The Bulletin

Vol. 33 no. 3 Autumn 2008 www.bvws.org.uk

BVWS Auction

Wootton Bassett, September 28th 2008.

High quality equipment from the pre–broadcast era to the late 1920's and early 1930's

Pictures of the items will be available, along with a downloadable catalogue from the BVWS website late August 2008.

Mobile phones are prohibited at this event!

Venue: The Memorial Hall, Station Road, Wootton Bassett. Swindon.

Viewing from 9 am

Sale starts promptly at 10 am

Bulletin of the British Vintage Wireless Society
Incorporating 405 Alive
Volume 33 No.3 Autumn 2008

www.bvws.org.uk

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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

Once again, September is upon us and the evenings are drawing in. We seem to have missed out on a long hot summer this year; plenty of tomatoes in the greenhouse but little sun to ripen them means a bumper batch of chutney.

Having now completed all of the lotting, photographing and organizing of the Special Auction on the 28th, I can concentrate a little more time on getting the workshop up and running, but there's still a huge amount to do.

The BVWS will be at the 'Murphy Day' at Mill Green Museum, Hatfield on the 21st, where several of us will be displaying and running Murphy radio and TV equipment for the afternoon. This is a pleasant afternoon there being a working water wheel driving a flour grinding mill and pleasant gardens to enjoy as well.

The sales of capacitors to members have been such a success that we have extended the range of capacitors available with several other values being stocked. The long awaited dual electrolytic cans are now ordered and will be available any time.

The BVWS North West radio meeting is on the move once again. The new venue will be: Lowton Civic Hall. Hesketh Meadow Lane, Lowton, Warrington, WA3 2AH. It is situated about 1 mile from the A580 and 3 miles From the M6/A580 junction. See below for further details and enclosed stall booking form.

Please support this event if you possibly can. Events can only survive with members support. I would like to thank Mark Ryding and his family for volunteering to organize the new event. The BVWS stall will be there with a heap of goodies to dispose of from the store.

There will also be a display of vintage 405 Line TV's working and a show of classic vintage radios.

I would also like to take this opportunity to thank John Marshman for hosting the last two Manchester meetings, they were most enjoyable.

A recent visit to the Wireless Museum, at Dulwich found a number of surprises.

Several of the main house rooms have been re-organized to make better use of the space and show more of the exhibits that had been tucked away in dark corners where they could not be seen. I must congratulate Gerry and the team on their efforts. It's well worth a visit to see what's going on, and at the same time you could take a wireless with you and get it 'Health' checked. See you all on the 28th.

Mike…

New BVWS North-West meeting

Sunday 23rd November 2008

The Pennington Room,
Lowton Civic Hall.
Hesketh Meadow Lane,
Lowton, Warrington, WA3 2AH.

Stallholders 9.00am
General entry 10:00am
entry £3.00 on the door.

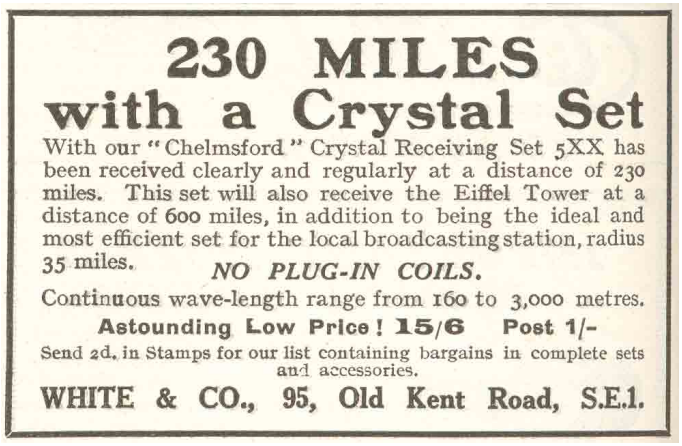
Light refreshments will be available in the hall.

Organizer: Mark Ryding
See stall booking form enclosed.

Crystal Sets and the 5XX High-Power Stations by Ian L. Sanders

"…the experimental 5XX marks a great milestone on the road to the ultimate aim of a perfect broadcast scheme, and it is to be sincerely hoped that formal permission for its permanent erection will not be long forthcoming." Captain P.P. Eckersly, Chief Engineer, the British Broadcasting Company, October 1924.

Measuring just 3½ inches in diameter, the 1924 circular Mecophone 5XX Crystal by Mann, Egerton & Co., Ltd. of Norwich was pre-tuned for reception of the BBC's long-wave station. The Post Office approval stamp indicates a manufacture date sometime before the end of the registration scheme in September 1924; in other words, shortly after the opening of Chelmsford, but almost a year before Daventry went on the air.



230 MILES
with a Crystal Set

With our "Chelmsford" Crystal Receiving Set 5XX has been received clearly and regularly at a distance of 230 miles. This set will also receive the Eiffel Tower at a distance of 600 miles, in addition to being the ideal and most efficient set for the local broadcasting station, radius 35 miles.

NO PLUG-IN COILS.

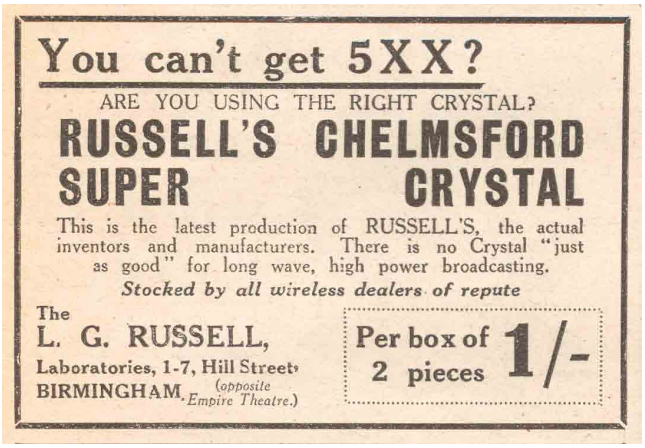
Continuous wave-length range from 160 to 3,000 metres.

Astounding Low Price! 15/6 Post 1/-

Send 2d. in Stamps for our list containing bargains in complete sets and accessories.

WHITE & CO., 95, Old Kent Road, S.E.1.

An ambitious claim for a crystal set, but several advertisements like this appeared after the opening of the BBC's high-power station. *Wireless Weekly*, November 12th, 1924.



You can't get 5XX?

ARE YOU USING THE RIGHT CRYSTAL?

RUSSELL'S CHELMSFORD SUPER CRYSTAL

This is the latest production of RUSSELL'S, the actual inventors and manufacturers. There is no Crystal "just as good" for long wave, high power broadcasting.

Stocked by all wireless dealers of repute

The
L. G. RUSSELL,
Laboratories, 1-7, Hill Street,
BIRMINGHAM. (opposite Empire Theatre.)

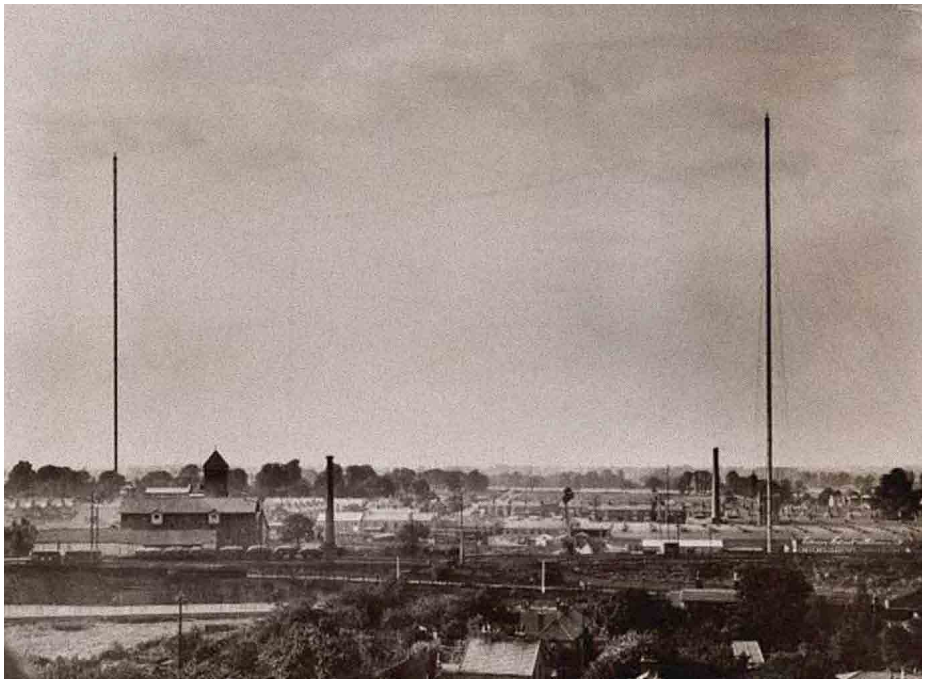
Per box of 2 pieces **1/-**

Specially formulated crystals for long-wave reception? Russell's of Birmingham professed to have invented one. *Popular Wireless Weekly*, September 13th, 1924.

The British Broadcasting Company opened their experimental high-power, long-wave station at Chelmsford on July 9th,1924, supplementing the local stations - eight main and five relay – then in operation. The new station, transmitting under the call sign, 5XX on a wavelength of 1,600 metres was the subject of controversy with listeners and in the wireless press. Operating at 15kW – some ten times more powerful than any of the existing BBC local stations at the time – Chelmsford was intended to boost nationwide coverage for listeners using crystal receivers, providing satisfactory crystal reception within a 100 mile radius of the station. The problem, however, was that the inherently unselective nature of the typical crystal set's tuning circuit would mean serious interference between 5XX and the local station in many areas. The need for receiver modifications (in the case of a crystal set this meant only the addition of a loading-coil in the aerial circuit) was another cause of concern with the public; the rendering obsolete of recently purchased sets causing much anxiety. Ironically, then it was the crystal listener – the intended beneficiary – who was the most concerned about the introduction of the new long-wave station.

The introduction of a high-power station had first been discussed by the BBC in late 1923 and a committee of industry leaders was established to review the idea. The original concept had been to set up a second station in London employing a power of 20kW to solve the problem of limited reception range for crystal set users. After reviewing the BBC proposal, the committee recommended that a new station with a wavelength between 1,400 and 2,000 metres be built, but at an optimum geographic location for maximum coverage (rather than London), subject to the approval of the Post Office. In order to test the idea, the BBC applied for temporary permission to conduct experiments at the Marconi Company's Works in Chelmsford.

During July and August 1924, the Chelmsford station relayed transmissions from 2LO starting at 7 o'clock in the evening, enabling much more of the country to hear the London programmes. Reception of the new station was unpredictable. While the BBC reported that 5XX had been heard in Algiers on a crystal, and journals published accounts of reception of 5XX in central and western France on crystal sets "*with the greatest ease*", frustrated listeners in London often could not receive the station with any strength. On the other hand, listeners in the less populated areas of the country had little sympathy for those in the capital. In this regard, a correspondent writing in Amateur Wireless in September 1924 pointed out that the critics in London "*seem to overlook the fact that 5XX is established for a definite purpose – to*



Left: The original 5XX long-wave aerial was of the "inverted L" type, suspended from two 450 ft. masts. The aerial as erected by the research staff of the Marconi Company with the assistance of the BBC. The natural wavelength of the aerial system was designed to be about 1,350 metres.

The 1,600 Metre Wave

THE British Broadcasting Company, having obtained a permit to erect a high-power transmitting station, are now discussing the arrangements under which this power will be used. A wavelength of 1,600 metres is proposed, and as might be expected, a large number of listeners-in have been considerably perturbed. . .

. . . Crystal sets will be the easiest to alter to the new wavelength, for in these cases an additional loading coil can be quite simply connected in circuit. Such sets, however, are by no means selective, and will not be able to tune out the local broadcasting station (if this latter is using a short wave) at 6 to 10 miles. This fact can easily be tested by anyone plugging in a suitable coil and listening on that wavelength at the present time. . .

The increase in power is presumed to be largely caused by the desire of the Broadcasting Company to give the crystal listener a good showing, care must be taken to prevent this highly important member of the broadcasting community from falling between two stools, or more precisely, between two waves, being jammed by both.

Wireless Weekly, February 27th, 1924.

More about the 1,600 Metre Wave

. . . Let us assume that the new high-power station is situated at Chelmsford, where we believe the first experiments will be conducted. What follows from this choice? A circle of 100 miles radius cuts through the Birmingham area and obviously includes London. The Birmingham listener will find signals quite weak, and therefore will be more prone to be jammed by their local station. Bournemouth, Cardiff Manchester Newcastle, Glasgow and Aberdeen listeners with crystal sets will be right outside the range of this high-power station, and therefore, even if the Chelmsford site is not finally selected will be unable to give their opinion of the experiment. The same remark, of course, applies to the crystal users around every one of the relay stations. . .

More relay stations are, in our opinion, the real need at present.

Wireless Weekly, March 5th, 1924.

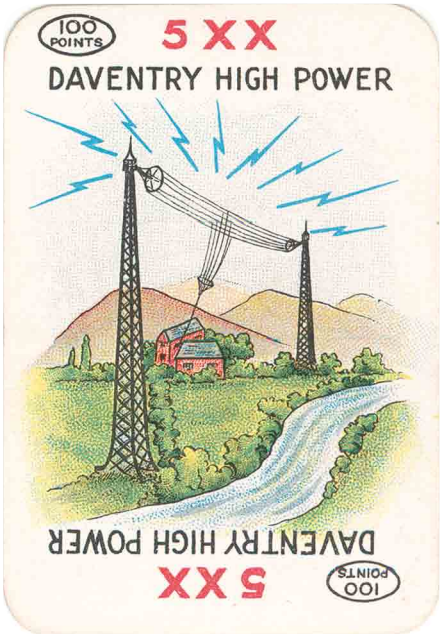
transmit programmes to the outlying districts which are out of the range of 2LO."

Birmingham and Glasgow were notoriously problematic reception areas, although many parts of the Midlands and the North Country reported satisfactory results. In contrast, excellent crystal reception of Chelmsford was routinely achieved over much of the south-east of England, with listeners living close to the station even reporting that the signal was strong enough to operate a loudspeaker directly from their crystal receiver.

On balance, 5XX was a success for the BBC and resulted in significant crystal set sales nationwide throughout the second half of 1924. By the autumn, most crystal set manufacturers offered at least one model capable of receiving both long-wave and the medium-wave "broadcast band" for local stations while at least one firm, Mann, Egerton & Company of Norwich, offered a pre-tuned set designed for 5XX only. Some crystal suppliers even advertised specially selected minerals supposedly optimised for the new wavelength.

At the beginning of 1925, 5XX – no longer "experimental" – was included in the Radio Times weekly programme listings. By this time, the content included material relayed from other BBC stations, although the majority of the programmes continued to be relayed from London.

In late August 1924, the BBC formally applied to the Post Office for permission to erect a permanent high-power, long wave broadcasting station. With negotiations in progress, a public pre-announcement of the intention to relocate 5XX to a permanent location was made at the All-British Wireless Exhibition in September 1924. Overcoming the last objections of the military, the Postmaster General finally agreed in November of that year to the establishing of a permanent long-wave BBC transmitter. Borough Hill, a flat, fifty acre site some 650 ft. above sea level and close to the town of Daventry in Northamptonshire was eventually chosen, and work on the new station started immediately. The new Daventry station, retaining the 5XX call-sign, was opened on July 27th, 1925 and, with its "National Programme," generated a renewed enthusiasm



5XX, Daventry featured in Chad Valley's "Listening-In" card game.

for the power of broadcasting as a social influence. Stanley Baldwin[1], the Prime Minister, regarded Daventry "... as another milestone along the road to social betterment of our people."

At the time of its inauguration, Daventry with a power of 25 kW was the world's largest broadcasting station and the first to use long-wave. With its opening, reliable crystal set coverage of an estimated 85% of the population of the British Isles was achieved and many now had a choice of two different programmes, although the problems of interference continued to plague crystal set users.

On 21st August 1927 a high-power medium wave station, 5GB, was established at Daventry and provided the "Regional Programme" on medium wave, while the National Programme continued to be broadcast from the 5XX long-wave transmitter. With the reduction in the number of wavelengths available to the BBC resulting from international agreements, 5GB set the pattern for the later "Regional Scheme" – powerful stations that carried both the National Programme and the Regional Programme and provided nationwide coverage, replacing the BBC's original, low-power main and relay stations. Daventry, 5XX continued to broadcast the National Programme, the wavelength changing to 1560 metres in November 1928 although by this time the popularity of the domestic crystal set was rapidly on the decline.

1. Quoted in: Briggs, A: *The History of Broadcasting in the United Kingdom, Volume 1.* Published by Oxford University Press 1961.

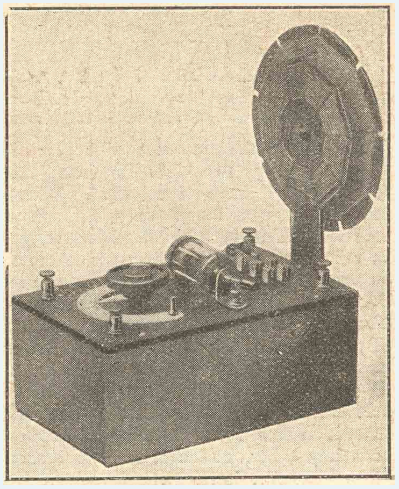
A Chelmsford Crystal Receiver

THE set described is of more than ordinary interest to any readers at the present moment. It is an answer to the question: "By what simple means can I alter or adjust my set in order to receive either my local station or Chelmsford?" Separate coils are used for the respective stations, and the quantity of wire on each is so adjusted that a minimum of capacity – say between 10 and 30 degrees on the condenser dial – is required to bring signals to a maximum strength. In this way there is no chance of getting any dead-end effects which may occur when a loading coil and a single-way switch are used.

The local coil has 40 turns of No. 26 d.c.c wire. The Chelmsford coil has 180 turns of No. 36 d.c.c wire. The coils are mounted on either side of the pillar by a 4 B.A. bolt with a pair of celluloid spacing washers; the connections are taken downward through two pairs of holes in the back of the cabinet and are connected to their respective contacts on the double-pole switch.

The circuit is an orthodox type, with the insertion of a double-pole switch which places in circuit one coil and completely isolates the other and vice versa. The variable tuning condenser is .0003 micro-farad capacity.

Amateur Wireless and Electrics, August 30th, 1924.



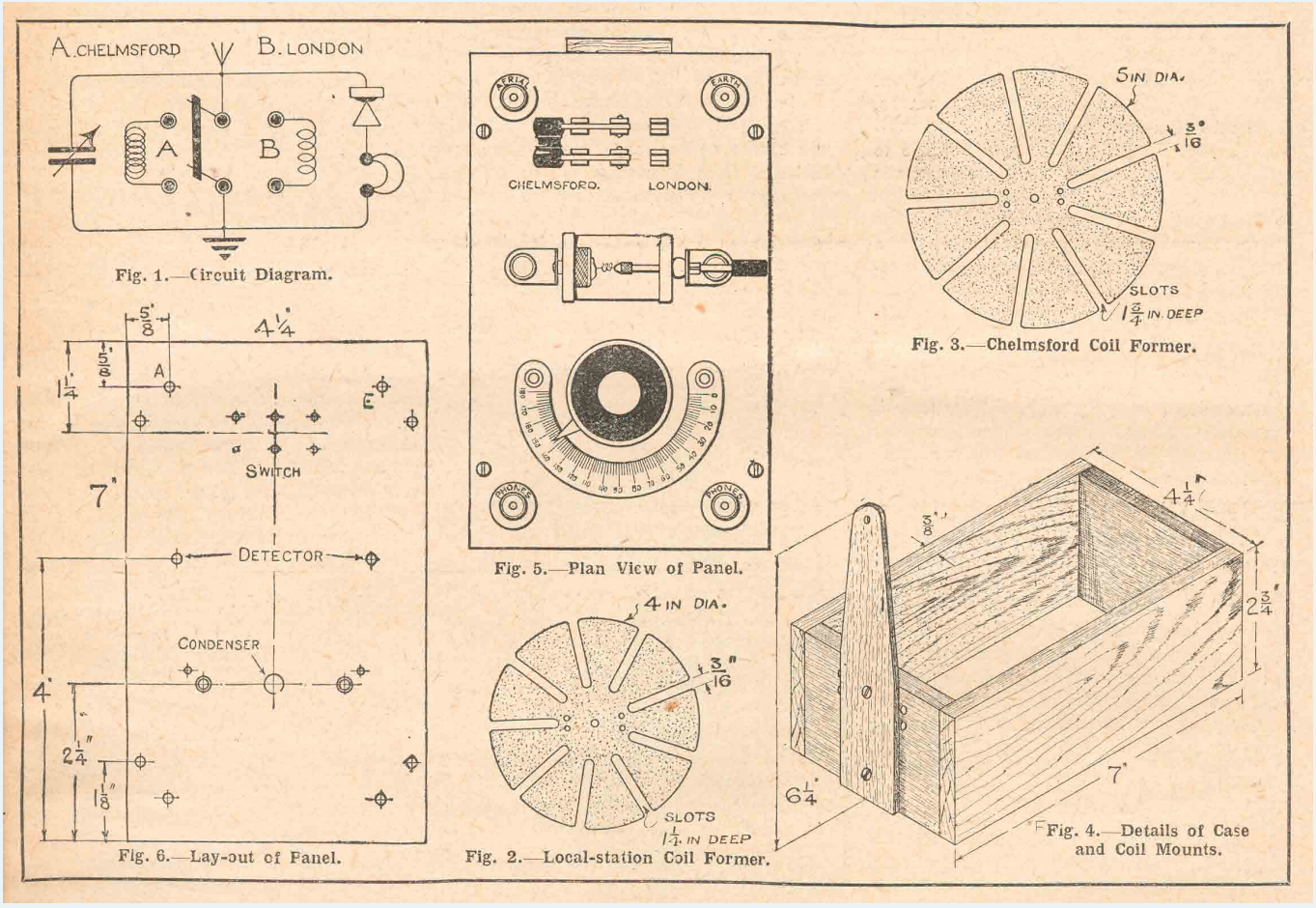


Fig. 1.—Circuit Diagram.

