, then ITT company. Maker of marine radio comms equipment.

International Rectifier. International Rectifier Corporation, 1521 East Grand Avenue, El Segundo, California. An American semiconductor company established by Leon Lidow and his son, Eric, in 1947. Initially, they made metal rectifiers but progressed onto silicon devices and transistors. They opened a UK factory at Hurst Green, Oxted, Surrey, in 1958. Initially, this was in partnership with Lancashire Dynamo Holdings (who were taken over by Metal Industries in 1960). Hence, in 1965, the UK company was part of the Metal Industries group. By Jan 1966, the "MI" logo disappeared from I-R (UK) advertisements. In 1966, they were offering solid-state, plug-in replacements for recifier valves. In 2004, run by Alex Lidow (son of Eric) and still an independent company.

Intersil Inc (in 1976). By 1982, Intersil-Datel.

Invicta Radio Ltd, Radio Works, 37 Parkhurst Road, London, N7 (in 1944 & 52) – a radio manufacturer. At 100 Great Portland Street, London, W1 (in 1960 & 62). Established in the 1930's (by C O Stanley, of Pye). Certainly a Pye subsidiary by the 1950's. Invicta was Pye's wholesale brand.

Irish Cables Ltd, Castlewellan Road, Newcastle, Co Down, N Ireland (in 1957). An associate of Wandleside Cable Works Ltd. Maker of TV aerial downlead coaxial cables.

Iskra Ltd, Redlands, Coulsdon, Surrey (in 1977). UK arm of Iskra Kranj, Yugoslavia, the electronic component manufacturer. Previously known as Guest International Ltd.

Letters

Dear Editor

Ref: letter Vol 29 No 4 'Thinking about crystal sets'

I thank Mr Levin for his kind remarks about my attempt to introduce novice members to the principles which underlie crystal sets. As I said in the article, in order to make it accessible to as many members as possible I have used simplifications and approximations.

Mr Levin raises the questions of unused turns on coils and stray capacity. All circuit designers have to consider the effects of strays and component impurities upon circuit separation. What we do is make a very rough order of magnitude, estimate if any of the strays/impurities effect actual operating conditions (what is negligible on long waves can be overwhelming on VHF for instance). If the indication is negligible we do not need to perform a complex analysis for all possible combinations of circuit parameters and manufacturing tolerances. Or if I am writing a very simple article I do not need to burden novice readers with complex analyses which are not essential to a basic understanding of simple circuits.

In my article I said unused turns may or may not be shorted. This was in the context that some sets do and some sets do not short unused turns and was not intended as a design reccomendation. It is good practice to short out all unused windings (not on power transformers of course). In the case of multi-band receiver coil packs and transmitter tank circuits serious problems may arise if this is not done. Special switch wafers are made which short all contacts except the one selected.

In the special case of a crystal set the tuned circuit is very heavily loaded and I have never been able to detect if the unused turns are shorted or open on a crystal set but this may not be always true. Before someone writes to ask what about the power lost in the shorted turns, the answer in the case of radio tuned circuits is negligible. If the winding resistance is very low as it should be and the short is physically short then you have very little resistance to dissipate energy in.

If you take a reasonable estimate of the time constant of the self capacity of a pair of 'phones and leads with the winding resistance, you will find much less than one microsecond. Envelope detection at broadcast frequencies using strays is not therefore possible.

The important point in the article is that without a large enough capacity current must flow through the detector even when it is reverse biased. I explained the mechanics of the capacity filter and the constraints upon its value in the article.

Yours sincerely,
LL (Bill) Williams

Dear Editor

So you want to build a wireless using germanium crystal triodes

While reading Henry Irwin's article in the winter Bulletin, I realized with some horror that it was now more than fifty years since I also built my first transistor set. It was very slightly later than the article in Wireless World and came from the February 1955 edition of Radio Constructor, which was then my preferred reading. The source article still paid its respects to the old technology, however, being entitled A Transistor "One-valver".