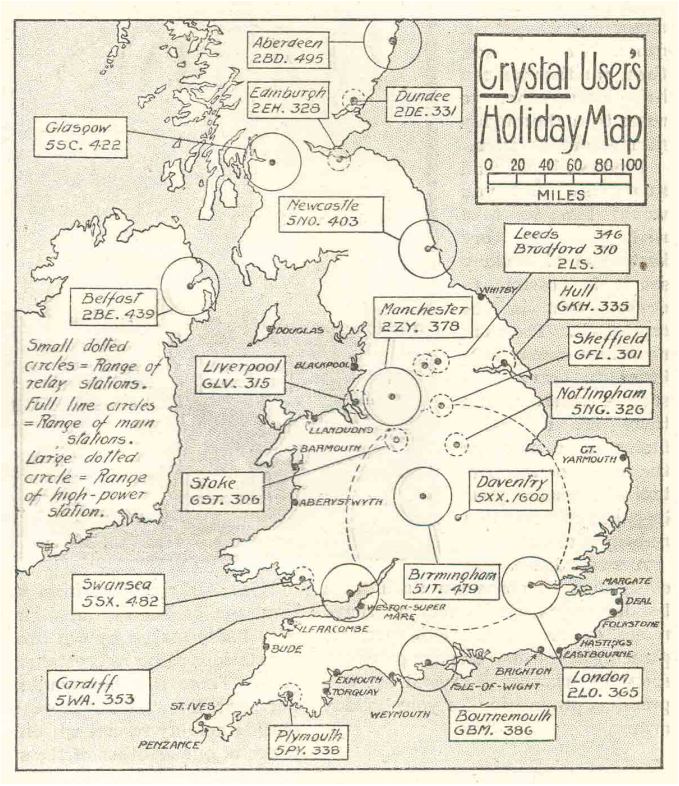
Fig. 2.—Local-station Coil Former.

Fig. 3.—Chelmsford Coil Former.

Fig. 4.—Details of Case and Coil Mounts.

Fig. 5.—Plan View of Panel.

Fig. 6.—Lay-out of Panel.



Above: Opening night at 5XX Daventry.

Pitman's Radio Year Book 1926. Published by Sir Isaac Pitman & Sons, London.

Left: This "holiday map" was published to help holidaymakers decide if they should take their crystal set on holiday. Daventry, of course, was an ideal central location for a national station. At a distance of 80 miles (dashed circle), much of central England was within reliable crystal range, while with some form of valve amplification, most of England and Wales could receive 5XX. This map also shows the original BBC main stations (reception radius – solid circles, 20 miles) and relay stations (reception radius – dotted circles, 10 miles).

The Wireless Magazine, August 1925.

Above: *Sparta* crystal set of 1924 by Fullers United Electric Works Ltd., fitted with an early-style loading coil for reception of Chelmsford, 5XX.

5XX's Range

WHICH of our readers holds the record for long-distance crystal reception from 5XX ? Up to the present we have received news of just under 250 miles being covered, but this distance will be exceeded under favourable conditions.
Popular Wireless Weekly, July 19th, 1924.

"I have a map which indicates crystal reception in the British Isles. Each black dot is a point where 5XX has been heard on a crystal – there are not pins for every report; the map is only representative; had I put a pin for every crystal the map in parts would have been black. Of chief interest are those outlying the 100-mile radius."
Captain P.P. Eckersley, Popular Wireless Weekly, October 11th, 1924

Daventry pros and cons. . .

Crystal Sets and the New High-Power Station

DEAR SIR, – In Suffolk the people are hesitating to buy wireless crystal sets because of the removal or closing down of the Chelmsford high-power station. The majority of them cannot afford valve sets, and it would relieve them to know that a crystal set will be of use when Chelmsford is shut down.

We are mostly farm labourers, and have paid our licence, so we would be obliged if you would let us know whether we are to lose this new kind of education and pleasure because of lack of funds.

Yours, etc., Kirton, near Ipswich.

H.D.F.

[The High-Power Station should still be audible on a crystal set in Suffolk after its removal to Northamptonshire.]

The Radio Times, November 28th, 1924.

The Opening of Daventry

ACCORDING to present arrangements, the permanent High-Power Station at Daventry will be officially opened on July 30th. The new "5XX" is so centrally situated that its crystal range will comprise a population of about twenty-five million people. .

The Radio Times, June 5th, 1925.

The New 5XX

SIR, – As my receiver is situated about eighty miles from Daventry I am in a good position to judge the relative strength of the new station when compared to Chelmsford. Nowadays Daventry can just be heard on a crystal set using a good aerial and earth. It is hoped that the Midlands are well served, because the southern counties are now out of range of 5XX so far as crystal reception is concerned.

Listeners on the coast, who formerly tuned to 1,600 metres in order to avoid the shipping traffic on the broadcasting wavelengths, must now put up with the serious interference which is constantly spoiling their programmes. It would seem a good plan for the B.B.C. to erect another station in the south of England in order to cater for the Cornwall district, which is at present very badly served, and the remoter parts of Hampshire and Sussex.

Amateur Wireless and Electrics, August 22nd, 1925.

In the months after the station opened, Chelmsford generated considerable interest in the press – both positive and negative. Editorial comments on 5XX, for example, were published almost every week in the journal *Popular Wireless Weekly*:-

5XX

GREAT interest is being taken in 5XX, the super station at Chelmsford, and many experimenters are constructing apparatus specially for this station. I should like to draw attention to one fact which does not seem generally realised, and that is that the wavelength, of 1,600 metres, may be altered after tests have been carried out. Constructors would therefore do well to use "flexible" tuning, such as plug-in coils provide, or wait until the wave-length is finally decided before making elaborate tuning apparatus.

Popular Wireless Weekly, July 12th, 1924.

Future of 5XX

WHATEVER the results of the B.B.C. experiments with 5XX, it is not likely that a permanent high-power broadcasting station will be maintained at Chelmsford. A more central situation would please a larger public at no greater cost, so finally no doubt the B.B.C.'s super-station will be placed well away from the coast, like the station at Rugby.

Popular Wireless Weekly, July 26th, 1924.

A Relay Suggestion

I THINK it is high time we had from 5XX the relaying of stations other than London. This would give listeners in other neighbourhoods the opportunity of comparing the same item when broadcast simultaneously from Chelmsford and their local station. Comparisons of signal strength, etc., are much easier and more accurate when both the stations tested are transmitting an identical programme.

Popular Wireless Weekly, August 23rd, 1924.

"Chelmsford" Coils

WHAT is a Chelmsford coil ? Naturally one would expect it to be a coil capable of efficiently tuning in to 5XX, but I have lately seen coils for that purpose which needed a very large capacity in parallel to tune up to 1,600 metres.

When a reputable manufacturer recommends a coil specially for Chelmsford you will notice that not much parallel capacity is required with it, and this, of course, is as it should be for best results. On the other hand signals of a kind can be obtained with a coil of only about 100 turns when a .001 or so condenser is in parallel with it, but I should certainly not call this a Chelmsford coil.

Popular Wireless Weekly, September 13th, 1924.

5XX's Fate

CHELMSFORD'S ultimate fate is still uncertain, but at present the arrangement continues whereby 5XX gives one provincial programme per week, and for the remaining evenings relays 2LO. Rumours of a new site in the north Midlands should be disregarded, and I am inclined to think that the original estimate of a site 35 miles north-west of London will be very near the mark.

Popular Wireless Weekly, October 4th, 1924.

This advertisement by Radio Instruments Ltd. was typical of those from manufacturers capitalising on the demand for crystal sets capable of receiving the new long-wave station.

Popular Wireless Weekly, July 26th, 1924.

Wireless, October 24, 1925.

5XX in Devon

A CORRESPONDENT in Greenway, Devon, writes and tells me that he hears 5XX nightly on a plain crystal set. He adds that this is not "bluff" and that three of his friends can also hear 5XX, using the old type "slider coil" crystal set. This is not bad; but doubtless the gentleman who recently heard KDKA on a crystal set (?) will not think it very wonderful.

Popular Wireless and Wireless Review, March 14th, 1925.

This unnamed set employed a shorting link to switch from "BBC" (the broadcast band) to 5XX.

Currys produced their Belvoir model with a shorting link that could be removed for reception of 5XX.

The Cable receiver by Cables and Electrical Supplies of London and the Rooco by J.R. Wireless, also of London, featured a pull-switch for reception of 5XX.

Chelmsford Experiences

Without Tuner
SIR, – It may interest you to know that I have received Chelmsford using only a crystal detector and a pair of phones – no tuner whatever. 2LO could be heard at the same time as 5XX, but while 5XX was working it almost cut 2LO out. Aerial 100 ft., height about 35 ft.

G.H.P. (Thornton Heath).

On an Indoor Aerial
SIR, – I can pick up Chelmsford on a simple home-made crystal set on an indoor aerial. It is not loud, of course, but music can be heard clearly and speech understood occasionally. I find that the loading coil must be exactly the correct size for 5XX, as the variometer becomes almost useless for tuning purposes.

V.N. (Oldham).

Good Crystal Results
SIR, – Here at Littlemoss, Ashton-under-Lyne (six miles east of Manchester), I am receiving 5XX regularly and without difficulty. Reception is not loud, but with three pairs of phones and the house quiet speech is still distinct, though, of course, I cannot keep Manchester out; I have to wait for the intervals.

I may say that I am in an exceptionally favourable position for reception – in open country with a high single-wire aerial and copper earth plate.

T.N.A. (Ashton-under-Lyne).

Amateur Wireless and Electrics,
August 23rd, 1924.

HIGH-POWER PROGRAMME.

The letters "S.B." printed in italics in these programmes signify a Simultaneous Broadcast from the station mentioned.

5XX 1,600 M.

SUNDAY, May 17th.
4.0–10.45.—*Programme S.B. from London.*

MONDAY, May 18th.
6.0-8.55.—*Programme S.B. from London.*
8.55-9.30. Speeches
at
ST. DUNSTAN'S TENTH ANNIVERSARY DINNER
by
H.R.H. THE DUKE OF CONNAUGHT, K.G., K.T., etc.,
Capt. IAN FRASER, C.B.E., M.P.,
LORD DESBOROUGH, K.C.V.O.,
and
Admiral of the Fleet
EARL JELLICOE, G.C.B., O.M., etc.
Relayed from the Connaught Rooms.
9.30-11.15.—*Programme S.B. from London.*

TUESDAY, May 19th.
6.0–8.0.—*Programme S.B. from London.*
8.0. A. E. NICKOLDS AND ALBERT W. HOWE
Celebrate
"SOCIABILITY,"
as it may be applied to their Vocal, Instrumental and Humorous Harmony.
8.15. JOIN IN THE CHORUS
with
THE WIRELESS CHORUS
and ORCHESTRA.
Folk Songs, Sea Chanties, Nigger Tunes, and Well-known Ballads.
9.15.—FLEETWAY HOUSE CONCERT. *S.B. from London.*
10.0–11.30.—*Programme S.B. from London.*

WEDNESDAY, May 20th.
6.0–11.0.—*Programme S.B. from London.*

THURSDAY, May 21st.
6.0–8.0.—*Programme S.B. from London.*
8.0. ENTERTAINMENT
by
PHILIP RITTE'S CONCERT PARTY.
GWEN GUILLERET (Soprano).
ETHEL WILFORD (Comedienne).
TINA FOSTER (Pianiste and Accompaniste)
PHILIP RITTE (Tenor).
LESLIE PAGET (Entertainer).
WILL EDWARDS (Comedian).
8.45.—Poetry Readings: Sir OWEN SEAMAN reading from his own works.
9.0. SHORT SONG RECITAL
by
BRABAZON LOWTHER (Baritone).
"My Heart Ever Faithful" ..... *Bach*
"Hark, Hark, the Lark" ..... *Schubert*
"Who is Sylvia?" .....
"New Hopes" ..... *Tchaikovsky*
"Only for Thee" .....
"Alleluia" *17th Century, arr. O'Connor Morris*
9.20. CHAMBER MUSIC.
Sextet for Two Violins, Two Violas and Two Violoncelli, Op. 18, in B Flat Major *Brahms*
HERBERT KINSEY (1st Violin).
PIERRE TAS (2nd Violin).
ERNEST YONGE (1st Viola).
JAMES LOCKYER (2nd Viola).
B. PATTERSON PARKER (1st 'Cello).
ANTHONY PINI (2nd 'Cello).
10.0-11.30.—*Programme S.B. from London.*

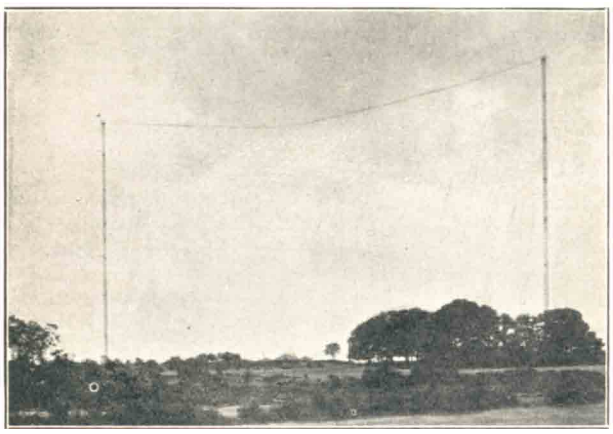
FRIDAY, May 22nd.
6.0–11.0.—*Programme S.B. from London.*

SATURDAY, May 23rd.
6.0–8.0.—*Programme S.B. from London.*
8.0–10.0.—MILITARY BAND PROGRAMME. *S.B. from Bournemouth.*
10.0–12.0.—*Programme S.B. from London.*

Above: Well-built amateur set with a double-pole panel switch for 2LO/5XX.

Left: *The Radio Times*, May 15th , 1925.

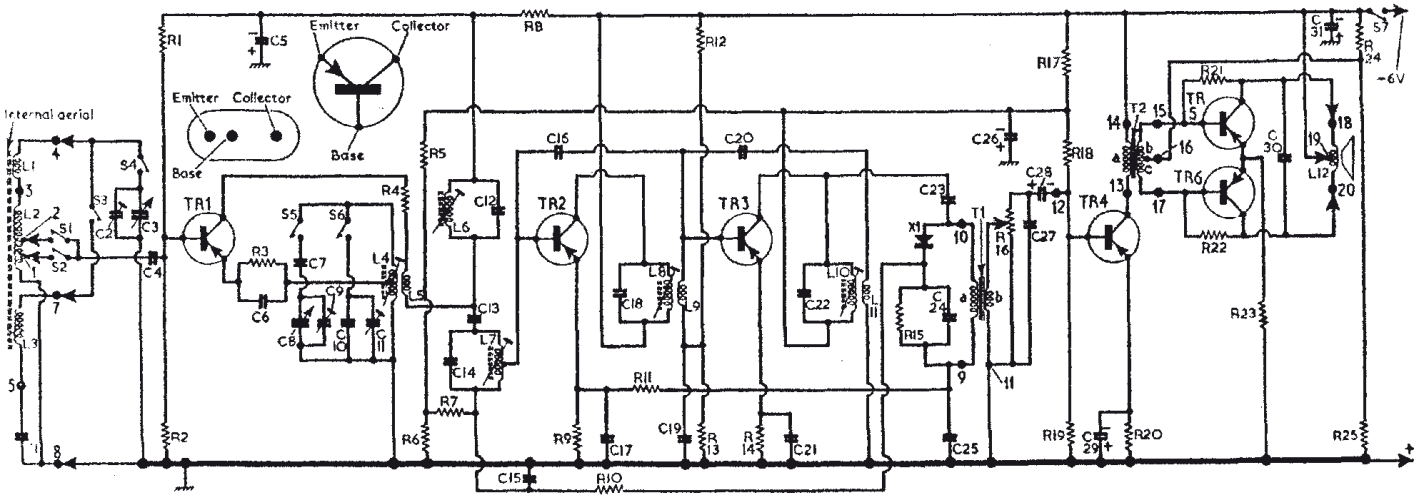
Below: The Daventry Aerial
Pitman's Radio Year Book 1926. Published by Sir isaac Pitman & Sons, London.



The evolution of Pye transistor portables from the pam 710

by Henry Irwin

The Pam 710, as is now well known, was released by Pye under one of its subsidiary marques in March 1956 as Britain's first commercially available transistor portable. It is the subject of much interest amongst transistor collectors and an example recently sold on E Bay for over £300. The Pam 710 is a rare beast with a relatively small number known to currently exist. This may have been due to slow initial sales or possibly also because of restricted production caused by a limited supply of suitable early transistors during that initial year. In this context it should be remembered that at the start of 1956 there were no commercial quantities of RF junction transistors available from Mullard or any of the other "Big Names" and Pye were the first to commit themselves by bringing to market a radio using their own semiconductor devices. This was a typically bravura gesture on the part of Managing Director C.O. Stanley from a company whose semiconductor research and production facilities were small in comparison to those of Philips, G.E.C. or A.E.I.



Circuit diagram of the Pye P123BQ. L3 functions as L.W. loading coil in the pre-tuned L.W. aerial circuit.

PYE P123BQ

The 710 had been in production for less than one year when Pye refined and simplified the circuit, confidently applied its own badge to the front of a restyled cabinet and released the Pye P123BQ in January of 1957. This radio appears to have sold in greater numbers and remained in production, in modified form, for several years. It turns up quite frequently at BVWS events, often looking sad and unloved and also on Ebay where modest prices indicate that it doesn't command the same respect or interest as its illustrious predecessor. This is a shame because I believe it is worthy of closer attention on several counts. Firstly, despite the simplifications, it still demonstrates many of the techniques that it had been necessary to employ in the Pam 710 in order to put a viable transistor radio on the market at this pioneering stage. Secondly it allows us to assess what sort of performance was possible in practice from these early first generation germanium junction semiconductors.

Contemporary with the release of the P123BQ, and using the identical circuit and chassis, came the Pam 720. This strangely proportioned radio was in a trapezoidal cabinet with a differently styled front panel and set of controls. It does not appear to be as common as the P123BQ, possibly because it had less visual appeal.

Legacy

Although Pye had reduced the transistor count from eight to six by adopting a self oscillating mixer and using a germanium diode in place of a transistor detector, the circuit was still substantially different from the generic six transistor superhet that was soon to become the industry standard. Most of these differences were dictated by difficulties in producing semiconductors that had sufficient gain especially at signal and intermediate frequencies. For this reason the IF amplifiers in the P123 operated, like its predecessor, at 315kHz. Much has been made of Pye's difficulties in producing transistors with consistent useable gain at these frequencies but we shouldn't be too dismissive of their efforts. The world's first commercial transistor radio, the Regency TR1, had an even lower IF of 262kHz and Sony, in their TR55 of 1955, had to use an IF of 245kHz with their early semiconductors.

There was an interesting consequence of Pye's decision to adopt the 315kHz intermediate frequency in their first two transistor radios. One independent manufacturer of wound components, Teletron, assumed, wrongly as it turned out, that this would set a standard for some time to come with available transistors and marketed briefly a range of IF transformers in small cans for 315kHz. (fig 1). Pye, however,

Early celebrity ad' for Pam 710 featuring Petula Clark

used their own transformers in the P123BQ and they were exactly the same unique bespoke devices that they had developed for the Pam 710. They were tall aluminium cylinders with a threaded brass shaft projecting from the top and they had their large value mica tuning capacitors mounted on the circuit board external to the can.

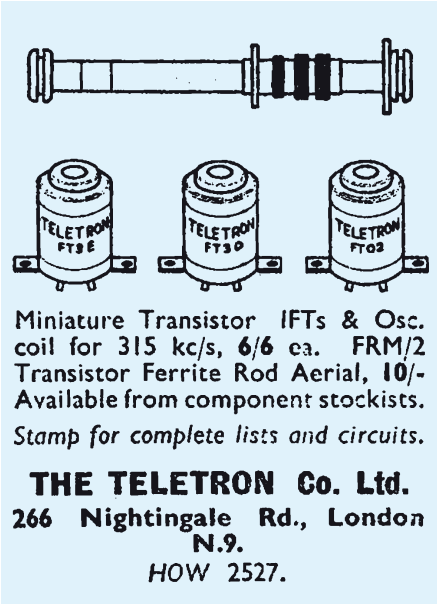
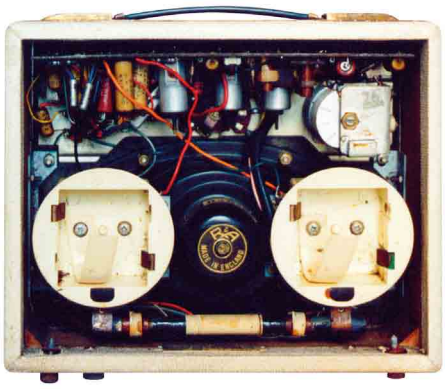
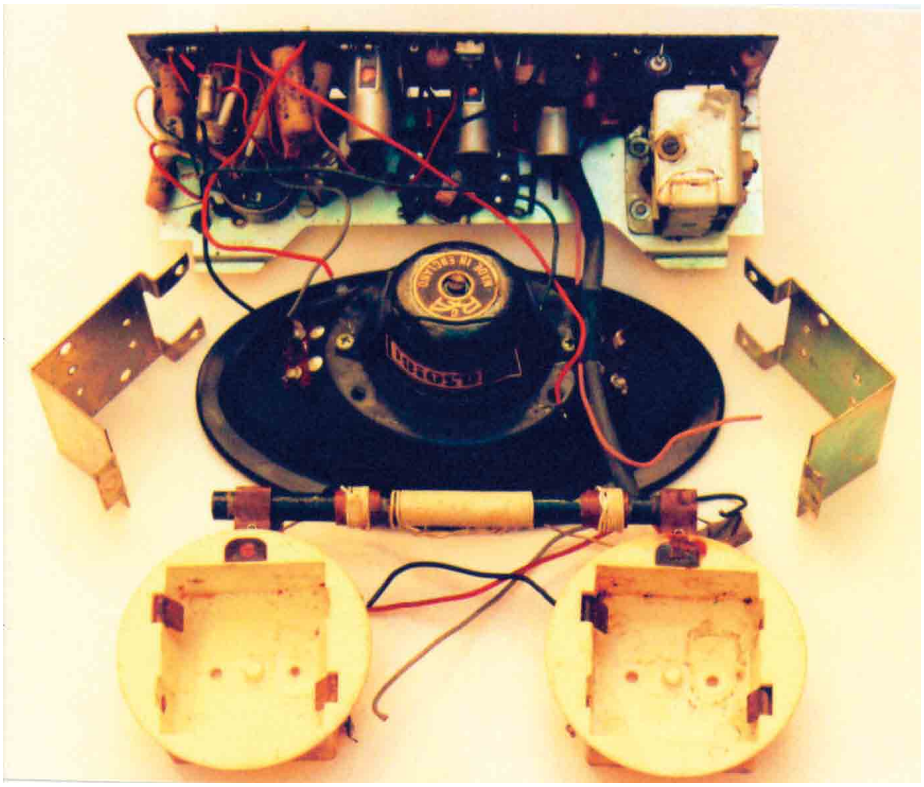


Fig 1

Original P123BQ awaiting restoration



Inside a 1957 P123BQ



Sub assemblies out of case

Fig 2.