The circuit was simple in the extreme, using an OC51 and a specially designed HMX Teletron coil. Despite having no reaction, let alone reflexing, it performed very well and was perfectly adequate for under the bedclothes listening in Cambridge, where we lived at the time. Its only technical drawback was its rather limited tuning range, occasioned by having to use a very small 100pF variable condenser in order to fit into the case.

The other drawback was financial. The author referred to the price of 30/- for an OC51 as 'modest', but it didn't feel that way to an 11 year old schoolboy, and I had to negotiate a loan from my father (actually, I think he was rather keen to see if the set worked, and gave me very easy terms). Not all that long afterwards, of course, red and white spot transistors were a tenth of the price, but I think that even they were about 10/- to begin with.

I still have the OC51 somewhere and have a long term ambition to recreate the set. But I'd need the Teletron coil, which was equally vital and now, I suspect, even more rare. Anyone got one, by happy chance?

The other thing I remember from about that time was a book in the school science library (which must have been quite good, now I think about it) which described the early point contact transistors and suggested that you could make one by breaking up a couple of germanium diodes. But I never tried it out!

Yours Sincerely
Antony Wedgwood

Dear Editor

Since my article on the "Lotus 3 valve band pass receiver" was printed in the last Bulletin I have heard from Jeffrey Borinski, who confirms that 2 Lotus chassis he has of the 3 valve set are not band pass, having only a 2 gang tuning capacitor. It therefore confirms my theory that this was a more expensive model they introduced, and with a serial number of 3000 looks like the first off the production line. It will be interesting to see if any other readers have come across this particular model. I doubt it is the only one still in existence, but you never know! I notice you didn't publish the circuit diagram which I guess would have taken up too much space.

Regards,
Graham Dawson

Dear Editor

A Rosetta Stone?

I am concerned about the future of early radio collections, a future in which being well past my 'best before' date I do not expect to have much participation.

I see in BVWS members the custodians of a heritage of some importance, no less than the roots of our electronics–based modern world. Worldwide telecommunications, PCs, electronic banking, mobile phones, the internet, cars with electronic engine management systems and even the instruments we are using to probe the nature of the cosmos; all developed from the technology of early radio. Our world could not be as it is without it.

In the short term I think we are doing a good job in collecting, restoring and recording. On balance I am pleased that the bulk of early sets are dispersed in small, private collections. We need, however, large comprehensive collections open to all as a reference source but the destruction by fire of the National Motorcycle Museum shows how vulnerable such collections can be when hundreds of rare items are stored under one roof.

I have directed that my own small collection with all the documentation shall be auctioned after my death. My reasoning is that a set is more likely to be well treated if a good price is paid for it than if it is given unasked for to a museum which has neither space or inclination to display it or suitable storage to keep it in. In the long term however well the sets have been restored and housed they will be subject to decay due to the limited life of the materials from which they were constructed. I also believe that some sets should be demonstrated operable and that, in the long term means spares and few parts have unlimited shelf life. Eventually our prized items will decay in museum cellars (they will be of little interest to the general public). Finally, early radio will become the province of a few specialist arcaeologists who will theorise about what the heiroglyphics on the circuit diagrams say.

Let us look at a preservation success story; the steam railway preservation societies, they collect and restore early railway equipment. I can visit a museum and spend a whole day walking round beautifully restored steam locomotives. I can also visit and ride a fully operational railway system which is not only a tourist attraction but operates to a timetable as a public service.

Better still, I can see and hear an express train thunder past at full speed. If I want to I can climb onto the front plate of a working engine and under supervision select gear and ease open the regulator to accelerate a 400 ton train away from rest. To operate a steam railway, members have had to research and learn all sorts of forgotten skills, for instance to restore engines they re–tube or even make boilers and all kinds of mechanical parts. One group is making an entire express locomotive of a type which no longer exists, creating the parts from new materials using the original blueprints.

Forty years ago I knew a radio amateur who repaired transmitting valves in his garage. It required only some simple glass working tools, a home made mini spot welder, a vacuum pump, a few bits of the right kind of metal and some simple hand tools. It's a lot easier than making a 100 ton engine. A mica and copper foil capacitor is much easier than making, say, an 'R' type valve. Both are quite feasible as home workshop projects and the results would be absolutely perfect reconstructions. If the will exists it is possible to maintain early equipment indefinitely.

Unfortunately, a preserved radio station does not have the same public appeal as a steam railway. There are a few operational stations with early equipment which may be operated by licensed radio amateurs and these do attract some interest and I detect an increasing section of the amateur community who set little satisfaction from operating the latest PC–based electronic miracles. One described it as being an appliance operator with little skill required. Some are returning to 'home brew' and simple home build AM transmitters or 'Ancient Modulation' as certain operators of commercially made digital systems term it. I have serious thoughts about building a 1930's style amateur station myself. I would have no difficulty in finding some similarly equipped stations to work. If we have the will we can operate early equipment as a group like the steam railways, vintage aircraft and English civil war re–enactment societies. It would be a lot better than leaving our sets to disintegrate on dusty museum shelves.

There is another problem which needs to be solved. All the information needed to recreate old radio artefacts and skills is in old publications, some of which are preserved in BVWS members' collections, but how can I find one early obscure publication of say 200 pages in which a single paragraph contains what I want to know. It would require a powerful search engine but that in turn would need an immense amount of data to be collected. A less comprehensive but easier to create solution would be to make a compendium of important information. For instance the June 1982 Bulletin contains an item by Desmond Thackeray which lists the appearance, nature, usage and sources of minerals used in crystal detectors. This would distil into one page giving the information to recreate many kinds of detector. I think any such compendium must have a hard copy from which is carefully guarded. I have a retired colleague who 40 years ago stored the results of many years of painstaking work on computer tape. When the computer was scrapped he preserved the tapes. Now that the data on them has become of importance to a new project and will require years of work to regain because no working machine can be found to recover the data from the format in which it is preserved.

There is a related problem. Much early information is in notation and units which will be difficult for any engineer who graduated after 1955. The omega Ω sign on early circuits must be read as Meg Ohms but on later circuits as Ohms which were written as the small omega symbol on early circuits. Anyone who graduated within the last twenty years may never have seen any form other than the Roman R .

I have lived through three systems of electrical units, three standards of circuit symbols and three conventions for drawing circuit diagrams. Consequently I can correctly interpret any data on electrical subjects published over the last 150 years, but there cannot be too many who are fluent in early wireless.

For future generations we need to create a 'Rosetta Stone' to enable the hieroglyphics to be correctly translated. We are fortunate that no scientific work was carried out after the mid 19th century using imperial measures. Consequently all electrical units however early are metric. Even the ultra conservative BBC never gave station wavelegths in yards, feet and inches but I am surprised that the Admiralty didn't use fathoms. Unfortunately my lifetime also spanned three systems of metric units. I was always educated in CGS (Centimetre, Gramme, Second) units. Briefly converted to MKS (Metre, Kilogram, Second) units at the whim of the BSI in the 1950s and then to SI (System International) units, which the whole world, even the USA uses. All metric, conversion should only require moving decimal points. Unfortunately SI units lump some mathematical constant like 4π which are always used in conjunction with parameters like permeability and permettivity into the constant used to define these properties of materials. This greatly simplifies calculations because we no longer have to multiply $4\pi/10$. It has already been done to the number that you look up in the tables. However it does make translation from CGS (pre 1950) to SI (1960 onwards) more complex and error prone.

What the Rosetta Stone needs is all three systems of units and all versions of circuit symbols and drawing conventions with exact equivalents otherwise early publications could have been written in ancient Greek (some of the symbols were!).

If there is sufficient opinion in favour of such a project it will be necessary to form a small working group to carry out the necessary work of research and compiling. Don't look at me! It's a serious long term task and I am old and have my days well filled. Vintage wireless is my fourth and least of my interests and only gets a few hours per year usually when the weather is too bad or I am too ill to do anything else.