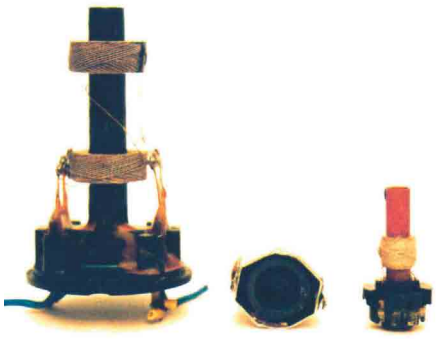
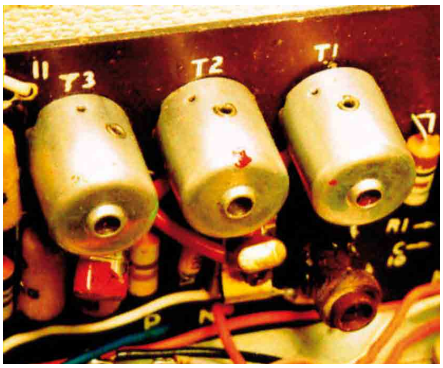


Fig 3.

The illustrations (fig 2 & 3) show comparison with an IF transformer from a contemporary Pye valve portable. The valve transformer is double tuned but even allowing for that, the aluminium can had to be large enough to prevent the earthed metalwork adversely affecting the Q of the coils. The transistor transformer developed by Pye for the Pam 710 and P123BQ avoids this by using the then relatively new technique of sheathing the small coil in a ferrite tube.



Mk2 circuit with 470kc/s IF

Ferrite provides a magnetic shield but it is also an insulator thus reducing RF eddy currents. The transformer betrays its descent from the Pam 710 prototypes in its internal construction with the small ferrite tuning slug glued to a brass thread concentric with the ferrite tube. The following year the transformer would be half that size.

The legacy of the Pam 710 is evident in other circuit features. One aspect borrowed from its predecessor is the double tuned

Restored P123BQ

top coupled first I.F. transformer used to maintain reasonable selectivity. The P123 also inherits a version of the 710's large elliptical speaker which has a specially wound centre tapped 110 ohm voice coil. A technique, dictated by the still modest gain of available semiconductors, allowed the output transistors to drive the speaker directly in push pull, eliminating the output transformer and its inevitable losses.

Mechanically and in layout terms many

things are also familiar from the Pam 710. The circuit board, although with a different track pattern, is still bolted at right angles to a substantial metal panel that also accommodates the same bandswitch, volume control and Polar tuning capacitor as the Pam.

Differences

There are, however, aspects of the circuit, dictated by the necessity of maintaining maximum efficiency in signal transfer, which are different from the Pam 710. Remember, we are down by two transistors from the original design.

For instance, the detector diode is fed from the high impedance winding of the final IF transformer while its low impedance winding is used only to provide neutralizing. The detected signal is then developed across the primary of an audio transformer, the secondary of which feeds directly into the first A.F. transistor thus improving matching and efficiency.

Another change is to the ferrite rod aerial coils. The medium wave coil is still wound in the centre of the ferrite rod to maximize signal pickup but, in a modification of the 710, there is no separate longwave winding. An auxiliary winding is now switched in series with the main winding and series resonated with a 3300 pf capacitor to ensure a better signal on the old Light Program wavelength of 1500 metres.

Evolution

Sometime early in 1958, as manufacturing processes were refined, the specification and performance of Pye's V6 series RF transistors was quietly improved. This was not indicated by any change in device designation but rather it precipitated a redesign of the P123BQ circuit to allow the intermediate frequency to become 470 kHz. The original idiosyncratic I.F. transformers were now gone, to be replaced by squat little aluminium cylinders with dust cores. Also gone was the transformer coupled detector stage. The circuit now more resembled what was becoming the standard transistor superhet although it still betrayed its descent from the Pam 710 in its physical layout and its use of the chassis, controls, 6 volt transistors and high impedance loudspeaker from its predecessors. This, however, is the last time that you will see a centre tapped loudspeaker in a transistor radio.

The changes were not heralded externally by any major change in the cabinet or appearance of the P123BQ although a version with a red band and gold flecked speaker fabric was introduced and for a while both case colour schemes were available with the revised circuitry. The only way to be certain if the green banded version is the later model is to remove the back and look for the absence of tall first generation I.F. transformers. However one new model did appear in 1958 based on the revised board and using the rest of the P123 internal hardware. This was the Invicta 30, a small "suitcase portable", which used, under its lid, the machined metal fascia of the P123, now chrome plated and decked out with the control knobs from the previous Pam 720.

1959 & 1960

The year 1959 saw further changes and development in Pye semiconductor production. They had been experimenting with HF Drift transistors (V15/20R) although these never appeared in commercial quantities. The main change was the introduction of a 9 volt range to supplement the original restricted 6 volt transistors. This restriction of maximum collector voltage may have been a result of Pye's original process used to achieve a thin enough base region for radio frequency operation. The V/6 and V/10 designations disappeared along with the characteristic red and yellow bands showing the month and year of manufacture. The 6 volt range became Pye White Circle transistors and the 9 volt range became Pye Yellow Circle transistors. These were identified by little coloured circles on the transistor side enclosing a number from 1 to 5 indicating if the device was a mixer or IF amp etc.

For 1959 the P123BQ and the Invicta 30 were still in the catalogue. They had finally relinquished the special speaker, using instead a conventional output transformer. Both received the White Circle devices and also a fully tuneable long waveband marked on their dials while the P123 was now only available with a red "suedeen" band. They were joined by a plethora of new cabinet designs in the "Q" series all using the basic P123 board and chassis. These were the Q3, Q4, Q5 in 1959 and the Q6 in 1960, most of these had the 9 volt Yellow Circle devices although some were produced in 6 volt versions. There was also the Pam 59 which used the same circuit with an internal cam to allow pushbuttons to operate the rotary wavechange switch and which had a complete complement of Mullard transistors!

Finale

The Q7 of 1961 represents the final reincarnation and development of the standard chassis which can be traced back to the P123BQ and its variants. It had now acquired 7 transistors in Pye's "Newmarket" series and in a curious throwback to the original board, re–acquired a double tuned 1st I.F. transformer.

Pye, of course, produced other special transistor designs during this period and also introduced their coat pocket sets, but that is another story.

Restoring a P123BQ

I mentioned earlier that this radio is often found in a sorry state. However it does clean up reasonably well. The problem, as I discovered, is that cleaning and restoration is not necessarily straightforward. Firstly the materials used are subject to age and use–related ravages apart from the usual dirt. The beige plastic (Vynair?) covering over the wood case is prone to sunlight discolouration: if it doesn't respond to a good scrubbing the only solution may be spray paint. The brass trim and the brass faceplate will probably have varying degrees of discolouration or corrosion depending on how much the protective lacquer has broken down. The transparent knobs may be cracked or without their centrepieces and in addition, Pye's masterpiece, the green "Suedeen" band surrounding the case edges, may be a shabby cracked mess.

Secondly, although the construction is in many respects more sophisticated than the Pam 710, the original Heath Robinson battery holders having been replaced with nice little polythene containers, it is assembled in such a way that proper access requires disassembly of everything in a particular sequence. The ferrite rod is attached to the two battery holders which in turn are screwed to brackets fixed to the speaker. The illustration shows all the sub assemblies dismantled and in relation to each other.

My advice is as follows; if possible purchase several receivers, even one good and one "scrapper". Then dismantle everything into the component parts before restoring anything cosmetically or electronically. Fortunately the front baffle, to which everything else is fixed, unscrews from the rest of the case with a 4BA nut spinner applied from behind. It should then be removed carefully from the front. Now, after drawing a diagram of the connections and noting the colours, the wires running from the bandswitch and the circuit board should be snipped at the ferrite rod tags, battery holders and loudspeaker respectively and each of these units removed from the baffle for separate attention. Externally the case should now be scrubbed with foam cleaner or methylated spirit and a toothbrush.

Brass

At this stage the brasswork can be attacked. The trim strips should be unpinned from underneath and with this complete the remains of the seudeen disaster may be removed. The decorative strips, which respond well to metal polish, are interesting in that they are crimped to what seems to be a lead ridge at 90 degrees to the trim thus forming a T shaped profile which fits into a slot in the case. The whole assembly remains flexible but is a bit fiddly to clean and a block of wood with a little groove to lay it in is a decided advantage. This is a rubber gloves job since lead is involved and when complete the whole is spray lacquered.

The machined fascia however proved in my case to be a real trial. The indentations holding pits of corrosion that were difficult to remove under a tenacious lacquer. A Brillo Pad was not an option here as it would have produced a network of fine scratches which would ruin the reflective effect. The solution was several soakings in thinners followed by a final attack with "Brasso" wadding. The soakings were done in a sealed plastic container outdoors and the "Brasso" sessions (it needed three) with rubber gloves. Health and Safety you understand!

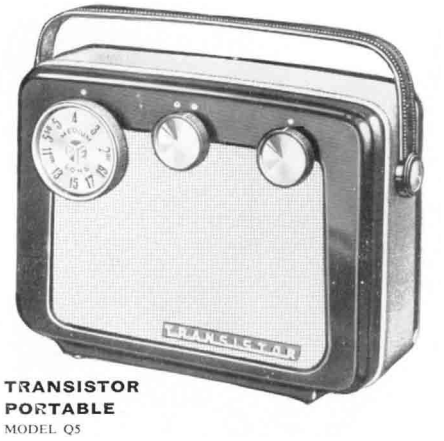
Fabric

With the brasswork complete the remains of the "Seudeen" material can be scraped off with a blade or sharp scraper after a good daubing with meths to soften its adherence to its adhesive fabric backing which should

Pye Q3

Pye Q4

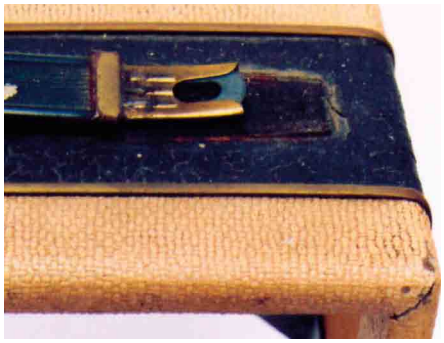
Invicta 30



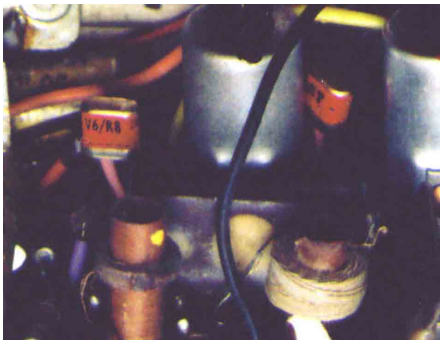
Pye Q5

Pye Q6,Q7

Pam 59



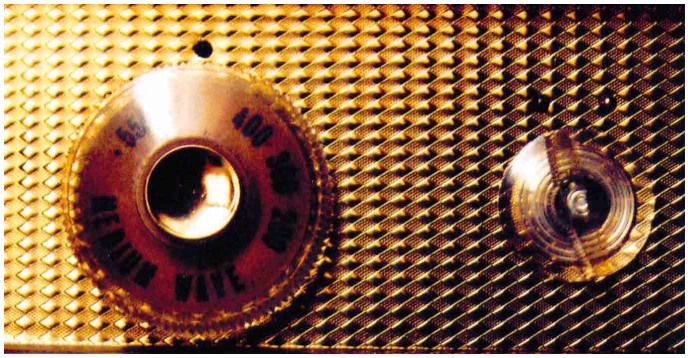
Disintegrating 'Seudeen'

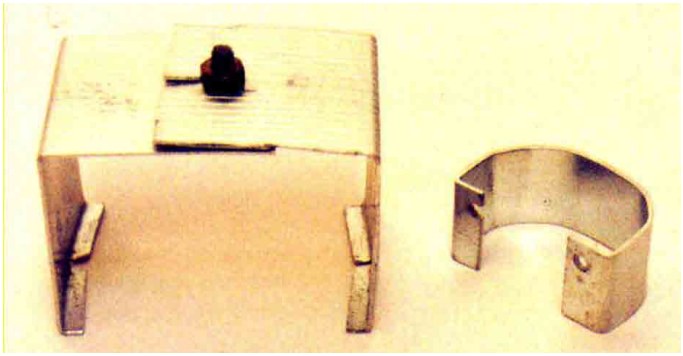


V6/R8 transistor on 1957 board

An advertising " flyer" showing a very early production or pre production model. Note the stitched handle, the tuning scale from the Pam 710 (metres scale on the bottom) and the cruder diamond pattern fascia, features not found on any production model I am aware of. This illustration was used in later Pye adverts unaltered. Pye publicity parsimony?

Below, right: Custom knob pullers





remain stuck to the wood. If you are very lucky its suede qualities may have survived almost intact, however, I had no such luck and had to find an alternative. I eventually settled on dark green felt from a Craft Shop which I carefully cut to shape with cloth shears and stuck on in three sections with water based adhesive. It is slightly too thick and a bit lighter than the original I think but generally preferable to the mess usually adorning these sets. I believe it is a fair reflection of how the material band would have looked when new, given that this will have darkened with age and dirt.

Knobs

Why did I suggest purchase of several receivers? Well, this brings me to the first major hurdle. The transparent knobs on this and the Pam 710 are notoriously brittle and difficult to remove. Having several sets will be an insurance policy and will also ensure that you have two knobs with brass centrepieces. The tuning control is a dual concentric which means that you can't really get a cord puller underneath. I tried WD40, suction pads, sore fingers, everything short of destruction, all to no avail. I came to the conclusion that a special tool was needed, so I manufactured one.

The photograph hopefully makes the nature of the bespoke knob puller clear. Requirements were that it would be adjustable, allowing two metal lips of just sufficient width to be introduced under the outer edge of the top portion of the dual tuning control, while stopping short of the inner knob and then providing a means of tightening the two units into a rigid assembly. The engaging lips should be sufficiently curved to allow pressure to be spread over a large area of the knob outer rim. When the assembly is tightened, the radio is laid on its back between the knees; the finger and thumb of one hand apply inward pressure to the two lips while two fingers of the other hand are inserted under the upper section and a firm upward pull applied. A little WD40 pre–applied underneath should ensure that the knob comes off without a breakage.

The "gizmo" was made from aluminium alloy sheet, thin enough to allow fabrication but thick enough to resist deforming in use. Brass plate could also be used. It was formed in a vice and cut with tin shears. Small V shaped cuts in the lips allow them to be curved and two slots permit the two L sections to be slid together and tightened with a nut and screw. Each of the "L" shaped sections is 35mm long either side of the bend and also about 35mm wide, while the slots are about 10 mm deep. The engaging lip protrudes by 4 mm.

A smaller companion U shaped single piece of aluminium was made to remove the wavechange switch. Hopefully these ideas may be of some use to anyone also faced with self destruct knobs or anyone lucky enough to own a Pam 710 but reluctant so far to dismantle it for cleaning.

Knobs again!

Once removed it is important to carefully extract the metal collars since these will continue to exert strong pressure on the brittle split shafts. On close inspection a fine network of stress cracks may be revealed on the shafts. Even without the collar the knobs are still a tight fit and to prevent possible fracture when reassembled I thought it would be useful to reinforce the shafts with a new collar of some appropriate material. To the rescue came " Solvent Free All Purpose Adhesive", sold by Woolworth in a green tube. It dries to a colourless, tough, flexible consistency very like polypropylene.

At this stage the knobs and component parts were cleaned with washing up liquid as any solvent will remove the gold paint from the inserts. Once the shaft was clean and grease free then a form for the new collar was made from thin card, with a glued overlap, formed into a cylinder of some 12mm dia. and a depth equal to the projecting shaft. Small strips of "Blutak" were used to block the slots in the shaft and were removed later. With the cylinder aligned concentric with the shaft, the glue was squeezed in the gap in two layers and allowed to set for 24 hours. For the first hour small adjustments were made to the alignment while the glue was still pliable.

The shaft on the inner section of the dual concentric tuning control didn't need this treatment as it seems to be less of a tight fit on its inner spindle.

Handle

The handle was dismantled by prising up the lugs on both end pieces with a thin wide blade screwdriver. Everything on the metalwork, including the caps, was then scrubbed with WD40 and a toothbrush, followed by rust removal with a sharpened screwdriver, a brush with meths and finally coated with rustproofer. I sprayed all the metalwork with a gold paint spray by Helmar. This is a craft spray and gives a very fine reflective coating but the finish is not as durable as car body spray. Car sprays tend to give a more matt finish and were more difficult to match to the trim but it may be possible to find a better one. After drying, the vinyl sheath was slipped back on and the end pieces re–attached by crimping the lugs with pliers, a bit of scrap felt between the pliers and metal acted to protect the paint.

Circuit repairs.

After fifty years of faithful service it appears that circuit malfunctions can be divided into two types, intermittencies due to hairline cracks or corrosion on the printed tracks of the circuit board or "dodgy" capacitors. Surprisingly, on the three different circuits I have checked, all transistors have been functional!

Pye were one of the first manufacturers to pioneer the use of printed boards. However I have experienced problems before with hairline cracks on pre 1960 Pye circuit boards which can be very frustrating to identify. On two of the P123BQ's that I acquired I was not surprised to find that they received signals when first switched on but these were prone to disappear if the case was picked up or the wavechange switch was moved. At first I thought that the problem was in the wave change mechanism but a bit of detective work pointed the finger of blame in another direction.

Early boards in the series have a protective lacquer over the copper while later boards, from about the middle of '57, have all of the tracks tinned with solder. Pye's characteristic large mica neutralizing capacitors mounted on the track side of the board, where their value could be selected on test, are insulated from the solder joints by strips of plastic tape. Herein lies the problem. The adhesive on the tape breaks down the lacquer over the copper and chemical corrosion begins, resulting in a green mess hidden from view under the capacitor and insulating tape. If it progresses far enough the copper will be weakened or eaten through.

This doesn't happen on the later boards. With these (or indeed all the circuit boards) a further problem can be traced to the point where the IF transformer lugs come through to meet the copper track. The transformers have a feature unique to these early sets. They sit in little circular cut outs in the board and their lugs are designed to locate next to copper tracks at the edge of the cut out with the solder flowed across the minute gap. This is a weak point and as the board flexes or warps an almost invisible crack can develop. I identified the offending transformer by prodding the board next to each one in turn and then flowed some fresh solder over the hairline break.

To be honest none of the capacitors in any of my sets was completely defunct. The paper ones are not subject to any high voltage stress and Pye seem to have used good quality electrolytics for these "flagship" receivers. They may have lost little capacity but one of them was implicated in a display of instability consisting of whistles and "motor boating" centred on 630 kc/s. Now this is twice the IF frequency and it is common to have some heterodynes on most radios at this tuning point. In this case however there was so much harmonic energy of the IF output being fed back that it was periodically blocking the receiver thus causing the low frequency racket. It turned out, as had been found on many previous old transistor sets, that electrolytic C25, which decouples the supply to TR3, had developed a high impedance at the IF frequency and it was no longer shunting any residual RF energy on the supply line away to earth. I wasn't of a mind to replace this component as it is difficult to locate so the solution was to parallel a 0.05mf disc ceramic across it flush to the track side of the board.

Putting it all back together

With the external case attended to and the circuit functioning it was now time to ensure that all the different elements were ready to be reassembled on the baffle. Some of these needed further attention.

The speaker although electrically identical to that in the Pam 710 is physically different. It is covered in a very thin layer of brown paint and will probably be showing several areas

of rust. I usually degrease with meths but in this case the paint will dissolve in it so I used lighter fuel. Areas of rust were scraped with a jeweller's screwdriver sharpened to a blade edge on a file and then magnetized. This ensures that any metal swarf sticks to the screwdriver and doesn't end up in the voice coil or gap. It was then rust treated with Hammerite Kurust and coated by brush with Humbrol enamel which was a good match to the dark brown. With liberal application and quick brush strokes done in two sessions there was little streaking.

Before reassembly the battery holders needed the inevitable corrosion removed. This was done with a solution of kettle descaler brushed on and a bit of scraping.

Finally the "transistor" logo and the Pye badge were cleaned and reaffixed to the baffle. The little brass and enamel badge, after a workover with Brasso and a lacquer spray, came up very well indeed.

Now was the time to call on the diagram of connections and wire colours made earlier and begin the reassembly process. First to go on was the speaker with its pressure washers and two brackets, then the brass fascia with the circuit board and chassis. At this point the speaker was rewired and the battery holder and ferrite rod assembly screwed on afterwards. All remaining connections were now resoldered. If this sequence isn't followed then some connections can be difficult to get at.

The last hurdle was to reacquaint the baffle with the case. This needs a bit of juggling to make sure the battery holders firstly go through the recesses in the side brackets and then that the projection on top of the baffle mates with the recess in the top of the case while the projecting baffle screws also go through the holes in the case brackets. All this without fouling the ferrite rod!

Air Test

Because a superhet mixer produces IF outputs for signals both below and above the local oscillator there is always some level of unwanted response to signals on the high side. This unwanted "image" response is kept to an acceptable level by the selectivity of circuits ahead of the mixer. With a standard IF, the image is 940 kc/s (twice the IF) from the wanted signal whereas with a low IF of 315 kc/s it is only 630 kc/s removed from the wanted signal. So we can see the increased potential for spurious responses while tuning around the low end of the medium wave.

One of the things I did was to check for audible pickup, at the lower end of the band, of powerful local stations broadcasting higher up and I did indeed find a slight off tune heterodyne on a local Radio 4 relay produced by Radio Ulster on 1341 kc/s. These effects however are slight and I would estimate them to be of little nuisance value unless the radio is used very close to a transmitter.

The most pleasant surprise while listening to this radio is its apparent sensitivity given the vintage of the RF transistors and the resources available in their production. Both this and another example tested are able to receive at entertainment value several BBC local stations at distances in excess of 150 miles during daylight hours, which is impressive even by the standards of several years later. Although this is anecdotal I have found that Pye transistors of the later "Yellow Circle" period appear to be nowhere near as consistent in performance, perhaps reflecting difficulties with increasing production quantities.

Selectivity is also good, although not exceptional, and weak stations only 18kHz (2 channels) removed from a powerful transmitter display but the merest trace of their powerful neighbour. Sound quality is pleasing with both adequate volume and bass. Overall, using this "old lady" has proved to be an enlightening experience and has set me wondering how its predecessor, brought to specification, would perform.

Assessment

At the start of 1957 the P123BQ was regarded as a flagship model and indeed Pye was still the only company capable of producing a transistor radio for sale. Before the end of that same year it would see its position challenged as both Cossor and KB introduced similar radios with new circuit features and new Mullard transistors. Over the next few years Pye adopted a process of evolution but lost its early technical lead.

While the Pam 710 has been criticized for not being radical enough in its styling, a little unfair since it has a minimalist elegance and good proportions, the P123BQ is even more conservative with its very four-square symmetrical layout. However this symmetry is its saving grace. It attempts to compensate for design conservatism by use of materials, translucent plastic knobs suggesting modernism and the machined metal fascia hinting at value and technical precision.

The person who bought his P123BQ in 1957* would have been well pleased. It would have performed as well, if not better than, many valve portables and it would have gone on working for ages on the same set of batteries. Best of all it would have been a conversation piece since portable radios without valves were still a relative rarity.

This restoration has been a bit of a challenge but ultimately has been worth it. I had a few surprises along the way in bringing this old "stager", once considered leading–edge domestic technology, back to use. As I finish the last line of this piece I am away to tune in to Bernie Quayle's Friday night 1950's music program on Manx Radio, 1368 kc/s. Rock On!

Appendix

1) The actual transistor line up for three P123BQ radios I have is V6/R8,V6/R8,V6/R4,OC71,OC72x2. Devices in the earliest radio are dated March 1957. The output transistors have the coy little legend, "Mullard made in Holland"! An alternative line up gives V10/30B or V10/50B for the output. Pye may have been concentrating all their resources on producing RF transistors at this time.

2*) The cost of a P 123BQ in 1957 was £24-3s-6d.

3) Recently on Ebay a Pye Australia version of the P123BQ in an almost identical case was offered for sale. It was claimed as being dated to 1957 but no further details were available to confirm this before the auction ended.

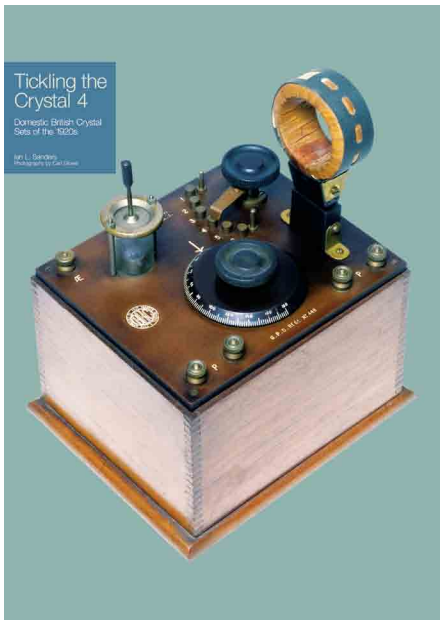
4) According to a plate inside the restored P123BQ featured in the photographs was originally purchased at Miltons Radio Service, 76 Northgate Street, Chester.

Book review by David Read

Tickling the Crystal 4

Domestic British Crystal Sets of the 1920s by Ian Sanders Photography by Carl Glover

BVWS Books £22.50, hard cover at £29.95 (£24.95 for BVWS members)



BVWS member Ian Sanders is well known for his expertise on the subject of crystal sets. That this is not an expertise based on the narrow viewpoint of a catalogue of maker's names and types of set has been obvious from his first publication – Tickling the Crystal volume 1.

From the beginning Ian has chosen a path that is both wide and deep. He places the crystal set in the context of public broadcasting, the historical and technical background to crystal detection, the types of circuit used and the cabinet styles of the sets themselves. When one adds to this the associated subjects of aerials, earths and the means of amplification it becomes clear that we are dealing with a scholarly body of work that is extraordinarily wide in subject area and deep in detail.

It is this breadth of vision and interest Ian has brought to the subject that has resulted in a project spread over a number of volumes rather than a single book; a project that has now resulted in volume 4.

Ian Sanders in his introduction writes, "This is the book that was never meant to be" and quoting John Lennon observes "life is what happens while we're busy making other plans". Harold MacMillan, British Prime Minister in 1957- 63, when asked by a journalist what was most likely to blow a government off course replied, "Events dear boy, events". In Ian's case the events are the new receivers and data relating to vintage wireless that have come to light and continue to do so.

Each of the four volumes has a mandatory chapter comprising a pictorial dictionary that lists the images of actual sets in alphabetical order and this chapter is followed by complementary chapters on crystal-valve receivers and amplifiers, known at the time as note magnifiers. In each successive volume, these mandatory chapters illustrate and describe the new receivers, crystal-valve receivers and note amplifiers that have come to light and also update or correct the previous volumes with new information on previous entries. It is not therefore appropriate, let alone possible, to review volume 4 or any of the earlier volumes as stand-alone books. For volume 4, over one hundred previously unlisted receivers have been photographed in full colour and with a colour balance and clarity of detail that sets a new standard for excellence; surely a remarkable achievement in itself. In fact all chapters of this latest volume are illustrated wherever possible in colour with even the reproduction of original black and white or grey scale material faithfully and beautifully realised.

As well as the mandatory chapters, each volume contains "ad-hoc" chapters and appendices that discuss a variety of associated topics such as types of receiver or cabinet design, different manufacturers, detectors, licence requirements, registration numbers and matters pertinent to the BBC or GPO. For volume 4 the topics covered in the ad-hoc chapters and appendices include special attention to varieties of circuits for crystal detection as well as a fascinating selection of crystal detector patents as disclosed under the Patent Office category for "Improvements in Crystal Detectors or Rectifiers for use in Wireless Telephony and Telegraphy". All this material has been placed in historical perspective by allocating much more space to advertisements and contextual ephemera to achieve a remarkably interesting and cohesive result.

Reading Tickling the Crystal 4 and assessing Ian Sanders' achievement of his project so far reminds me of something that is often said by authors, particularly those who have given birth to what one might call a magnum opus. When asked how the material was planned and the characters and plots developed the response has been "the subject and its characters assumed control of the pen".

Volume 4, comprising 280 pages including appendices and indexes, shows overwhelmingly that this book must be viewed, together with earlier volumes, as part of a project that continues to build towards a conclusion that its author cannot predict. In the meantime the appendices and cumulative indexes for volume 4 are provided with excellent cross references to the earlier volumes so there is no difficulty in treating all four as one. Ian has done no less than use the crystal receiver as a window through which the reader of his volumes can view and understand the whole world of early broadcasting together with the technologies used for its reception. The result is without doubt the finest work ever written in this genre. Not only will it be an essential source of reference as well as essential reading for those fascinated by crystal sets, but it will also hold the attention of everyone with an interest in the early days of radio.

Full colour throughout.
Strictly Limited Edition! only 500 copies printed
£5 discount for BVWS members

280 pages of GPO No. era British crystal sets. Over 200 full-page photographs. £29.95 (£24.95 for BVWS members) plus £7 p&p for UK, £13 EEC (rest of world £15)

Restoring an Ekco AC97 from 1936 by Gary Tempest

I had not been a fan of the popular Ekco radios, thinking them attractive but too high priced for me. Then, as well, many collectors malign them for performance and lack of technical interest.

However, slowly this radio began to grow on me until I couldn't resist its art deco charms. The black model, with ivory trim, is much the better 'looker' than the standard brown version in my opinion. This one does have a short 'hairline' crack (they all are on Ebay), but I had to be shown where it was, and it came with poor reproduction front knobs.

I acquired this one from a friend who said it played and indeed it had had some skilful work done on it. But to me it wasn't satisfactory with the chassis having the quite common pock marked rust spots through the single coat of original paint. As normal it was worse than it looked as the rust spreads under the finish. Then a look around the transformer showed the flaking insulation on the lead out wires. Some carrying mains voltage very close to the metal work of the un-earthed chassis (see picture).

Main features

The radio is a four valve plus rectifier, MW and LW, Superhet with a magic eye. The output valve is an awkward type having a 2V heater that are getting harder to come by. The same is true for the TV4 magic eye, mounted high on the cabinet, which gives the radio its nickname of Cyclops.

I was to find that the radio did have technical interest, having selectable bandwidth ("Fidelity Control"), a 'loudness circuit' and noise suppression whilst fine-tuning. Some of these may have been more marketing attractions than real user advantages.

Ekco it seems were also promoting audio quality as in the Service Data (there is also Trader Sheet 664) they say "The speaker has an exceptionally wide frequency response… beware of overloading and harmonics that would not be heard on an ordinary speaker". Well it is unusual as the voice coil is wound with aluminium wire.

Getting started

I had read Roger Grant's article on restoring his AC97, in Bulletin Winter 2003, a couple of times; it's always nice to have some guidance before starting. He had stripped his radio by drilling out the rivets and keeping much of the parts as connected sub-assemblies. I made the decision that I would strip and rewire as the wiring was very tired and would have been even more so once I had disconnected it from the tag boards. These were going to be separately cleaned and rebuilt as that is by far the best way. I know people attend to them in situ but it must be difficult and not very satisfying. The panels have no solder tags so component leads are twisted through holes in the Paxolin along with the wiring and soldered.

The Power Supply chassis

This was stripped; the rust abraded and acid treated before painting with zinc rich primer and Ford Dove Grey paint. As is now my usual practice I dulled the high gloss of this with satin lacquer.

I removed the tag and voltage selector panels from the transformer, followed by more cleaning and re-painting of the metal work.

1: The speaker cone out

2: Coil close–up

3: Coil sliced off

4: Inner sleeve

5: The ‘doner’ coil

6: Mounting jig

7: New coil in position

8: Coil done

Whilst I was at it, I took off the flaking outer paper covering over the windings and replaced it with insulating cambric. The tag panels and a new voltage selector panel were put back with fibreglass sleeving over the wires.

It obviously needed care whilst working on the transformer as I didn’t want to stress the lead out wires. So for rust treatment and painting I mounted it on a turntable made from scrap materials (see picture). The plywood pad, to which the transformer is screwed, has a recessed bolt securing it to the upright.

The power supply was rebuilt using pan head bolts, nuts and washers.

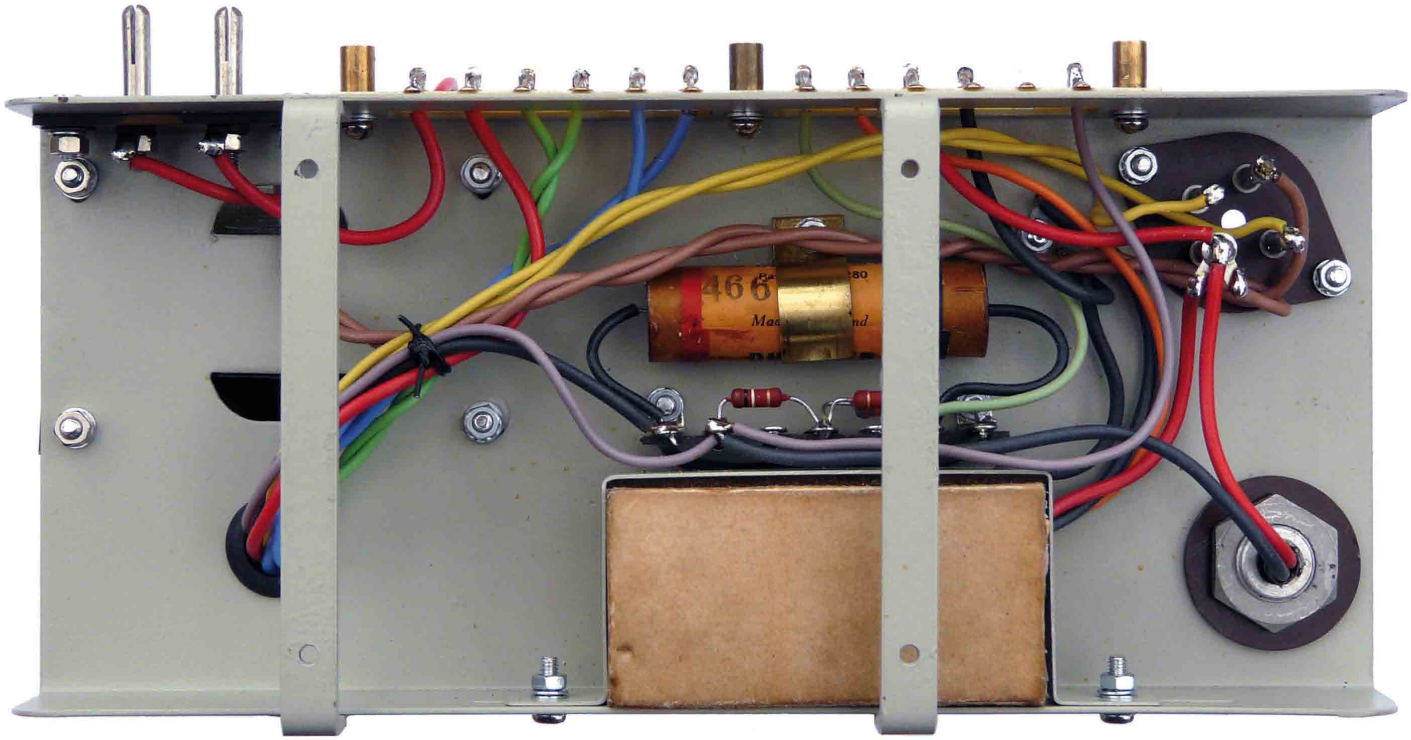
Ekco collectors will immediately notice the new tag panel for the hardwired connection to the main chassis. For those who haven’t come across it the original is two tag panels with the tags soldered together. Ideally you need a fourteen bit soldering iron to separate them without damage. The alternative is a one bit iron and lever the tags apart as you go. After a few times some of the tags are going to get broken and the rest are going to be pretty sad.

I wasn’t going to put my resultant mess back and so used this beautiful tag strip from AES (Antique Electronic Supply, Arizona USA). It has exactly the right pitch for the mounting holes but the tags are spaced further apart. This means that the tag numbering is different from that used originally but there are just enough tags.

To cover these live connections, and support the cable form, I made a panel from 2 mm Paxolin sheet supported on pillars. The wires are simply butt soldered to the tags obviating the need for a fourteen bit soldering iron should the two chassis ever need separating again.

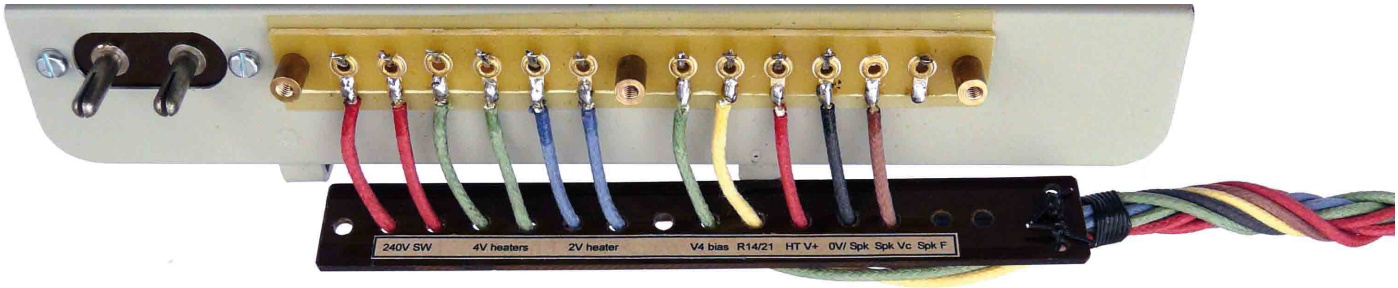
In the pictures can also be seen the new cable forms. I wasn’t going to change the originals but some wires were