I would suggest that some way to begin the Rosetta Stone is to publish occasional one page items in the Bulletin containing archaic symbols, units and component symbols and their exact modern equivalent or any required conversion factors together with a brief explanitory note if necessary. This page would be scrutinised by all interested partners for errors and omissions and after editing would be added to the growing store. When sufficient translations are to hand they could form an appendix to the proposed compendium of early wireless data. I have a possible title for the one page items – Archaisms. I think the plural 's' is incorrect but Archea which I like has a connotation in evolutionary biology to which some may object.

I can imagine many members saying 'we don't need this. we just want to collect old sets'. Fine in the short term but knowledge is power and it is of limited use unless we can understand what it is that we have collected. The real Rosetta Stone enabled the translation of Egyptian hieroglyphics. We can now read all the codices on the mighty structures of the Pharoahs but we don't know how the ancient Egyptian engineers 4000 years ago built structures which our most powerful machines cannot do today, even at a tenth of the original size. Some archaeologists theorise about how it might have been done but as for practical tests all have failed.

In the BVWS we are preserving the engineering texts. Two generations from now may not have a Rosetta Stone, the early texts may be very difficult to understand. It may not matter but history shows odd bits of almost forgotten knowledge are essential to progress.

If there is enough interest I will, if I am able to, submit a couple of pages of old symbols and units. Get it on paper first then put it into a logical order when the collection is large enough I think. It's up to you. Perhaps one day a member restoring a late 1930s or 40s continental made set will find a failed oscillator padding capacitor with a value given in centimetres and factor to convert centimetres to picofarads. Padders are often ±1% tolerance. It's a case where near enough may not be good enough if you want perfect tracking. The BVWS CDs are a great source of essential information, let us add to it.

Yours sincerely,
LL (Bill) Williams

Dear Editor

I was very interested in the item by L.Williams on crystal sets. (Autumn issue). It may be worth recording my experiences as below;

a). I have found it best to have a simple 'tank' circuit wound to high Q dimensions and tapped a few times, including at each couple of turns at the bottom end, and tuned overall by a low loss 500pF capacitor. Then tapping the aerial down and the crystal feed down from the top also (probably a different tap) leads to an optimum match and volume/selectivity compromise. The capacitor always tunes the whole coil as this restrains resonant mode-hopping.

b). Telephone Capacitor,
What may be the self capacity of long 'phone cords? I have never tried low pF/metre coax to compare.

c).Audio.
DLR5 'phones are low resistance and so an atrocious mismatch to a crystal set yet deliver loud signals to the ear. Use of a step-down matching xfmr of varying ratio gives also a big improvement as DLR5 is matched to the crystal set source Z. Surprisingly an old RS 40volt many winding Xfmr is heavy but does the match well. The silicon steel core is no great help so a better and smaller Xfmr with NiFe core could be more efficient. The tiny D.C in the Xfmr winding is no saturation threat. However D.C bias on another winding could with benefit move the operating point of the core to its max. permeability. It seems that crystal set Z varies with signal level so audio match needs optimising for each signal strength. The use of crystal bias can bring the crystal to a state of best rectified output power of modulation.

So it seems I need variable Ae-in and crystal take-off taps, variable crystal bias, and alterable audio match to 'phones (no time to listen to the programme?). I did most of my trials some 30/40 years ago when matching into a good 3 ohm PM LS or better a 15 ohm mains energised one gave loud speaker results.

Since then no doubt age will have lopped n db off my ear response so it's too late now to hear the best. However, my Brown Mic Amp helps, and here is a further pair of matchings to be looked after.

Finally, modern Xtl earpieces are voltage operated and reputed to give (when provided with a parallel resistive charge leak) good results. For them the matching would have to be looked at all over again.

Gillette razor blades no longer seem to have diodic blue coating and seeing a crystal set my post-grad students enquire, "Where is the remote?" How times change. I hope someone will keep double side band HiKW analogue braodcasts going for some long time.

Congratulations on top quality Bulletin these days.

Best Wishes,
Phil Beckley

Dear Editor

I thought I might share a strange electronic fault that I have discovered with fellow members; I shoe–horned the output stage of a 'Dynatron' record player (ECC83, 2 x EL84) into the cabinet of an American 1940s home acetate recorder.

They often turn up at swapmeets, two 'tone-arms' half–nut is a bit of hacksaw blade on edge. A 6SL7 provided a pre–amp and I evolved what was a fair representation of a 60 year old midget recorder. All's well until during a three hour playing series of 1944 swing there is a loud hum. Oh dear. A suspect heater cathode leak, changing the valve made it sound better... Not for long though, removing two 47Ω across LT and using 200Ω pots made no difference.

Giving the ECC83 driver a wiggle, my hand caught the 50µF–50µF psu electrolytic and all was sorted! The capacitor was *not* earthed, only relying on case–to–mounting clip contact. 40 years of aluminium–steel junction was just a little bit high resistance (another tip – don't even try to use a stroboscope under high efficiency flourescent tubes, unless you work at 60,000 rpm! everybody's probably got caught on that one if they'd admit it!

Regards,
John R Gomer

Minutes

Minutes of the BVWS Committee meeting held on Friday 16th December 2005 at the Vintage Wireless Museum, Dulwich.

Present: Mike Barker (chair), Carl Glover, Graham Terry, Guy Peskett, Ian Higginbottom, Paul Stenning, Jeremy Day, Jon Evans, Martyn Bennett.

1. Apologies for absence: Terry Martini.

2. The minutes of the meeting held on Thursday 6th October 2005 on the conference telephone were accepted as a true record. Matters arising (not dealt with below): none.

3. MB proposed and GT seconded that Martyn Bennett (MtnB) be co-opted onto the Committee. Approved nem con. MtnB took his place and was welcomed by the Committee.

4. GT reported that the membership at nearly the end of the Society's year stood at 1697. The corresponding figure last year was 1740.

5. JD tabled provisional accounts for 2005. He reported that the account balances at 16 December stood at £9,752 (current) and £16,981 (deposit). The greatly reduced costs of printing the Bulletin were noted.

6. CG reported that the Christmas Bulletin had been printed and delivery was expected at the Museum at any time. He reported he was running low on material for 2006 and called for more articles (closing date for copy 1st week of each quarter).

7. Late delivery of material for the DVD faced the Committee with the choices of mailing the Bulletin without it or delaying the mailing until the New Year. It was decided to mail in time for Christmas enclosing a slip saying that the DVD would be included with the February mailing. JE agreed to take over production of the DVD. The theme will be television, the provisional contents being: Manufacture of a GEC television (1958), History of Television by Mullard (possibly BBC copyright), and Mullard CRT manufacture, a total of about 50 minutes. MB will contact Robin Reynolds, head of BBC Heritage, to try to sort out the copyright position. The discs must be ready for the first week in February; this means the content must be decided by 23 December.

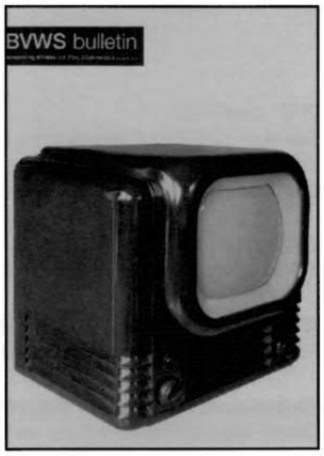
8. 30th Birthday celebrations. MB proposed that an Exhibition of Collecting be part of the event and called for suggestions for exhibits. A preliminary list was drawn up.

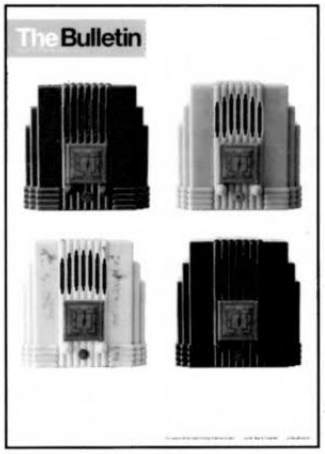
9. Committee communications. MB urged all members of the Committee to join the private Committee area of the Internet Vintage Wireless forum set up by PS.