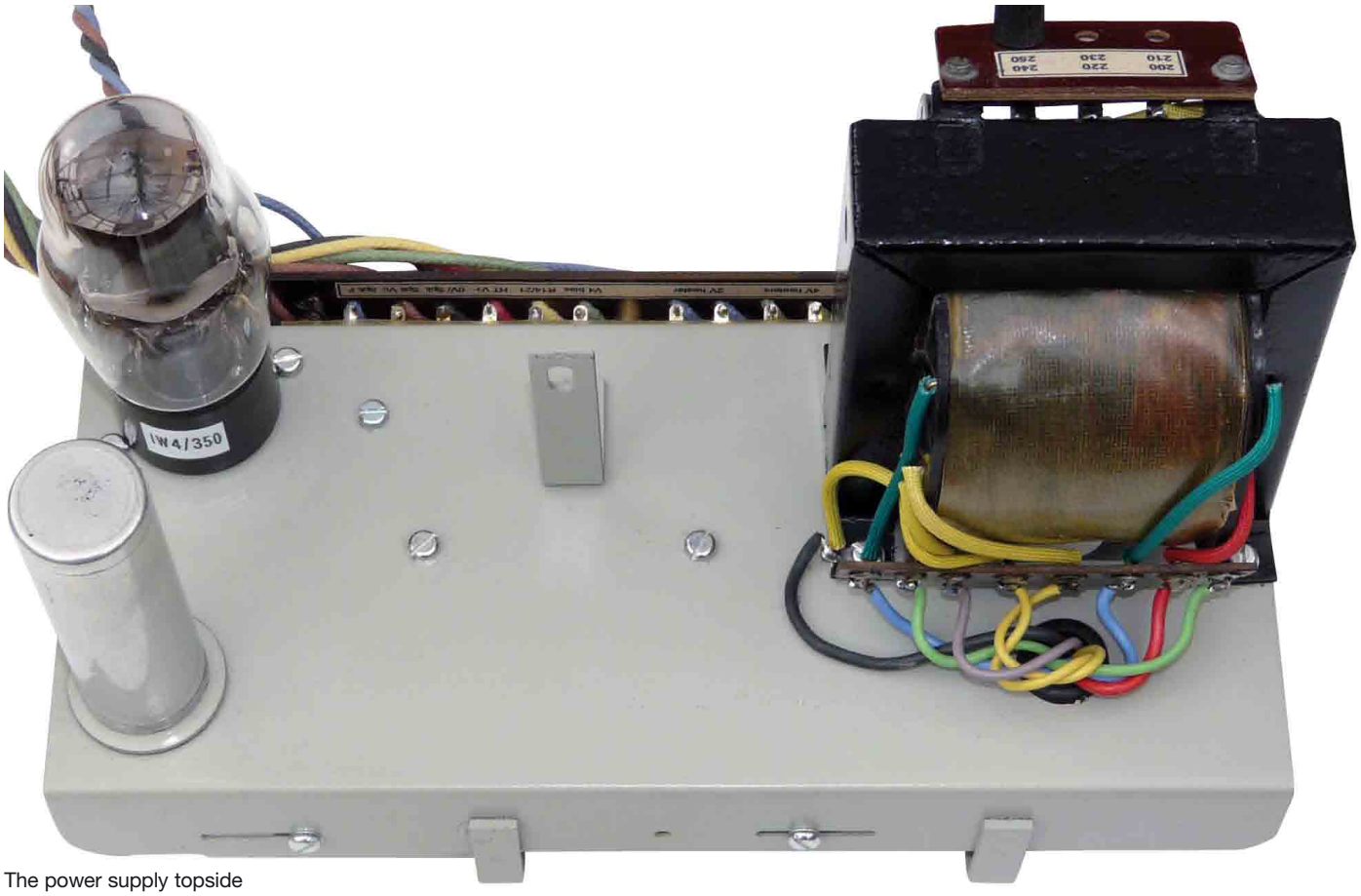
9: Finished speaker



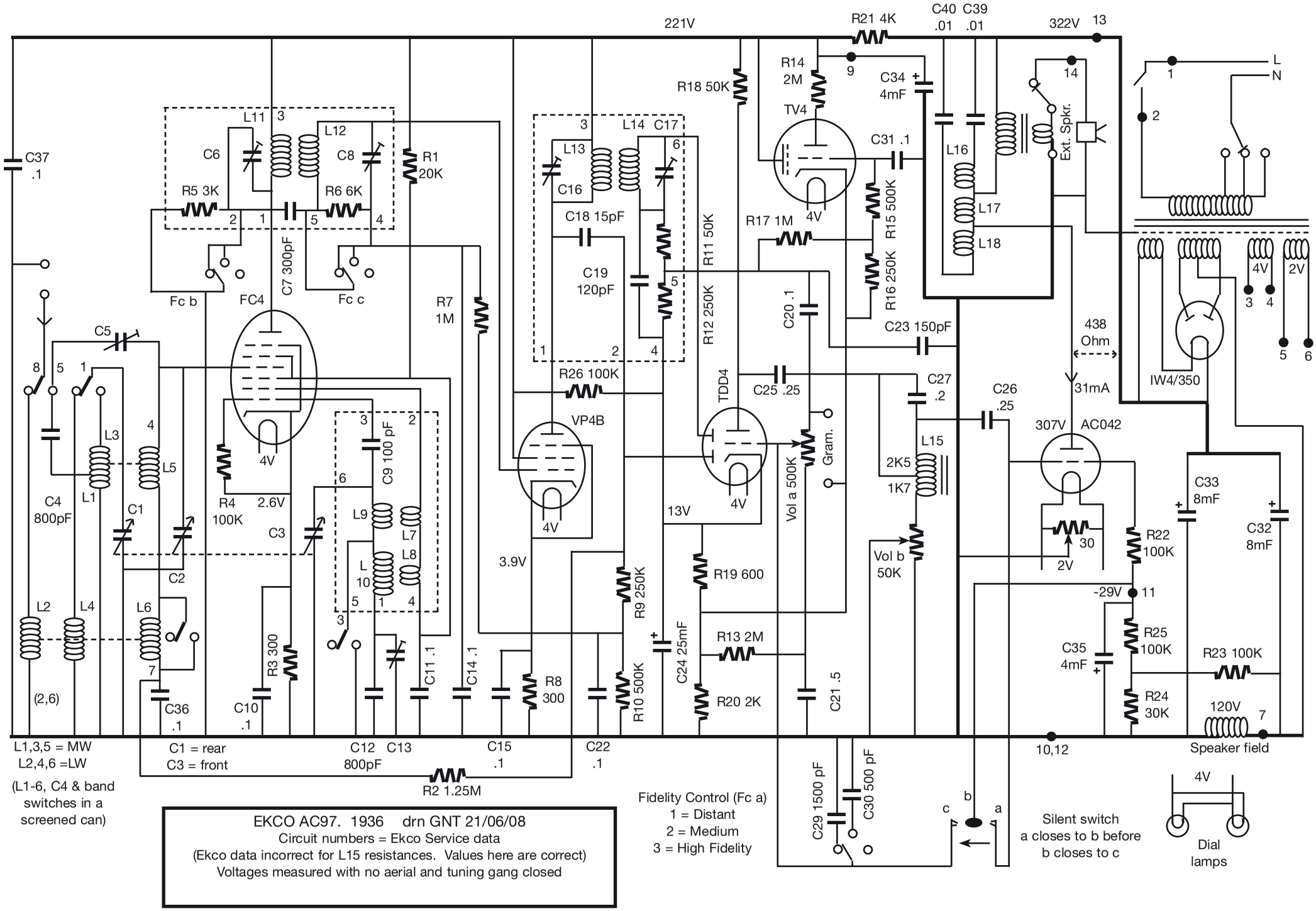
The power supply underside

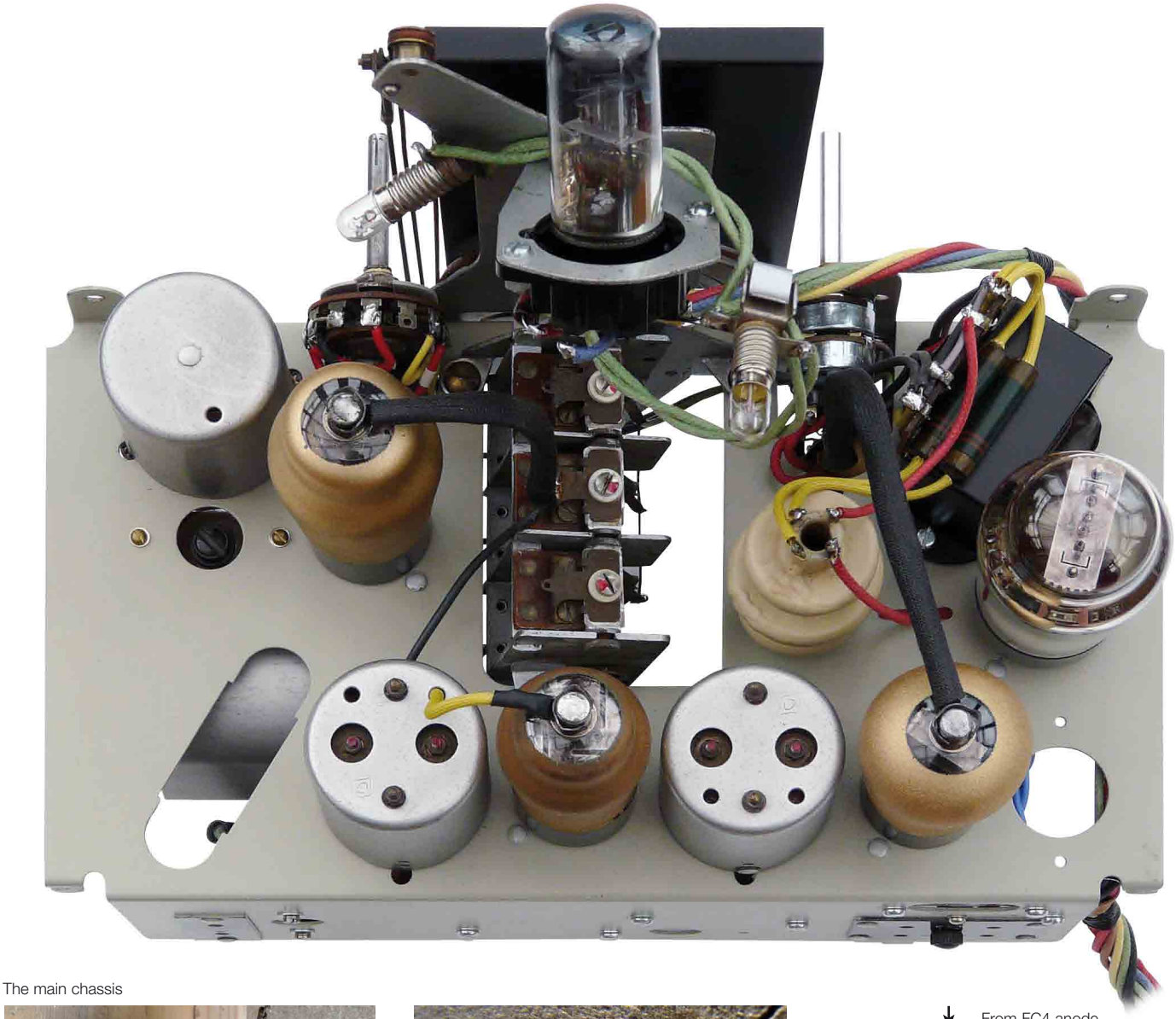
Below: the power supply tag panel





The power supply topside

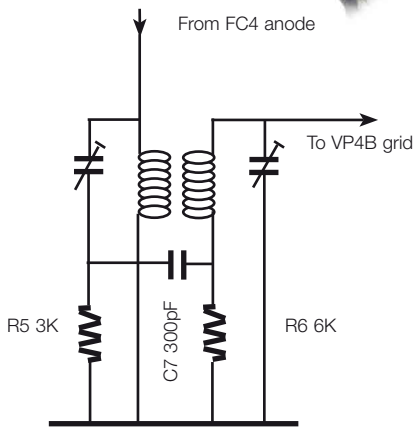

221V
R21 4K
C40 .01
C39 .01
322V
13
R14 2M
9
C34 4mF
TV4
4V
C31 .1
R18 50K
L11
L12
C6
C8
R1 20K
R5 3K
R6 6K
C7 300pF
Fc b
FC4
Fc c
L13
L14
C17
C16
C18 15pF
C19 120pF
R11 50K
R12 250K
R17 1M
R15 500K
R16 250K
L16
L17
L18
14
Ext. Spkr.
L
N
1
2
C37 .1
C5
8
5
1
L3
L1
4
L5
C4 800pF
C1
C2
L2
L4
L6
7
(2,6)
C36 .1
R4 100K
2.6V
4V
C3
C9 100 pF
L9
L7
L8
L 10
R3 300
C10 .1
C11 .1
C14 .1
R7 1M
R26 100K
VP4B
4V
3.9V
R9 250K
R10 500K
C24 25mF
C20 .1
C25 .25
TDD4
4V
13V
R19 600
R13 2M
R20 2K
C21 .5
Vol a 500K
Gram.
C23 150pF
C27 .2
C26 .25
438 Ohm
31mA
307V
AC042
L15
2K5
1K7
Vol b 50K
30
2V
-29V
11
C35 4mF
R25 100K
R24 30K
R22 100K
R23 100K
C33 8mF
C32 8mF
120V
7
Speaker field
10,12
IW4/350
4V
2V
3
4
5
6
C29 1500 pF
C30 500 pF
c
b
a
R2 1.25M
C12
C13
800pF
C15 .1
C22 .1
L1,3,5 = MW
L2,4,6 =LW
(L1-6, C4 & band switches in a screened can)
C1 = rear
C3 = front
Fidelity Control (Fc a)
1 = Distant
2 = Medium
3 = High Fidelity
Silent switch
a closes to b before
b closes to c
Dial lamps
EKCO AC97. 1936 drn GNT 21/06/08
Circuit numbers = Ekco Service data
(Ekco data incorrect for L15 resistances. Values here are correct)
Voltages measured with no aerial and tuning gang closed



The main chassis

The mains transformer on a vertically-mounted turntable

The original mains transformer voltage panel



First IF transformer in broadband configuration

damaged and the rest were mainly dust inside the cotton covering. I used a very good replica wire, again from AES.

The loudspeaker

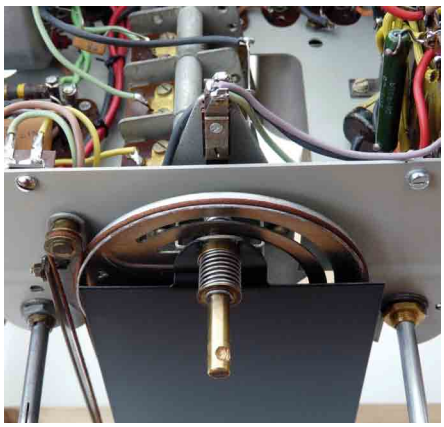
It may have worked but once I had tweaked the suspect voice coil wires it was no longer going to. The aluminium wires were originally soldered to tags of the same metal but this is never reliable after a number of years. The tags are held to the paper cone by brass rivets for normal soldering of the copper flexible connections to the speaker tag panel.

Roger had a similar problem and managed a cure by soldering a copper wire into the eyelet, which was twisted to the aluminium wire, and covered with silver conductive paint. I tried the paint and wrapping to the tags but it didn't work for me.

Moving on, I stripped the speaker and took out the cone, dissolving most of the old glue used for the cloth surround, with acetone. I would have attempted to rewind the voice coil with copper wire (often done so I'm told) except that the cardboard former was far too fragile to give much chance of success. An investigation of some junk speakers found one with an identical diameter voice coil. No doubt there was some commonality in this measurement.

Pictures here are easier than too many words so I have included a work sequence. Fig 4 shows an "Inner sleeve" made from brown paper and just lightly glued in position. It is to stop any epoxy getting inside and is removed finally. The donor coil, from a PM Goodmans speaker of later vintage, (Fig 5) was too long and was shortened. Fig 6 is a jig, made from scrap plywood with a piece

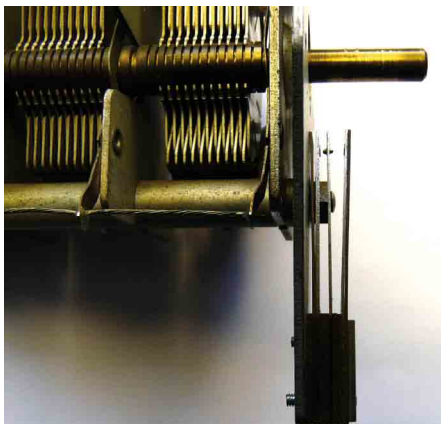
The main chassis underside



The silent switch

of dowel glued squarely into it. This was a little small in diameter and was built up with a piece of heat shrink sleeving and a non-overlapping round of masking tape. Fig 7 shows the cone on the jig, with the new voice coil pushed down with a little flex and held in position by low tack masking tape. I had already applied a fillet of epoxy and the final result is shown in Fig 8.

After cleaning, de-rusting and painting the metal work the speaker was reassembled and I was pleased that it worked very well. For the voice coil wires I didn't bother with the



The silent switch

tags but soldered them, along with those to the output tag panel, into the brass eyelets.

The main chassis and circuit

The circuit (mainly parts that interested me)

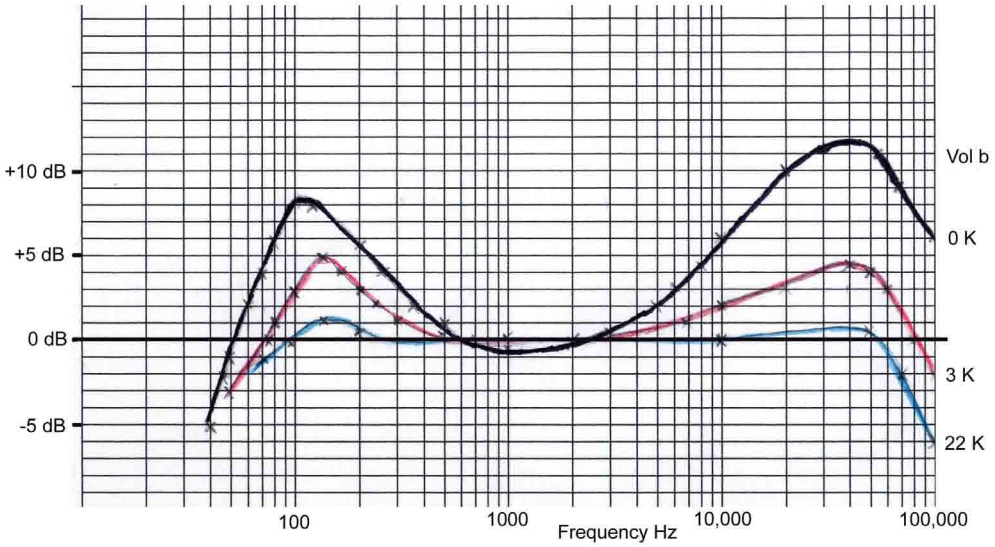
In my redrawn diagram the wave band switch is shown in the LW position. Aerial input is to L2, which is inductively coupled to bandpass filter L4 (tuned by C1) and L6 (tuned by C2). On MW the input is via capacitor C4 to a tap on L1/L3 (tuned by C1) that is coupled to L5 (tuned by C2 with L6 shorted out).

The clover–leaf tuning indicator

There is a pre-set capacitor C5, for image suppression. It works by feeding a signal of opposite phase, to the image that passes via the bandpass filter, giving cancellation.

The FC4 is an octode frequency changer with electron coupling of the tuned grid oscillator, coils L9 and L10, with feedback windings L7 and L8.

In the anode is the first IF transformer having selectable bandwidth. The first two positions of the "Fidelity Control" are intended for distant stations with maximum selectivity. In the third position, for strong



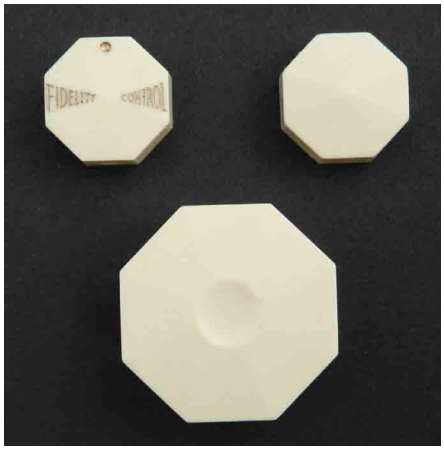
Loudness circuit frequency response

The simple coil winder

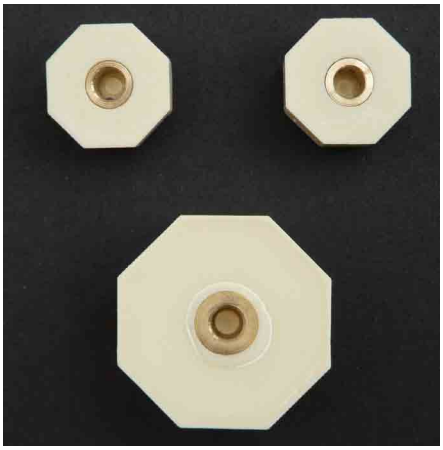
Broken wave–change knob

Wave–change knob with ski–pole collar

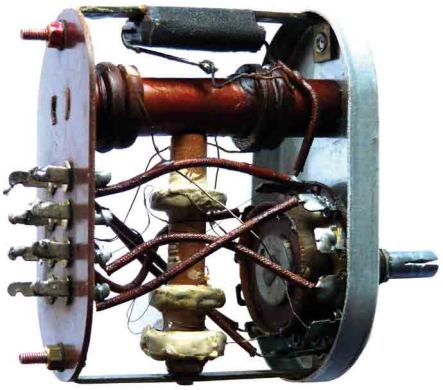
Wave–change knob with painted collar



Wim's knobs



Wim's knobs viewed from the rear



The waveband switch and filter unit

local stations, resistors are added in series with the primary and secondary circuits. They are quite high values compared to winding resistance, but presumably some of their effect is negated by bottom coupling, via C7 with a reactance at the IF of 4K Ohm, (see the simplified circuit). Just to convince myself that the transformer windings are still doing something I shunted the primary with 820 pF and there was serious loss of signal.

In measurements with a Wobbulator, the narrow bandwidth is a single peak about 4 kHz wide (half-height) doubling to a single peak, with sloping sides, of 8 kHz on broad bandwidth. Not an ideal broadband characteristic but apparently about what can be expected with the method used. The Fidelity Control also adds top cut, for the first two positions, by another pole of the switch.

The VP4B is a conventional variable –mu pentode operating as an IF amplifier. One diode of the TDD4, fed by C18 develops AVC. Note the attention to detail, and audio quality, by the use of only partial AVC to the IF stage. This minimises distortion, when the stage is handling large signals, by ensuring that it is not biased too far back, as would be the case with the full AVC voltage. A lot of manufacturers didn't bother with this and saved the extra resistor and capacitor. Delay for the AVC is by the potential divider R26, R19/R20.

The other TDD4 diode is used for detection in conventional manner with the audio, via C20, going to the triode pre-amplifier. The DC component after filtering drives the magic eye, which has its cathode returned to a DC potential approximately equal to the AVC delay such that it indicates weak signals.

The audio feeds to the output stage via the 'loudness' circuit, which is covered fully below. In early chassis, according to the Trader Sheet, a "whistle stop filter" (coil and capacitor) was fitted in the grid lead of the output valve. This later chassis doesn't have this but has a low pass filter in the anode. It must have been quite a costly item as the coils used have an elaborate construction (it's the cream 'beehive' alongside the output transformer in the pictures). The designer really must have been concerned about high

frequencies reaching the 'special' loudspeaker.

You don't need to know much about filters to see how it works. Looking from the anode you have a series tuned circuit, L18 and C40, separated from an identical circuit by L17. I measured L18, L17 and L16 and they were 25 mH, 45 mH and 25 mH respectively. If you do the sum then the series tuned circuits (25 mH and .01 mF) are resonant, and low impedance, at 10 kHz. The choke L17 between these two shunt paths (virtually the DC resistance of 54 Ohm) will have a reactance of 2.8k Ohm at this frequency.

There is a 'silent switch', which can be used as a noise mute when tuning between stations or for final tuning using the magic eye. The switch is operated by pushing on the tuning knob, which distorts the tuning slow motion drive. This allows it to bear on the relay contact type switch (see pictures). On the schematic it is seen that contact "a" closes to "b" first, which shorts out R22 and silences the radio from further clicks and pops. When these contacts make with contact "c" then the negative output valve bias voltage charges C21, which cuts off the TDD4 for about two seconds.

Work done

Once stripped the chassis was dealt with in the same manner as the power supply chassis. Then came the slow but satisfying job of rebuilding all the cleaned tag panels with re-stuffed components.

Any items that could be taken apart were, and carefully inspected, before cleaning and re-assembly. The waveband switch was found, using an electronic LCR meter able to measure low resistance, to be 'dicky' on the LW position. As can be seen in the picture the switch and coil assembly looks formidable to take apart. However, I found a neat dodge and that was to remove the Circlip, on the switch spindle, and then push back the rotor. There is then enough room to get to the contacts (pads with shorting segments on the rotor) and clean them using switch cleaner and cotton buds.

Volume Control potentiometer

This is a twin gang type, with switch, having a 500K Ohm log section and a 50K Ohm, probably log section, used for volume related bass boost or 'loudness'.

My one was beyond doing anything more with, it was rusty and intermittent everywhere and had been worked on in the past. Fortunately, I was given a new modern type but with a 100K log rear section that does the job.

Transformer L15

This can be seen at the front right of the chassis, in the underneath view, partly obscured by the chassis fixing bracket.

It is used in the 'loudness' circuit and was open circuit in the top winding. Note that the radio will still function as the circuit only does anything at low volume and the winding is bypassed by C27 for all but low frequencies.

The way it works is that at high volume, "Vol b" will be tens of K Ohm and the coupling from the TDD4 to the AC042 will be via capacitors C25, C27 and C26. At low volume and with "Vol b" being only a few K Ohms then transformer action by L15 will take place at low frequencies. My rewound transformer was approximately 2.5:1 step up and this will be the maximum boost, tapering off as the reactance of C27 falls and shunts away the gain.

I could measure the bottom half of my transformer for resistance and inductance and the resistance value was nothing like that given in the Ekco Service Data. Two BVWS members very kindly measured the transformer resistance values for chassis in their sets and the Ekco figures are clearly wrong. Expected values are 1.7k Ohm for the bottom half and 2.5k for the top.

I stripped and rewound the transformer with 47 SWG wire, as I had measured for the original, using a hand coil winder (see picture). Oddly the bobbin was less full for the correct resistance values, from the pictures I had taken as I stripped the coil. Also, the inductance of the bottom half was only 2.4 H against 3.8 H measured originally. It would have been nice to put on the correct number of turns rather than just wind for correct resistance. However, it's hard to count the turns taken off, without a turns counter, and temptingly easy to just cut away the wire. As inductance is proportional to the square of the turns it is likely that the turns are down by about 25%.

For interest I plotted the frequency response of a test circuit for a few values of "Vol b". My transformer is clearly not identical to the original so the response may be different for the original chassis. It's good to speculate, so how is it likely to differ? I think the turns ratio would be similar and so the maximum boost much the same but having more inductance the boost will start at a higher frequency. Now if someone has another transformer on a junk chassis I will investigate further.

So how much bass boost can I expect at a likely low volume? On narrow band selectivity (see Note below) "Vol b" is about 2K Ohm and so about 3 dB of boost is likely at 100 to 200 Hz.

Roger noted that there is a gain loss due to "Vol b" (he replaced it with a fixed resistor). For reference it is about 13 dB from the original maximum value of 50K down to zero. In practice it doesn't matter as it is absorbed into the normal volume reduction as the control is turned down.

Note: The gain is lower for wide band (I would guess at 20 dB) and so the volume control will be more advanced. Thus "Vol b" will be higher and less boost will occur.

Alignment

Once the chassis was carefully rebuilt I tested it and it worked with reasonably correct voltages straight away. I had to use an audio generator to align the 126.5 kHz IF transformers as I didn't have an RF type that would go that low. I monitored the AVC line with an oscilloscope and managed to fool myself into the bargain. I wondered why I couldn't get the last coil L14 to peak but of course you need to monitor post the AVC line. Once I had moved the scope probe to the top of C20 it behaved. I didn't have a TV4 magic eye at this stage, as no doubt I could have done it on that.

RF alignment was straight forward, just the two trimmers for the bandpass filter and the oscillator padder for LW. There is no padding needed for MW as the tuning gang section has shaped vanes.

Cabinet (Including Knobs, Grill cloth and Dial)

Not a lot to be done to the cabinet as it had been well buffed in the past. However, the great piece of luck was finding someone who already had moulds for the front knobs and made me an excellent set (see pictures). He is a Dutchman by the name of Wim Jaegers and his e-mail address is: wimjaegers@hetnet.nl

If ordering be sure to specify 4BA tapped holes, for the grub screws, or at least a plain hole of the correct size for tapping yourself.

The side wave change knob had a broken shank and the thread left in the brass bush was worn and would not take much torque. They say never throw anything away and I had kept an old aluminium ski pole. If you have been skiing then you will know that these have a gradual taper from top to bottom. With some trial and error I cut a piece that was a perfect press fit on the knob shank whilst filling the broken piece with Araldite Steel. All it needed, when well hard, was a hole drilled and tapped to line up with the original.

The fitted blue replacement grill cloth was not to my taste, and far from the original, and so I spent time going around all the material shops. Again I got lucky and found an ideal piece of cream cloth that I deemed as perfect as I was ever likely to find.

When I first got the radio I bought an excellent looking reproduction silk screened dial from Clive Mason (01902 662050) who used to do many replacement parts for Ekco radios. Unfortunately, he told me he is no longer doing this and is just selling off old stock, once gone then there will be no more.

Conclusions

The radio is about as sensitive and selective as I would expect with a pleasing sound from the quite large loudspeaker. The Fidelity control is useful having reasonable tone steps between positions. If you can find some unobjectionable music, on a local station (or use your own transmitted material), then the broadband option gives a noticeably brighter sound. I'm not greatly impressed by the 'loudness' circuit or the silent tuning option. But this radio is so much about its looks. I'm even more thrilled with it now than when I first got it: it must be one of the most art deco radios ever made. The designer, Jesse Collins (see Note below), is to be congratulated along with Ekco for taking a chance on such a radical design. It certainly has a wow factor for visitors who see it on display in the lounge.

The replacement tuning dial does have a drawback to the original in that it is very hard to read in daylight. The original was printed on 1/8" thick glass with a polished edge so the edge lighting would have been effective. Not so the reproduction which uses thin picture glass.

Note: The London Transport Museum Internet site had this to say:
"Jesse Collins was a designer. As well as posters and packaging he was interested in industrial and electrical design. In 1936 he designed the Ekco AC97 radio. He became a Fellow of the Society of Industrial Artists in 1945. In the 1950s he was a principal at the Central School of Arts and Crafts in London."

I found further references but not much else about him. He is much less written about than Wells Coates the designer of the round Ekco's.

The Pye Baby QU Mains portable of 1937 by Graham Dawson

There were two Pye QU mains portable sets; a superhet in a wooden cabinet and a TRF in a rexine covered style cabinet termed the Baby QU. Of these there are reputed to be very few left because they had an unfortunate habit of catching fire! When you look at the amount of power dissipated as pure heat in this small-ish set it is hardly surprising. It is perhaps difficult to understand why the set didn't have a mains transformer except that at the time there were quite a lot of houses that still had DC mains, so a universal AC/DC set was manufactured in 1937.

Before the war 100mA series heater valves were not made, so the 200mA valves had relatively low heater voltages, meaning with only 4 valves a lot of volts had to be lost in a dropping resistor producing unwanted heat. The QU had 4 valves which when connected in series needed 79 Volts. That meant from 230V mains some 150 volts had to be dropped on a large resistor dissipating 30 Watts. Add to this the power consumed by the valve heaters, another 16 Watts and the HT load of 10 Watts, then nearly 60 Watts of heat was being produced inside the cabinet. With just a few slots in the back and the valves near the top, the build up of heat at the top of the cabinet was sufficient to cause burning and sometimes fire, especially if ventilation space behind was restricted

The example I have has no sign of burning on the cabinet inside, but is discoloured by excessive heat from the valves and the inside of the back is also brown from heat. I do not know the history of the set, having acquired it in part payment for some extensive repair work I performed on another collector's set, but I suspect it had not been used a lot. As received it was not working because the rectifier was missing and the dropper open circuit, which may have saved it from possible destruction. I knew the reputation these sets had, so wanted to repair it in a way that would reduce the heat produced. The obvious answer was a transformer to feed the heaters, but this would not have been easy with the limited space inside, and I wanted to keep it as near original as possible. The next best solution was a diode in series with the heater dropper, which effectively reduces the voltage applied to .707 of the original. The resistance of the dropper can then be reduced, lowering the heat dissipated. For a set only going to be used intermittently this seemed the best compromise and the diode could be hidden behind the dropper heat shield. The calculations work out like this:-
Valve heater voltages 79V at 0.2 amps.
Voltage applied to dropper .7 x 240 = 170V
This leaves 91 Volts at 0.2 amps which gives a 455 ohms resistance. I used a 470 ohm 20 watt chassis mounted type.

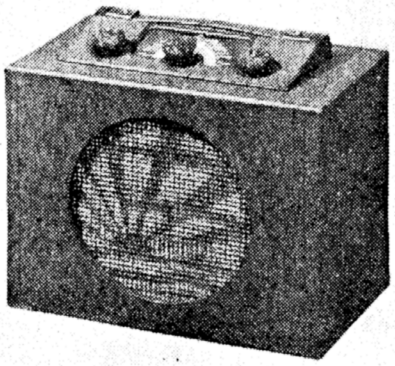
The original dropper was open circuit and as I was going to fit another one, the original component could be left in place, retaining the authentic if rather damaged original appearance. This resistance was tapped at 10 volt intervals from 200 to 250 Volts. Having obtained a replacement

'TRADER' SERVICE SHEET

345

PYE BABY QU

AC/DC PORTABLE



THE Pye Baby QU receiver is a 2-band portable of small size, for use on AC or DC mains. It has a self-contained frame aerial, and there is provision for an external aerial and earth, and for external phones.

It can be used on any mains with voltages between 200 and 250V.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, C20** (MW) or **L2, C20** (LW) to variable-mu pentode valve (**V1, Mullard metallised SP13C** or **Ever Ready C50B**) operating as RF amplifier with gain control by variable potentiometer **R9** which forms auto GB resistance in negative HT lead to chassis. Provision for connection of external aerial via **C2,** and earth via isolating condenser **C1.**

Tuned-anode coupling by **L5, L6, C23** between **V1** and pentode detector valve (**V2, Mullard metallised SP13C** or **Ever Ready C50B**) which operates on the grid leak system with **C8, R3.** Reaction is applied from anode by coils **L3, L4** and controlled by variable condenser **C22.**

Resistance-capacity coupling by **R6, C13,** and CG resistances **R10, R11** forming a potential divider across **R9** for GB, via RF filter **C11, R7, C12,** and stopper **R8,** between **V2** and pentode output valve (**V3, Mullard Pen36C** or **Ever Ready C70D**). Fixed tone correction in anode circuit by **C14.** Provision for connection of headphones across secondary of output transformer **T1** by means of plugs and sockets. One plug, when fully inserted, causes **S4** to open muting internal speaker.

When the receiver is used with AC mains, HT current is supplied by half-wave rectifying valve (**V4, Mullard URIC** or **Ever Ready C10B**) which, on DC mains, behaves as a low resistance. Smoothing is effected by speaker field **L9** and dry electrolytic condensers **C15, C16.**

Valve heaters are connected in series, together with ballast resistance **R12,** across mains input, which is provided with double-pole fuses **F1, F2.** Filter circuit comprising chokes **L10, L11,** and **C18, C19** suppresses mains-borne interference.

COMPONENTS AND VALUES

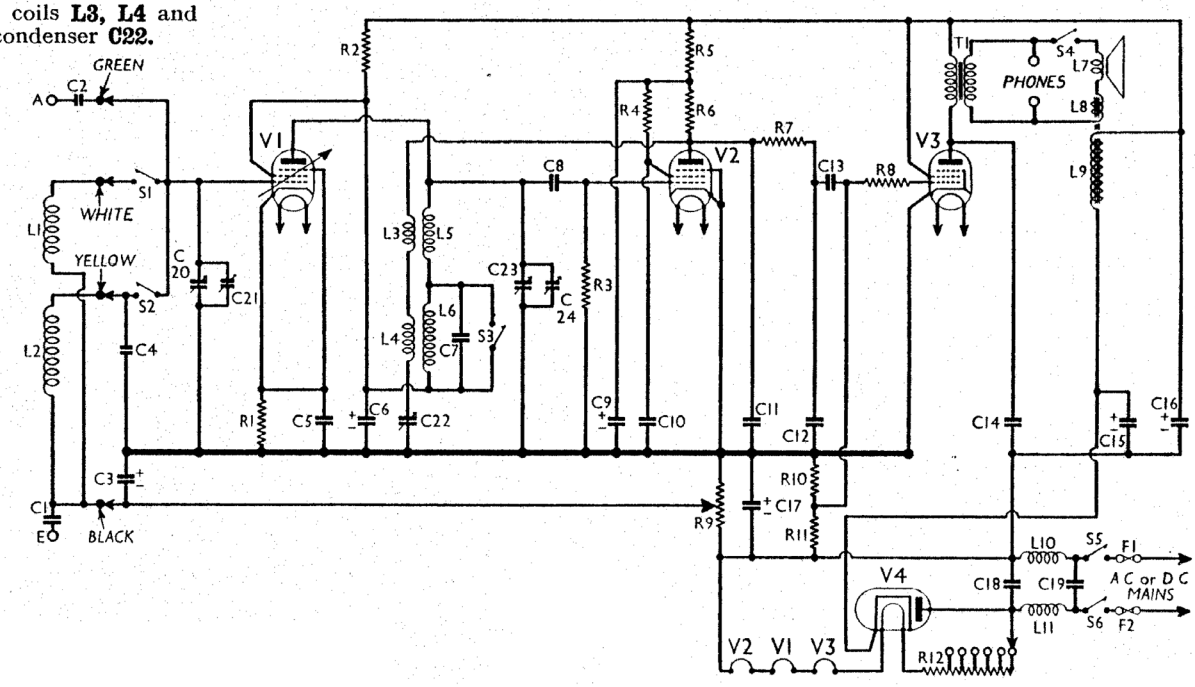
	RESISTANCES	Values (ohms)
R1	V1 fixed GB	1,000
R2	V1 anode and SG HT feed	5,000
R3	V2 grid leak	510,000
R4	V2 SG HT feed	260,000
R5	V2 anode and SG decoupling	20,000
R6	V2 anode load	110,000
R7	RF stopper	110,000
R8	V3 CG RF stopper	50,000
R9	V1 gain control, ganged C22	250
R10	V3 GB potential divider and CG resistances	1,100,000
R11		1,100,000
R12	Heater ballast resistance	840*

* Tapped at 45 O+, 45 O+, 45 O+, 50 O+, 50 O+, 605 O from V4 heater.

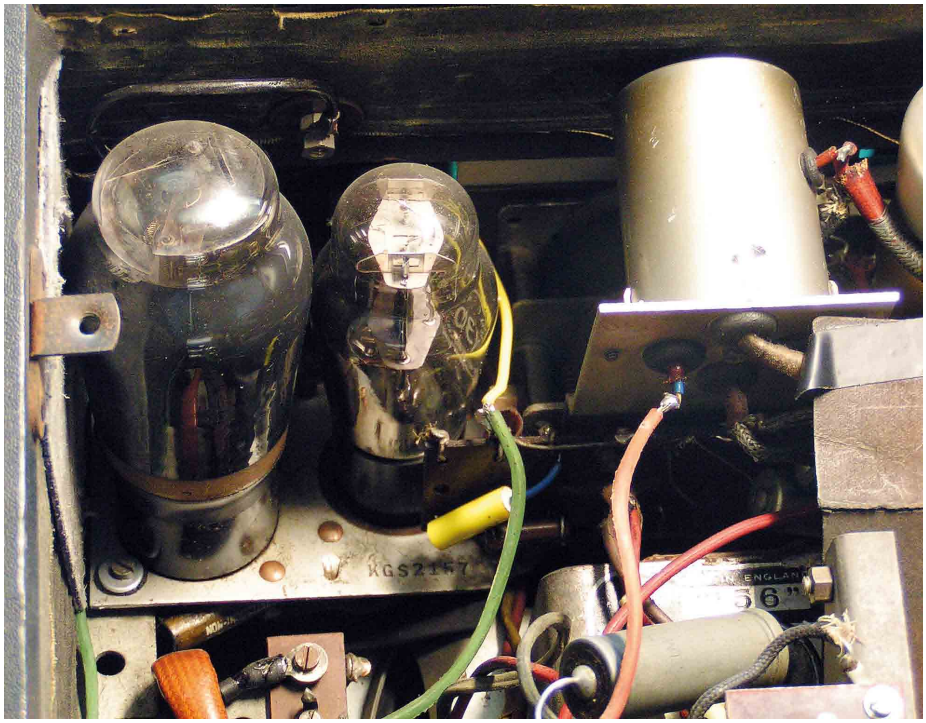
	CONDENSERS	Values (μF)
C1	Ext. earth isolating	0·05
C2	Ext. aerial isolating	0·000005
C3*	V1 CG decoupling	10·0
C4	Frame aerial LW trimmer	0·00002
C5	V1 cathode by-pass	0·1
C6*	V1 anode and SG decoupling	2·0
C7	V1 anode circuit LW trimmer	0·00002
C8	V2 CG condenser	0·0001
C9*	V2 anode and SG decoupling	2·0
C10	V2 SG RF by-pass	0·1
C11	V2 anode RF by-pass condensers	0·0002
C12		0·001
C13	V2 to V3 AF coupling	0·01
C14	Fixed tone corrector	0·003
C15*	HT smoothing	8·0
C16*		16·0
C17*	Auto GB circuit decoupling	10·0
C18	Parts of mains input curcuit RF filter	0·1
C19		0·1
C20†	Frame aerial tuning	—
C21‡	Frame aerial MW trimmer	—
C22†	Reaction control, ganged R9	—
C23†	V1 anode circuit tuning	—
C24‡	V1 anode MW trimmer	—

* Electrolytic. † Variable. ‡ Pre-set.

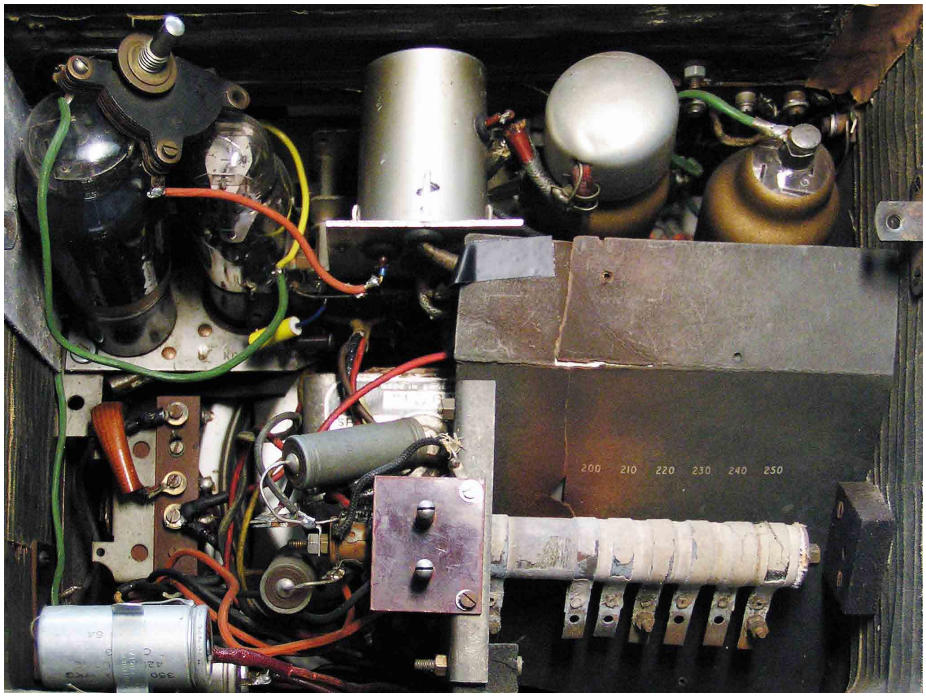
	OTHER COMPONENTS	Approx. Values (ohms)
L1	Frame aerial windings	1·72
L2		26·0
L3	Reaction coils	3·5
L4		
L5	V1 anode circuit tuning coils	3·0
L6		12·0
L7	Speaker speech coil	1·6
L8	Hum neutralising coil	0·2
L9	Speaker field coil	1,000·0
L10	Mains RF filter chokes	2·0
L11		2·0
T1	Output trans. Pri.	450·0
	Sec.	0·3
S1-S3	Waveband switches	—
S4	Speaker switch	—
S5, S6	Mains switches	—
F1, F2	Mains circuit fuses	—



Circuit diagram of the Pye Baby QU AC/DC portable receiver. It employs a 3-pentode "straight" circuit. **R9** and **C22** are ganged. Note the grid bias arrangements.



Output valve and rectifier



Pye back removed with the reaction capacitor sitting on top of the output valve, originally this would have been integral with the volume control.

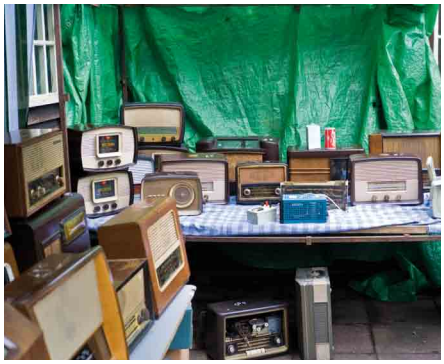
UR1C rectifier, fitted a chassis mounting 470ohm resistor on the back of the dropper metal heat shield and wired the diode in the heater circuit, I could power up the set and see if it worked. With a diode in the heaters it is no longer possible to measure rms voltages with a meter, so one has to observe the brightness of each valve heater and compare it to how they look on the valve tester when fed normally. They all looked similar which proved the arithmetic correct.

The construction of the set is hardly inspiring (one might say awful) and dismantling it is a long and laborious process. Whoever designed it was not thinking about easy servicing, but maybe most of them caught fire before they needed repair. Many of the early pre war Pye sets were constructed in a way that made them difficult to service and this set was no exception. Most of the larger components look as though they were put in as an afterthought and fitted around the cabinet or mains input socket.
The frame aerial coils are glued to the inside of the cabinet and covered with a cloth strip. The handle, dial escutcheon, knobs and valves have to be removed and numerous leads disconnected along with the heat shield, mains input panel and then finally the chassis can be removed. I took notes on where all the leads went because there were so many of them. There are details in the trader service sheet, but I recommend anybody repairing this set to write down what goes where for ease of assembly.

A look at the circuit shows gain (or volume) is controlled by a resistor in the negative leg of the HT supply varying the bias on the first stage, coupled to a reaction capacitor which increases positive feedback as the control is advanced. In my set the original control had been replaced by an ordinary 250 ohm pot with a separate variable capacitor fitted on the back of the set as a normal reaction control. The original control must have been very compact because there is little room between the rectifier and the spindle mounting bracket and the heat from the rectifier would have damaged it over time. I replaced all the mains filter capacitors and the smoothing electrolytics as a matter of course, also the coupling capacitor to the grid of the output valve before re-assembling and testing. It is virtually impossible to power this set in a dismantled state because of the many inter connections that have to be made, so any suspect components are best replaced before rebuilding and attempting to try the receiver. I suppose it would be possible to make up a harness of cables to extend the leads, but this would be a last resort if nothing appeared to be working. The original mains plug carried fuses in both live and neutral, but I did not have this so I fitted a fuse in the non chassis side of the mains for safety.
I did try the speaker to ensure the energising winding was intact and it was not rubbing on the cone, because the speaker is not something that can quickly be removed after reassembly. Having convinced myself there were no major faults with the receiver I set about the long job of re-assembly. After double checking all connections against my notes and the circuit diagram I plugged in and switched on. There was quite a long warm up period before a faint hum could be heard and when the tuning knob was turned (lo and behold!) sound came forth from a local station. The gain needed to be well advanced however, particularly on weaker signals, but it did appear to work across the band. As always I looked for signs of burning and kept a meter on the HT line for any indication of excessive loading. The heat shield was getting warm after about 5 minutes from the dropper, but otherwise all seemed OK. Because of the proximity of the output valve to the cabinet side this has a strip of asbestos glued on to deflect heat. Performance was what one would expect with a TRF, where strong signals tend to swamp weaker ones of a similar frequency, but generally quite lively on both bands.

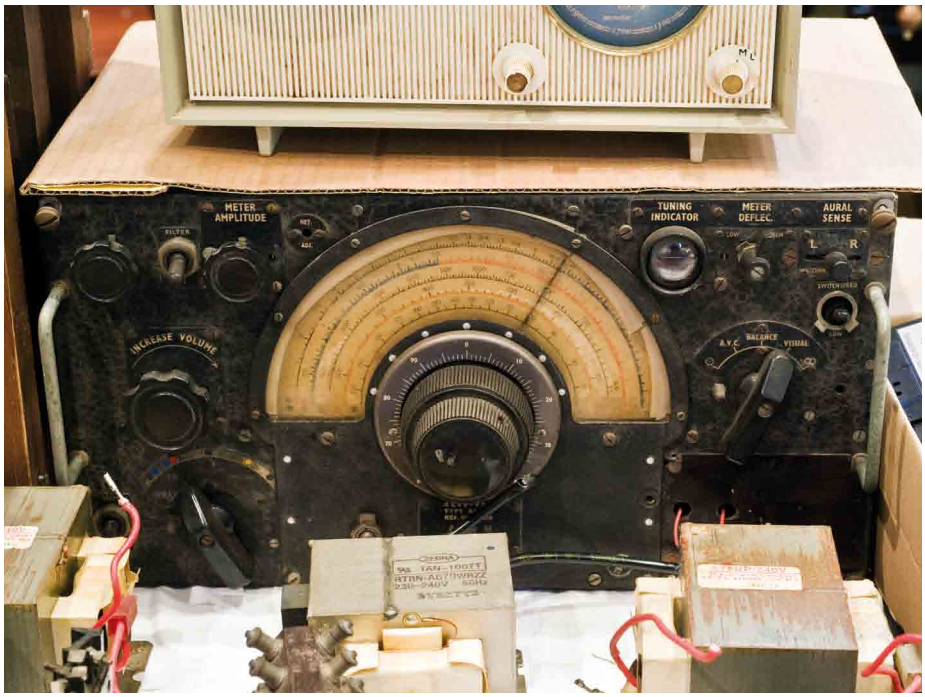
The set is once again in working order but I can't say I particularly like it. If anybody finds one of these sets at a swapmeet and wants to get it working, then these notes may be of some help, but it certainly isn't a classic in my books.