10. MB reported that the group running the NVCF for the Society had pulled out of the agreement before the end of the contract. It was agreed that the Committee would take it on. The following decisions were made; there would in future be fairs in the summer only, the Guide would be discontinued and a simple stall plan produced. There would be a discount on stalls for members of the Society. The entry timetable and charges were discussed. The flyer and ticket application forms would be sent out in January to those normally booking stalls and February to all other BVWS members. Advanced booking of entry tickets would now be administered.

11 AOB
(i) A confidential item was discussed
(ii) PS reminded committee members about how to access the private forum
(iii) It was noted that the NVCF date would clash with that of a major French meeting.

The next meeting was set for 16th February 2006 on the conference phone. The meeting closed at 01.05.





Back issues

Vol 10 Numbers 2, 3 & 4 Inc. The KB Masterpiece, Extinct Species "A Monster Defiant".

Vol 11 Numbers 1, 2, 3, 4 Inc. BTH VR3 (1924) receiver, Marconi's 1897 tests, Origin of the term 'Radio', Baird or Jenkins first with TV?

Vol 12 Numbers 1, 2, 3, 4 Inc. the Emor Globe, The Fultograph, Ekco Coloured Cabinets.

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

Vol 14 Numbers 1, 2, 3, 4 Inc. Cable broadcasting in the 1930's, The story of the Screen Grid.

Vol 15 Numbers 2, 3, 4 Inc. The wartime Civilian Receiver, Coherers in action, Vintage Vision.

Vol 16 Numbers 1, 2, 3, 4 Inc. The Stenode, The Philips 2511, Inside the Round Ekcos.

Vol 17 Numbers 1, 3, 4, 5, 6 Inc. Wattless Mains Droppers, The First Philips set, Receiver Techniques.

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

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

Vol 20 Numbers 1, 2, 4, 5, 6 Inc. Radio Instruments Ltd., Japanese shirt pocket radios, Philco 'peoples set', notes on piano-keys, the story of Pilot Radio, the Ever Ready company from the inside, the Cambridge international, the AWA Radiolette, this Murphy tunes itself!

Vol 21 Numbers 1, 2, 3, 4 Inc. Marconi in postcards, the Defiant M900, GPO registration No.s, Personal portables, the transmission of time signals by wireless, the Ekco A23, historic equipment from the early marine era, the birth pains of radio, inside the BM20, plastics, Ferdinand Braun, pioneer of wireless telegraphy, that was the weekend that was, the first bakelite radios, BVWS - the first five years, the world of cathedrals, Pam 710.

Vol 22 Numbers 1, 2, 3, 4 Inc. Another AD65 story, the Marconiphone P20B & P17B, listening in, communication with wires, the story of Sudbury radio supply, French collection, Zenith Trans-oceanics, Farnham show, Alba's baby, the first Murphy television receiver, AJS receivers, Fellows magneto Company, Ekco RS3, Black Propaganda.

Vol 23 Numbers 1, 2, 3, 4 Inc. Sonora Sonorette, Bush SUG3, RNAS Transmitter type 52b, North American 'Woodies', Why collect catalin, Pilot Little Maestro, Theremin or Electronde, The Radio Communication Company, Early FM receivers, an odd Melody Maker, Black propaganda.

Vol 24 Numbers 1, 2, 3, 4 Inc. The Superhet for beginners, Triode valves in radio receivers, History of GEC and the Marconi - Osram valve, KB FB10, Great Scotts!, Riders manuals.

Vol 25 Numbers 1, 2, 3, 4 Inc. Repair of an Aerodyne 302, Henry Jackson, pioneer of Wireless communication at sea, Zenith 500 series, Confessions of a wireless fiend, RGD B2351, John Bailey 1938 Alexandra palace and the BBC, Ekco during the phoney war, Repairing a BTH loudspeaker, The portable radio in British life.