Images from Gerry Wells' Garden Party Photographs by Carl Glover

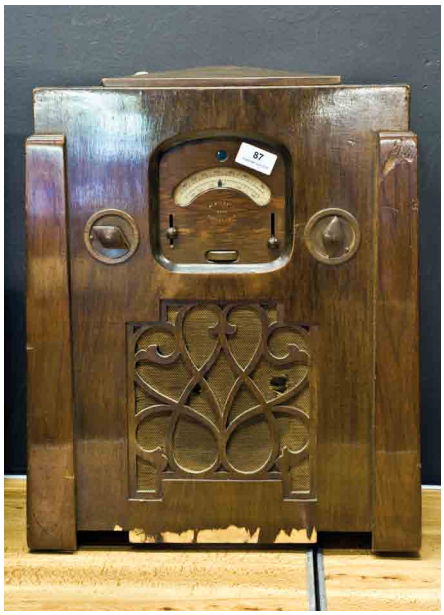


Harpenden! Photography by Carl Glover

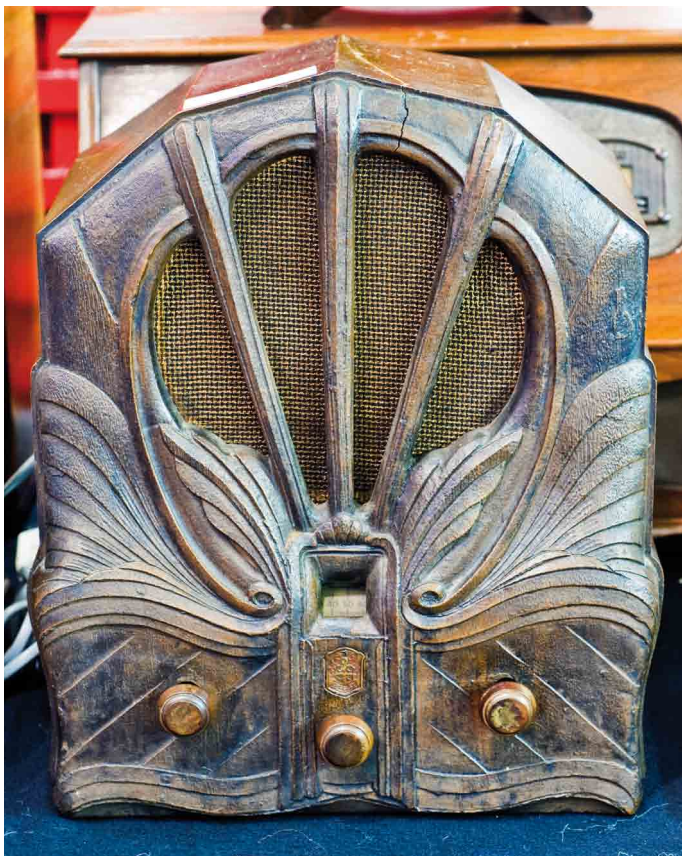

THE MAJOR ITV SERIES


METER AMPLITUDE
TUNING INDICATOR
METER DEFLEC.
AURAL SENSE
INCREASE VOLUME
BALANCE


AVO Signal Generator Mark III
150KHz - 220MHz
Appears to be working
(Silent Key Sale)
AVO
SIGNAL GENERATOR TYPE III
ATTENUATOR




AVO
UNIVERSAL AVOMETER




Timer Scaler 905c
START
STOP
LAMP
RESET
OFF
TIME
E.H.T.
COUNT


Radio Constructor
PRACTICAL WIRELESS
80p EACH
80p EACH
80p EACH


INSTRUCTIONS
RADIO
GEOPHONE


SONY

A brief resumé of British (and several overseas) finished goods & component manufacturers (as at April 2006) part 18 by Dave Hazell

UCC Brand of electrolytic capacitor (made in England), circa 1962. UCC stands for Universal Capacitor Co., which was acquired by LEMCO (London Electrical Manufacturing Company) in 1963 and renamed LEMCAP Ltd in 1965.

UIC. The United Insulator Co. Ltd., of Oakcroft Road, Tolworth, Surbiton, Surrey (in 1946) and of (offices in?) 12-20 Laystall Street, London, EC1 (in 1942 and 48?). Maker of ceramic capacitors, coil formers and trimmers for radio use. UIC was bought by the Telegraph Condenser Company - by 1964.

Uher – German tape recorders and HiFi – Uher Werke, of Munchen. In 1976, they establsihed a UK subsidiary – Uher UK Ltd, at 24 Market Place, Falloden Way, London, NW11.

UK Solenoid Ltd, Hungerford, Berks (in 1970). Moved to 115 London Road, Newbury, Berks in 1971. Maker of "Blue Line" rotary switches, relays, contactors and starters.

Ultra
In 1934, Ultra Electric Ltd, Chalk Farm, London, NW3. Western Avenue, Acton, London, W3 (in 1950). In 1952, the service dept. was Erskine Road, Chalk Farm, London, NW3. Originally established in 1920 by E E "Teddy" Rosen, as Edward E Rosen & Co, which became Ultra Electric Ltd, in 1923. In 1955, construction of a new TV & radio factory at Gosport, Hants was started (expected to open in May 1956) – this eventually closed in the early 1990's, when Ferguson Ltd ceased its UK manufacturing operations. Ultra's loss-making consumer electronics business was sold to Thorn in 1961. Although primarily known for their radio and TV products (up to 1961, when Thorn bought this side of their business), Ultra had diversified into industrial electronics (including radiotelephones – certainly in 1971) long before that time. In 1960, Ultra Electric (Holdings) Ltd formed two subsidiary companies: Ultra Radio & Television Ltd (which also had Pilot Radio & Televison Ltd as a subsidiary) and Ultra Electronics Ltd. In March 1960, the Ultra Radio & Television Ltd TV R&D centre was located at Stonefield Way, South Ruislip, Middlesex.

Ultra Electronics Ltd had its industrial electronics headquarters at the Ultra Works, Western Avenue, Acton, London. Ultra Electronics (Components) Ltd made connectors (at their Fassetts Road, Loudwater, Bucks factory – 0494 26233) and other components at their Greenford plant (in 1982, Ultra Electronic Communications Ltd, 419 Bridport Road, Greenford Trading Estate, Greenford, Middlesex). In 1965, Edward Rosen resigned from the chairmanship of the holding company – Ultra Electric (Holdings) Ltd and the subsidiary, Ultra Electronics Ltd. By that time, a 40% interest in Ultra Electronics Ltd, was held by Electronics International Capital Ltd, of Bermuda. Edward E Rosen died on 6th March 1966 at the age of 68. In 1970, they made "Centralab" rotary wafer switches, under licence from Globe-Union Inc. Ultra also acquired the Trix brand name by the late 1960's.

The industrial section of what was originally Ultra Electric Ltd. continued independently until its take-over by the Dowty group in the late 1960's. Dowty made hydraulic products, such as pit props and aircraft landing gear. It was established in the 1930s by George Dowty (1901–1975) in Gloucestershire, to manufacture hydraulically operated aircraft undercarriages. George Dowty worked previously for the Gloucester Aircraft Company.

Dowty was itself taken over by TI Group (formerly called Tube Investments) in the 1990's. Following this, a large part of what originally was the old Ultra electrical and electronics operation was spun off as a new, independent company called Ultra Electronics plc! TI was taken over by Smiths Industries (which used to make clocks, Radiomobile car radios, timeswitches and car dashboard instruments) in 2000.

Ultra Electronics Ltd, Western Avenue, Acton, London, W3 (in 1964 & 69). Maker of industrial electronics. A subsidiary of Ultra Electronic Holdings. In 1965, also at Long Drive, Greenford, Middlesex (Telecommunications division – e.g. VHF radiotelephones).

Ultra Electronic Communications Ltd, 419 Bridport Road, Greenford, Middx (in 1978). A member of the Dowty group. Sonar, rescue beacons, communications systems, VHF box-to-train radio for British Rail. Dowty took over Ultra around 1977 (see Daily Mail of 4-9-78; finance page).

Ultra Radio & Television Ltd, Television House, Eastcote, Ruislip, Middx (in 1962 & 64). Became a Thorn subsidiary when it purchased the radio & TV operations of Ultra Electric Ltd in 1961. In 1965, the Ruislip location was closed and all sales and marketing was transferred to the (new) British Radio Corporation Ltd offices at 284 Southbury Road, Enfield, Middlesex (HMV and Marconiphone sales also moved there at the same time).

Unamec Ltd, United Africa House, P O Box 1, Blackfriars Road, London, SE1 (in 1964). Importer of "National Panasonic" radios.

Unilab Ltd, Clarendon Road, Blackburn, Lancs. Teaching aids for schools and colleges (e.g. power supplies). In 1967, a division of Rainbow Radio (Blackburn) Ltd.

Union Carbide Ltd (UK subsidiary of Union Carbide USA), sold its UK semiconductor operation at Aycliffe, Co Durham, to Solidev Ltd (the UK subsidiary of Solitron Devices Inc). In 1974, Union Carbide UK Ltd, 8 Grafton Street, London, W1 (e.g. Kemet tantalum capacitors).

Unisal. Brand name of Band 3 converters made by Graham Taylor Ltd, 7 Stanhope Row, London, W1.

Unitech Ltd, Phoenix House, Station Hill, Reading, Berks (in 1972). In 1968, it owned Celdis Ltd, of Reading (an electronic component distributor). In 1972, it acquired Pantiya Electronics Ltd and APT Electronics Ltd (power supplies and Lektrokit) (the latter from APT Electronic Industries Ltd – a member of the Bonochord Group).

United Components Ltd, Eastern Avenue, Romford, Essex (in 1955 & 60). The design and manufacturing company of the RGD and Regentone group (Argosy was added by 1960).

Unitra. Brand name of radios made in Poland (in 1965).

Unitrode Corporation, 580 Pleasant Street, Watertown, Massachusetts, USA (in 1973). Semiconductor maker.

Universal Engraving Co, of S E London. Entered into a venture with a Dutch firm, shortly before the start of WW2, to make glass tuning scales, overprinted with wavebands, wavelengths, station names, etc. They went into large scale production at the end of WW2, making scales for many of the industry's well-known names.

Universal Capacitor Co. Acquired by LEMCO in 1963 and renamed LEMCAP Ltd in 1965.

Vactric Control Equipment – bought from Joseph Lucas in 1972, by Muirhead Co Ltd. In 1973, Muirhead Vactric Test House, Garth Road, Morden, Surrey. In 1965, Vactric owned A P Besson & Partner Ltd – a manufacturer of miniature microphones, earpieces and inductrial electronics (located at St Joseph's Close, Hove, Susssex).

Vactric Ltd, Chapelhall, Airdrie, Scotland (in 1946). Vacuum cleaner manufacturer. Went into receivership in 1960.

Vacwell Engioneering Co Ltd. Manufacturer of CRT vacuum pumping unit. In 1958, at Willow Lane, Mitcham, Surrey.

Validus Aerials, 57 Hornsey Road, London, N7 (in 1957). Maker (?) of indoor TV aerials.

Valor Co Ltd, 50-52 New Cavendish Street, London, W1 (in 1964). Makers of portable electric domestic heaters.

Valradio Ltd, 57 Fortess Road, London, NW5 (in 1950) as well as New Chapel Road, High Street, Feltham, Middx (in 1952). In 1962 and 1980, Browells Lane, Feltham, Middx. Maker of inverters (since 1935), also projection TV set. Band 1/2/3 tuners in 1954/55. In 1984, Valradio Power Ltd, AK International Building, Lawrence Estate, Green Lane, Hounslow, Middlesex - inverters.

Van der Molen Ltd, 1 Mildmay Road, Romford, Essex (in 1971). Later, at 101 Hainault Road, Romford, Essex. Maker of audio equipment. Established by Mr Van der Molen, in 1965/67, at 42 Mawney Road, Romford, Essex. who was previously with Elizabethan.

Vanguard. Brand name of Vanguard Engineering Co Ltd, Commonwealth Factory, Woolwich Church Street, London, SE18 (in 1962). Manufacturer of "RingOlite" circular fittings.

Varelco Ltd – see Pye.

Varian. Varian Associates, of California was founded in 1946 by (amongst others) Dr Russell H Varian –who invented the Klystron in collaboration with his brother, Sigurd. In 1970, EMI-Varian Ltd was the UK agent for Varian (USA) tubes.

Varley. Varley Magnet Co. In 1928, Varley Ltd had a relationship with Radio Instrument (RI), as there was a joint sales catalogue for their radio components. The Varley company was taken over (before 1934) by Oliver Pell Controls Ltd., of Cambridge Road, Woolwich, SE18 (in 1948). In 1938, Oliver Pell Controls were at Bloomfield Road, Woolwich. It was used as a trade name. In business since at least 1934. In 1938, 54 & 74, Oliver Pell Control Ltd, Cambridge Row, Burrage Road, Woolwich, London, SE18. Manufacturer of mains and audio transformers, radio IF transformers (in 1938), rheostats, chokes and relays. Subsequently merged with Keyswitch Relays Ltd. (possibly when taken over by Thorn in the 1970's). Keyswitch Varley was sold by Thorn EMI in the 1980s to FKI Group. It was then subject to an MBO and is now (2002) known as Signature Industries Ltd. Varley, Kingsway House, 103, Kingsway, London, WC2 – "Thank you for buying British" on 20's intervalve transformer catalogue.

There was also Varley Dry Accumulators Ltd, of Bypass Road, Barking, Essex (in 1943 and 1976). Were they connected?

VARTA. Vertrieb, Aufladung, Reparatur, Transportabler, Akkumulatoren (distribution, recharging and repair of portable accumulators). The original company was Accumulatorenfabrik AG - AFA, established in Germany, in the late 19th century. In 2004, Varta AG has sold its vehicle battery business to Johnson Controls (USA) and consumer alkaline business is now a joint venture with Ray-O-Vac Corporation (USA). Varta has concentrated on its "micro battery" business.

Venner Accumulators Ltd, Kingston By-Pass, New Malden, Surrey (in 1953 & 61) – maker of Silver-Zinc accumulators. There was an associated company – Venner Electronics Ltd, of the same address. Probably the same firm that went on to make timeswitches. Taken over by AMF (of the US).

Venner Electronics Ltd, Kingston By Pass, New Malden, Surrey (in 1954 & 69). Maker of measuring equipment (especially time), test equipment and radio equipment. By 1971, known as the Venner division of AMF International Ltd.

Vent-Axia Ltd, 9 Victoria Street, London, SW1 (in 1946). Maker of electric air fans. By 1964, a Hall-Thermotank company. In 1982, Vent-Axia Ltd, Fleming Way, Crawley, West Sussex.

Verdik Sales Ltd, 8 Rupert Court, Wardour Street, London, W1 (in 1956). In 1958, they moved to a new factory and offices at 139-143 Sydenham Road, Sydenham, London, SE26. Maker of "Verdik" HiFi equipment (including tape recorders).

Veritone Ltd, 5 Avenue Parade, Ridge Avenue, London, N21 (in 1958). Maker of tape recorders.

Vernitron – see Brush-Clevite.

Vero Electronics Ltd, Industrial Estate, Chandler's Ford, Eastleigh, Hants (in 1969). In 1963 & 65, at South Mill Road, Regents Park, Southampton. They moved to their new factory and offices at Chandler's Ford, in 1966. Maker of Veroboard, equipment racking systems and enclosures. By 1980, Verospeed, the component distribution business was in operation. Later taken over by BICC and then sold on to APW (USA).

V.G. Porcelain Co Ltd, Gorst Road, Park Royal, London, NW10 (in 1965). Porcelain and Steatite products for the radio industry. In 1966, now known as Park Royal Porcelain Co Ltd (incorporating V G Porcelain Co Ltd) – same address.

Victor Manufacturing Co (Greengates) Ltd, New Line Works, Greengates, Bradford, Yorks (in 1958). Maker of clothes drying cabinets.

Video Circuits Ltd, 101 Salisbury Road, Barnet, Herts (in 1967 & 71). Circa 1982, at 1a Wentworth Court, Alston Road, Barnet, Herts. Maker of TV test pattern generators (in 1967), CRT testers and rejuvenators. Their 1967 TV pattern generator was distributed by Antiference (and branded Antiference – see WW July 67, p 13)..

Vidor. Vidor Ltd, West Street, Erith, Kent (in 1947). A maker of batteries and radios. The Vidor battery company was established T N Cole, who founded the Lissen Company in the 1920's. Lissen was bought by Ever Ready (GB) in 1928 and T N Cole stayed with the company. However, he became disenchanted and bought the ailing Burndept Radio Company. He started making batteries at Burndept, in Erith, Kent and the Vidor name was derived from the Christian names of his two daughters and wife. Later on, Vidor also made radios and TV sets. This activity ceased in the late 1950's. In 1948, they also made toasters and a tabletop electric cooker!

In 1968, Vidor Ltd and Burndept Ltd (both part of the Royston Industries group – in receivership) were acquired by Crompton Parkinson and they used the trademark "Crompton Vidor" for batteries. Crompton Parkinson was already owned by Hawker Siddeley in 1968. At that time, battery factories were located at Dundee and South Shields. Also in 1968, the Ever Ready Company (Great Britain) Ltd, acquired Burndept Electronics Ltd and the new company was called Burndept Electronics (E.R.) Ltd. By this time, the only Vidor battery factory was in Tyneside. Hawker Siddeley was in turn taken over by BTR circa 1990. I think it was at this stage that BTR sold the battery business to Ray-O-Vac of the USA, since I have seen "Ray-O-Vac Vidor" branded batteries. Now, only the Ray-O-Vac brand name is used. Burndept (E.R.) Ltd, of Erith, was still going in the 1970's but Burndept (the marine distress radio beacon product) is now part of Signature Industries.

Vidor Ltd, West Street, Erith, Kent (in 1955 & 64). Maker of Vidor radio, television, torches, batteries and distributor of Mastertape in the UK. By 1967, at Petts Wood, Kent (now separated from Burndept?) – Managing Director R P Taylor.

Vinten (W) Ltd. Established in 1909.

Vishay Resistor Products UK, Haywood House, 64 High Street, Pinner, Middx. (in 1972). UK company of Vishay USA. Vishay was founded in 1962 by Dr Felix Zandman, with financial backing from Alfred P Slaner. In the 1980's and 1990's, it grew rapidly by taking over many well known names: Sprague, Telefunken/ Siliconix, General Semiconductor Industries, Spectrol, Roederstein, …….

Visionhire. TV rental company which was trading in the 1950's. Grew considerably over the years and moved to a new HQ at Crawley, Sussex. Merged with several other related businesses and became the Electronic Rentals Group. Taken over by Granada TV Rental in the 1990's.

Vista Rentals. TV rental subsidiary of Radio Rentals Ltd, in 1967.

Visual Engineers Ltd, Stocklade, Aylesbury, Bucks (in 1965). A member of the Negretti & Zambra group. UK agents for Grundig test and measurement equipment.

Vitality. Vitality Bulbs Ltd, Neville Place, Wood Green, London, N22 (in 1957 & 65). In 1966, Vitality Bulbs Ltd relocated to Beetons Way, Bury St Edmunds, Suffolk. Manufacturers of lamps, particularly LES and MES types used for dial lighting in radios, etc. Vitality was taken over by the General Instrument Corporation in 1969 and the UK group included Hivac neons (previously part of the Automatic telephone & Electric Co.) and Chicago Miniature Lamp Works. In 1974, Vitality Ltd, still GI and same address in Bury St Edmunds. GI divested itself of this operation (late 1980's, I think) and it was then known as VCH Lamps. However, it has now become part of SLI, the former lighting division of Sylvania.

Vitavox Ltd. Westmoreland Road, London, NW9 (in 1948). A maker of microphones and loudspeakers.

Vitavox Ltd, Westmoreland Road, London, NW9 (in 1947 & 1958 & 1974). Established in 1931 by Len Young, who died in 1974. His son Neil became MD after this. Maker of PA equipment, including microphones. In 1982, they established a new subsidiary, DSN Marketing Ltd (same address), to market: Vitavox loudspeakers, Bullet loudspeaker components, D & R mixing consoles and Helios mirror balls.

Vitramon – a US (?) capacitor maker (in 1973). In 1979, Vitramon Ltd, at Wycombe Lane, Wooburn Green, High Wycombe, Bucks.

Vitrohm Elektoteknisk Fabrik A/S, Copenhagen, Denmark. In 1966, a wirewound and low power resistor manufacturer. Dubilier Condenser Co were their UK distributors in 1966. In 1971, VTM (UK) Ltd was formed as the UK distributor for Vitrohm. J H Cotton – formerly of Dubilier – was involved in the establishment of VTM UK Ltd.

Vodafone. The mobile network started out as a subsidiary of Racal, in 1982, after the award of a mobile phone service licence from the Government. Vodafone started in Newbury, Berkshire and is still headquartered there. Vodafone means: Voice, Data and F(ph)ONE. Vodafone demerged from Racal in 1991. It is now a global player.

Voice Microsystem Ltd, Abercynon, Mountain Ash, Mid Glamorgan (in 1981). A member of the AB Electronic Products group. Speech processors for carrier and line communication systems.

Volex – see Ward & Goldstone.

Vortexion Ltd, 257 The Broadway, Wimbledon, SW19 (in 1945 and 1973). Founded in 1932 by Sidney A Brown (died 19th January 1972). By 1958, 257-263, The Broadway. Maker of amplifiers, PA equipment and tape recorders. In 1975 – CSI Vortexion (same address) – Clarke & Smith? Yes! – in 1978 Vortexion division of Clarke & Smith Manufacturing Co Ltd, Melbourne Works, Melbourne Road, Wallington, Surrey.

Voxson SpA, of Italy. Consumer electronics manufacturer. EMI bought a 50% stake in 1971. In 1961, there was a Murphy Voxson car radio – any connection?

VSE Construction Co Ltd, 5-7 Denman Street, London, W1 (in 1947). Maker of radios and portable amplifiers.

WE - see Wimbledon Engineering Co. Ltd.

WISI, of Niefern, W. Germany (in 1968). Manufacturer of MATV and CATV distribution equipment.

Walls Ltd, 202 Fazeley Street, Birmingham (in 1948). Manufacturer of “Walco” electric fires and small cookers.

Walsall Conduits Ltd, Excelsior Works, Dial Lane, Hill Top, West Bromwich (in 1946 & 68). Conduit and flameproof switches, etc. Later taken over by GEC. Makers of the “13A plug look-alike”, with pins rotated through 90 degrees – introduced in 1959. When GEC became Marconi, various parts of Walsall were sold on to Legrand (French) and some other companies.

Walter Instruments Ltd. Garth Road, Lower Morden, Surrey (in 1948 & 64). Maker of switches, variable capacitors and scale pointers. By 1964, they also made tape recorders. In 1962, they went into voluntary liquidation and a new company, Walter Headquarters Service Centre Ltd, was set up at 154 Merton Hall Road, London, SW9.