Vol 26 Numbers 1, 2 Inc. How green was your Ekco?, The Amplion Dragon, Crystal gazing, The BVWS at the NEC, Installing aerials and earths, novelty radios, Machine-age Ekco stands of the 1930s, Volksempfänger; myth & reality.

Supplements:
1 'WW 1927 data sheet'
2 'Seeing by wireless' the story of Baird Television
3 Reproduction Marconi catalogue

Earlier Bulletins and supplements are priced at £2:00 each + postage. Bulletins from volume 21 onwards are priced at £2.50 each. + postage.

Postage: for individual Bulletins add 50p, for 2-5 bulletins add £1, for 6 or more add an extra 20p each.
23 Rosendale Road, West Dulwich
London SE21 8DS
Telephone 020 8670 3667.

Cheques to be made payable to 'The Vintage Wireless Museum'.

News and Meetings

GPO registration Numbers
Martyn Bennett has the role of custodian of the BVWS list of GPO Registration Numbers. As many members will know the project of assembling this list was started in the early days of the BVWS and, more recently, has been enthusiastically carried on by 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

2006 meetings
5th March Harpenden Auction and AGM
19th March Radiophile *Exposition* at Shifnal
9th April West of England Vintage Wireless Fair
23rd April Workshop at British Vintage Wireless and Television Museum
23rd April Radiophile *Spring Exposition* at Cowbit
6th May BVWS 30th anniversary meeting and show at National Motorcycle Museum
7th May NVCF at Warwickshire Exhibition Centre
3rd June Garden party at British Vintage Wireless and Television Museum
4th June Swapmeet at Harpenden
2nd July Wootton Bassett
9th July Workshop at Vintage Wireless Museum
23rd July Radiophile *Summer Special* at Sambrook
18th August 'Friday Night is Music Night' at British Vintage Wireless and Television Museum
3rd September Table top sale at British Vintage Wireless and Television Museum
10th September Radiophile *Exposition* at Shifnal
1st October Swapmeet at Harpenden
15th October Southborough
22nd October Workshop at British Vintage Wireless and Television Museum
22nd October Radiophile *Exposition* at Cowbit
12th November Leeds Vintage Audio Show
3rd December Wootton Bassett

2007 meetings
6th May NVCF at Warwickshire Exhibition Centre
1st July Wootton Bassett
2nd December Wootton Bassett

2008 meetings
4th May NVCF at Warwickshire Exhibition Centre

Workshops, Vintage Wireless Museum:
For location and phone see advert in Bulletin. 11:00 start.

Harpenden: Harpenden Public Halls, Southdown Rd. Harpenden. Doors open at 10:00, tickets for sale from 09:30, Auction at 13:30. Contact Vic Williamson, 01582 593102
Leeds Vintage Audio Show: Ramada Jarvis Hotel Seacroft roundabout A64, Leeds. Doors open 10:00. Contact Andy Wilcox, 0113 273 2323
West of England Vintage Wireless Fair: Willand Village Hall (J27/M5). Doors open 10:30. Contact Barrie Phillips, 01392 860529
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 10:30. Contact Mike Barker, 01793 536040
Southborough: The Victoria Hall, London Road. Southborough, A21, Kent. Doors open 10:30. Contact John Howes, 01892 540022 (between 8 and 9PM Only please)

For more details with maps to locations see the BVWS Website:
www.bvws.org.uk/events/locations.htm

AN EKCO A22 WIRELESS RECEIVER, IN BLACK BAKELITE CASE, 1946
£500-800

Auction
31 May 2006

Consignments by
20 March

Viewing
27-31 May

Enquiries
Laurence Fisher
lfisher@christies.com
+44 (0)20 7752 3278

Catalogues
+44 (0)20 7389 2820

South Kensington
85 Old Brompton Road
London SW7 3LD

View catalogues
and leave bids online
at **christies.com**

Mechanical Music and Technical Apparatus

South Kensington, 31 May 2006

CHRISTIE'S
SINCE 1766


250
300