Walter (J & H) Ltd, Farm Lane, Fulham, London, SW6 (in 1947) and 2 Caxton Street, London, SW1 (in 1948). Maker of chassis and panels.

Waltham. Brand name for consumer electronics sold in the 1970s and 80s (e.g. music centres, TV/radio/cassette combi units). It is believed that the products were made in the Republic of Ireland, using Japanese designs and components. Possible connection with the Japanese “Standard” brand? In 1980, Waltham Electronics (UK) Ltd., 155-159 Queens Road, Watford, Herts., WD1 2QH (directors: M.Raymond, L.Raymond & A.T.Jeffers).

Wandel & Golterman (UK) Ltd, 40-48 Acton High Street, London, W3 (in 1970-4). German maker of mainly telecoms type test equipment. Took over Hatfield Instruments, of Plymouth. W&G merged with Wavetek in the 1990’s. Following a further merger circa 2000, the company is now called called Acterna.

Wandleside Cable Works Ltd, 106 Garratt Lane, Wandsworth, London, SW18 (in 1956 & 64). In 1958 “one of the FALKS group”. Maker of TV aerial downlead coaxial cable. In 1964, also at Castlewellan Road, Newcastle, Co Down, N. Ireland.

Wandleside Warren Wire Co Ltd, Dunmurry, Northern Ireland (1960s?). Also at 106 Garrat Lane, London, SW18. A predecessor or successor company to Wandleside Cable Works Ltd. In 1971, Enfield Standard Power Cables Ltd acquired the company.

Ward & Goldstone. Ward and Goldstone founded in 1892, was involved in the production of automotive wiring components when the Ford Motor Company started assembling automobiles in Manchester, England in the early 1900s. Established by Mr Ward and Mr Goldstone. The Goldstone family ran the company. They were an electrical company, based in Pendleton, Salford, Manchester 6. This included cable and wiring harness manufacture. They soon ventured into radio components. In 1938, they used the “Goltone” brand name and were at Frederick Road, Manchester 6. I have a 1940’s mains electric clock branded “Volex Temco”. Their electrical plugs, etc., were branded “W&G” (later Volex). Their electrical cables business was closed down in 1983. Also in 1983, M H Goldstone was dismissed as Managing Director of Ward and Goldstone, a company founded by his Grandfather, for disagreeing over strategy with the then Chairman. In 1982, Volex Electrical Products Ltd, Salford, Lancs. In the 1980’s, the firm appears to have restructured and changed its name to Volex Group plc, in existence in 2004. In 2004, “Volex” branded electrical wiring accessories are marketed by Electrium plc. In 2005, Volex Group plc announced severe job losses at its UK factories, due to its serious financial position.

Wardray & Co Ltd, Kennington, Oxford. In 1964, they made an electrically operated wire stripper tool. Still in business in the mid-1970’s.

Watkins Electric Music Ltd, 66 Offley Road, London SW9 (in 1964). Maker of “WEM” high power amplifiers, etc. for musicians.

Watkins Sporne & Co Ltd, cabinet manufacturers (in 1964).

Watts (Cecil E) Ltd, Darby House, Sunbury-on-Thames, Middx (in 1961 & 69). Maker of the famous “Dust Bug”, etc, for record players. He died on Sept 15th 1967, aged 70. He was also involved in other aspects of high quality sound reproduction. Book review in WW July 1972, p 340.

Waveforms Ltd, Radar Works, Truro Road, London, N22 (in 1954 and Jan 59). In 1951, Radio, Radar & Television, 26 Oakleigh Road, New Southgate, London, N11. Maker of “Radar” brand TV test equipment. In March 1959, at Radar Works, Wallisdown, Bournemouth. Acquired by the Metal Industries group in 1963. In 1964, at 72 Vauxhall Bridge Road, London, SW1 (same address as Avo Ltd).

Wavemaster. British (?) supplier/maker of variable capacitors for radio sets.

Waycom Ltd. In 1961, at 16 Duke Street Hill, London, SE1 and UK distributor for “Mial” polystyrene capacitors. In 1965, at Capacity House, Rothsay Street, Tower Bridge Road, London, SE1. In 1974, at Wokingham Road, Bracknell, Berks and the UK distributor for ”Wima” capacitors and other electronic comonents.

Wayne Kerr Laboratories Ltd., 44 Coombe Road, New Malden, Surrey (in 1948 and 70). Richard Foxwell was a founder director. By 1957, at Roebuck Road, Chessington, Surrey. In 1965, at Sycamore Grove, New Malden. In 1958, it became a member of the Wilmot Breeden Group. In 1969 - 71, The Wayne Kerr Company Limited, New Malden, Surrey. In 1971, Tolworth Close, Tolworth, Surbiton, Surrey. In 1972, Wayne Kerr, Durban Road, South Bersted, Bognor Regis, Sussex. Maker of electronic test equipment. In 1982, WKR Limited, Durban Road, Bognor

Regis – maker of audio test equipment. In 2002, still at Bognor but now owned by Advance Electronics Ltd, of Wrexham.

Wearite. Brand name of Wright & Weaire Ltd., South Shields, Co. Durham – also at 2 Lord North Street, London, SW1 (in 1948) and High Road, Tottenham, N17 (in 1947). In 1954, there was a sales and accounts office at 131 Sloane Street, London, SW1. W & W was established by Joseph Wright and Thomas Weaire, who set up in business circa 1920, in Tottenham, London (in 1920, according to the ad in WW Oct 1970 – also see WW Nov 62, p 529). Messrs Wright & Weaire retired at the end of WWII and sold the business to some employees: Richard Merrick, Ernest Niblett and Walter Berridge.

A factory at South Shields was allocated to the company by the Government in 1945, for "civilian" production. Manufacturer of electronic test equipment (incl. valve testers – in the 1930's), wound components, including power and IF & AF transformers, vibrators, chokes, coils and switches. In the late 1940's a separate company was set up at South Shields, to manufacture tape recorders – The British Ferrograph Recorder Co. Ltd., which continued into the 1970's. The Tottenham factory closed around the end of the 1940's, when the company relocated to South Shields. Later on, they made tape heads and a tape head demagnetiser.

Two W & W designers, Messrs Renard and Dare, later set up a separate W & W subsidiary company known as Rendar, to make high quality connectors. Rendar relocated to Burgess Hill in West Sussex.

In 1955, W & W became a public company. Circa 1968, W & W, Ferrograph and Rendar were taken over by the Wilmot Breeden group. By 1970, The Ferrograph Company Ltd, had a sales office at The Hyde, Edgware Road, Colindale, London, NW9.

In 1977, Wilmot Breeden sold Ferrograph to North East Audio Ltd (NEAL).

Webb Condenser Co Ltd, 32 Hatton Garden, London, EC1 (in 1937). In 1964 at Jubilee House, Denmark Street, Maidenhead.

Webcor (Great Britain) Ltd, 36 Grosvenor Street, Mayfair, London W1 (in 1955). Later in 1955, they relocated UK HQ to Ingersoll House, Kingsway, London, WC2. Established in 1955 to sell Webster-Chicago Corporation (Chicago, USA) "Webcor" record players (made in UK to US specs.) in the UK. They called them "fonografs"! In mid-56, they "temporarily" ceased trading …..

Webmore (1948) & Co, Camp Lane Works, Kings Norton, Birmingham 30 (in 1955). Maker of TV aerials. In 1964, Webmore Co Ltd, High Street Works, Astwood Bank, Redditch, Worcs.

Weco – brand name for components (incl. valves) made by Western Electric.

Wego Condenser Co Ltd, Bideford Avenue, Perivale, Greenford, Middx (in 1936, 46, 58 & 65). A maker of "Wego" brand ceramic, mica and PF correction capacitors. In 1958. In 1964, at 42 Bideford Avenue, Perivale, Middlesex.

Weir Electrical Instruments Ltd, Bradford-on-Avon, Wilts (in 1955). Maker of panel meters.

Weir Electronics Ltd, Durban Road, Bognor Regis, Sussex (in 1968 and 1971). Maker of power supplies. In 1970, they were a Unitech group company. In 1974, they established Weir Electronic Instruments Ltd, same address, for the manufacture and marketing of a range of low-cost instruments.

Weller Electric Corporation, Easton, PA (in 1955 & 67). Maker of soldering equipment and power tools. In 1961, the UK agent was Elstone Electronics Ltd, Hereford House, North Court, Vicar Lane, Leeds 2 and there was a factory at Besigheim, Neckar, West Germany. Weller had a UK subsidiary by 1965, at Blatchford Close, Horsham, Sussex. Later in 1965: Weller Electric Ltd, Redkiln Way, Horsham, Sussex. UK manufacture commenced in 1967. Taken over by Cooper Industries (in the 1970's?). Cooper also took over Xcelite, Crescent, Lufkin & Nicholson tools and Bussman fuses.

Welmec (The)Corporation Ltd. By 1958, at 147 Strand, London, WC2. In 1964 & 66, at Lonsdale Chambers, 27 Chancery lane, London, WC2. UK distributors for Telefunken tape recorders and AEG washing machines. It was the UK subsidiary of AEG (Germany). In 1965, its name changed to AEG (Great Britain) Ltd.

Welpac. Brand of prepacked electrical items sold in retail outlets. Supplied by Welbeck Trading Co (London) Ltd, Welbeck House, 2-6 Baches Street, City Road, London, N1 (in 1964).

Welwyn Electrical Laboratories Ltd, of Welwyn Garden City, Herts. (in 1948). Maker of "Welwyn" fixed and variable resistors. By 1950, they were at Bledlington Station, Northumberland. Founded in 1937 (WW ad, Sep 70, pa29). Later known as Welwyn Electric Ltd. Manufacturers of resistive components (and trimmer capacitors in 1947). In 1958, the MD was J R Hunt and they also had a factory in Canada. They were also at Links Road, Blyth, Northumberland. In 1982, there was a subsidiary, Welwyn Strain Measurement Ltd, Armstrong Road, Basingstoke, Hants. For many years now, they have been at Bedlington in Northumbria. They were taken over by the Royal Worcester (pottery and china) group (Royal Worcester owned them in 1963 & 82) and then sold on to the TT Group plc. AEI bought a 26% stake in Welwyn, in 1963.

Wesgrove Electronics Ltd, New Street, Worcester (in 1965). Moved later in 1965 to 1 Maddox Street, London, W1. Maker of video tape recorders and television cameras.

Westclox Ltd, Strathleven, Dunbarton, Scotland. US based clock and watch manufacturer.

Westcode Semiconductors. Originally formed from the semiconductor division of The Westinghouse Brake & Signal Co Ltd, Chippenham, Wilts. Later formed into a limited company – Westcode Semiconductors Ltd. It was spun off in the 1990's? by WB&Sco's parent (BTR/Invensys) and is still based at Chippenham – on the Westinghouse site. In Jan 2002, IXYS Corp, Santa Clara, California, made a bid for Westcode…

Western Electric. The manufacturing arm of AT&T (who bought it from Western Union). Circa 1923, ITT acquired the non-US operations of Western Electric from AT&T. In the UK, the firm was headquartered at Connaught Hose, 63 Aldwych, London, WC2. It was soon renamed Standard Telephones & Cables. They also made crystal sets in the 1920's.

Western Electronics Co, Germoe, Penzance, Cornwall (in 1964). CRT rebuilder.

West Hyde Developments Ltd, Park Lane, Harefield, Middlesex (in 1963). In 1966, at 30 High Street, Northwood, Middlesex. At Ryefield Crescent, Northwood Hills, Northwood, Middx, HA6 1NN (in 1970). In 1978, Unit 9, Park Street Ind Est, Aylesbury, Bucks. Supplier of neons, instrument cases and enclosures. Now part of Tyco Electronics and based in Stroud, Gloucestershire.

Westinghouse Brake & Signal Co Ltd. London office at 82 York Way, Kings Cross, London, N1. Factory at Chippenham, Wilts (by the station). A British company originally established by George Westinghouse in the 19th century. Taken over by Hawker Siddeley, circa 1980. Then by BTR (who bought Hawker). Now an Invensys PLC company (BTR merged with Siebe, to form Invensys).

Westinghouse Brake & Signal Company Ltd. Chippenham, Wilts (also of 82 York Way, London, N1). The Westinghouse Brakes Co. was founded in the 19th century by American George Westinghouse, who gave his name to many companies around the world. Later, prior to 1934, Westinghouse Brakes merged with the Saxby & Farmer Railway Signalling Co. to form Westinghouse Brake & Saxby Signal Co. The name later changed to Westinghouse Brake & Signal Company Ltd.

Although principally concerned with railway brakes and signalling equipment, the rectifiers division made metal rectifiers (from circa 1930), some of which were used in TV and radio sets. By 1933, they had published a booklet describing the use of their metal rectifiers in radio battery charger and power supply circuits, as well as "Westectors" in the AM detector stages. Later on, they made silicon power semiconductors under the Westcode brand name (see also under Westcode). In the 1950s and 60s, their small, low power metal rectifiers were also used in the flywheel sync, frame interlace and AGC circuits of TV sets. The brake company was sold to Knorr of Germany, in 2001.

Westinghouse Electric Corporation of the USA made a wide range of electrical

equipment, including “Reliatron” valves (in 1955). In 1967, their new R&D centre was at Pittsburgh 35, Pennsylvania, USA.

Westinghouse Electric SA, 1 Curfew Yard, Thames Street, Windsor, Berks (in 1973). UK office for colour CRT sales.

Westminster. Brand name used by Curry Ltd – since at least 1948.

Weston (G T) Ltd, 130 Vaughan Road, Harrow, Middx (in 1948). Maker electric tabletop cooker.

Weston Instruments – see Sangamo Weston.

Westrex. The film sound recording system. Was it originally a Western Electric product? In 1958, Westrex Company Ltd, Liberty House, Regent Street, London, W1 (also made loudspeaker systems). Westrex became a subsidiary of Litton Industries Inc (certainly by 1969).

Weyrad. The Weymouth Radio Manufacturing Co. Ltd., of Crescent Street, Weymouth, Dorset (in 1948 & 61). Manufacturer of wound components, including RF/IF coils and transformers, mains, power and TV line output transformers (LOPTx by 1953) – they made a signal generator in 1953. In 1946, In 1946, they made the “Weymouth” radio chassis, for installation into cabinets made by others (home build enthusiasts?). In 1965, Weymouth Radio Manufacturing Co Ltd, School Street, Weymouth, Dorset. In 1965, they changed their name to Weyrad (Electronics) Ltd, of School Street, Weymouth (still making coils and IFTs). In 1976 - 1998, Weyrad Electronics Ltd, Lynch Lane, Weymouth (Tel 01305-783801). They were used extensively by Decca in the 1970’s, to make wound components for their TV chassis. I think they may have even been taken over by Decca, since they were later sold by Racal, which bought Decca circa 1980. They were still listed in a Trades Directory for 1999 as Weyrad Electronics, but are not currently listed.

Wharfedale. The Wharfedale Wireless Works, 62 Leeds Road, Bradford, Yorks (in 1937). At Hutchison Lane, Brighouse, Yorks (in 1938 & 45) and later (by 1952) of Bradford Road, Idle, Bradford, Yorks, was founded by Gilbert A Briggs in 1932. They are best known for their loudspeakers – for home constructors and ready made. They also made audio transformers (matching, output and isolating types). Wharfedale became a part of the Rank Organisation in 1959 and in 1966, it was renamed Rank Wharfedale Ltd. Wharfedale was sold by Rank in the early 1980’s. In 2003, it is part of the International Audio Group.

Later on, when Rank also bought H J Leak and Company, the Leak operation was moved from London to Idle (Yorkshire), where own design tuners and tuner amps were made and sold under both brand names. All of Rank’s consumer brands (Wharfedale, Leak, Bush, Murphy and Arena of Denmark) were, in the early 1970’s, amalgamated into a single company – Rank Radio International. RRI continued until 1982, when Rank threw in the towel.

There was a management buy-out of the Wharfedale operation in Idle, but they no longer made electronics. Wharfedale was bough out by International Audio Group in the 1990’s (who also own Quad).

White (S. S.). The S. S. White Co, Britannia Works, Camden Town, London, NW1 (in 1946). A maker of flexible drive shaft couplings, as used in tuning drive mechanisms.

White-Ibbotson Ltd, relocated to Goldhawk Road, Shepherds Bush, London, (in 1952). Maker of projection TV sets. At some point, they combined with/were taken over by G B Equipment Ltd, who then made “GB” branded, large screen projection televison sets. In 1954, their London office was at Mortimer House, 37-41 Mortimer Street, London, W1 (which was also the address of GB Equipments Ltd – Television Division). GB Equipments Ltd – “A member of the British Optical & Precision Engineers Group – (BOPE) - within the J Arthur Rank Organisation”.

Whiteley Electrical Radio Co. The company was formed from the original firm Whiteley and Boneham (using the “WB” brand) which was started in Mansfield, Notts., in 1926. It was a partnership between Alfred Whiteley and a Mr Boneham. The firm manufactured valveholders, coil holders and an aerial/earth switch for home use. The partnership was dissolved amicably after only two years when Mr Boneham decided to concentrate on mechanical engineering, whilst Mr Whiteley pursued the electrical side. Alfred Whiteley set his new company under the name Whiteley Electrical Radio Co Ltd (WB Radio Products, Whiteley Electrical Radio Co Ltd, Radio Works, Victoria Street, Mansfield, Nottinghamshire). The WB brand was retained long after the original partnership was dissolved. The firm remains in Mansfield to this day. By the end of the 1920’s, the firm was making loudspeakers – both as a component and in cabinets. When WW2 started, the firm soon gained contracts for war materials and this involvement in industrial and military electronics continued after the war. Circa 1948, they produced many of the wound components for the “Viewmaster” home build TV design. By 1950, Alfred Whitely’s son, P B Whiteley, was a director of the company. In 1957, they produced the “Stentorian” FM tuner and an amplifier. In the 1050’s, the firm also made furniture items, such as the “Sherwood” TV trolley and TV and record cabinets. Alfred Harold Whiteley died on 23rd may 1967, aged 74. The firm also continued to make loudspeakers under their famous “Stentorian” brand name – until the 1970’s. In 1980, the firm changed its name to Whiteley Electronics Ltd. It became part of the International Gemma Group in 1997. They now make public address systems, command and control systems, automated announcing systems, etc.

Wholesale Fittings (The) Co Ltd, Head Office, 46-52 Commercial Street, London, E1 (in 1955). Established in 1894. Wholesaler of lighting fittings but also a general electrical distributor. In 2002, known as WF Electrical plc.

Widney Dorlec, PO Box 133, Birmingham, B4 7BD (in 1976). Equipment enclosures and cases. Brand name used by Hallam, Sleigh & Cheston, Oldfield Road, Maidenhead, Berks (in 1959).

Wilcox (Edward) & Co Ltd, Slydlok Works, Earl Road, Cheadle Hulme, Cheshire (in 1964). Maker of “Slydlok” fuseholders, etc.

Willet & Robinson Ltd, Green Arrow Works, Maidstone, Kent (in 1960). Maker of “Green Arrow” household equipment and Miracoal electric fire.

Wilmot Breeden Electronics Ltd, Durban Road, South Bersted, Bognor Regis, Sussex (in 1976) – with manufacturing facilities at South Shields (Ferrograph), Burgess Hill and Bognor Regis - a subsidiary of Wilmot Breeden (Holdings) Ltd. Also at 442 Bath Road, Slough. The new company incorporating Ferrograph, Wayne Kerr and Rendar products. Still the same company in 1980. Possibly took over Radford (of Bristol) by 1980 – see under Radford. In 1933, the company was Wilmot Breedon Limited of Eastern Works, Camden Street, Birmingham. Wilmot Breeden was a long established company that made bumpers, Calormeters - radiator temperature gauges, radiator ornaments and emblems, radiator and fuel caps, luggage grids, mirrors, locks, window regulators, steering wheels and door handles for the UK car industry. In 1984 the name was changed to WBH (WB Holdings perhaps?). Later, it became part of Metalrax plc.

Wima. The brand name of Wilhelm Westermann of West Germany (founded in 1948). Exclusively a capacitor manufacturer. Makers of the infamous lozenge shaped paper capacitors used in Telefunken and Grundig tape recorders of the late 50’s.early 60’s – which were about as reliable as the Hunts moulded types of that period! They are still in business.

Wimbledon Engineering Co. Ltd., of Garth Road, Lower Morden, Surrey (in 1948 & 50). Manufacturer of electromechanical vibrators, for producing HT from a low voltage dc source. These were essential for powering most valve car radios.

Winston Electronics Ltd, Govett Avenue, Shepperton, Middx (in 1956 & 66). Founded by F Winston Reynolds. By 1962, it was a subsidiary of Dynamics Corporation of America. Renamed Dynamco Systems Ltd, in 1965. Maker of decade (sine/square) oscillator and later, tape recorders.

Winter Trading Co Ltd, 6 Harrow Road, London, W2 (in 1956). In 1964 & 67, HQ at 95-99 Ladbroke Grove, London, W11. Distributors for imported products,

such as: Nora radios, Siemens and Dario valves, Schaub-Lorenz radios, Shira radios and tape recorders, Realtone radios and Trio Hi-Fi equipment.

Wireless Press Ltd, Marconi House, The Strand, London (in 1917). Publishers of Wireless World after it assumed that title in 1913 (at that time, its publisher was the Marconi Press Agency). It was originally called The Marconigraph, the first issue of which appeared in April 1911 – published by Marconi's Wireless Telegraph Company. In 1914, the publisher became Wireless Press Ltd. Taken over in 1924 by Iliffe. Iliffe was taken over by International Publishing Corporation (IPC) in the 1960's.

Wireless Telephone Co Ltd. In 1958, producers of a range of sub-miniature IFTs and ferrite rod coils, as well as standard products for valve sets. By 1961, a Plessey subsidiary.

Witte & Sutor GmbH, Murrhardt/ Wurttemberg, West Germany (in 1961). Manufacturer of "W&S" electrolytic capacitors.

Woden. The Woden Transformer Co. Ltd, based in Moxley Road, Bilston, Staffs (in 1950). In 1964 & 82, at Oxford Street, Bilston. A transformer manufacturer going back at least to 1947. Also made a "schools" radio set.

Wolf Electric Tools Ltd, Pioneer Works, Hanger Lane, London, W5 (in 1955 & 60). Maker of power tools and soldering irons. Later Kango-Wolf Tools Ltd.

Wolsey Television Ltd, 75 Gresham Road, Brixton, London, SW9 and 59 Soho Hill, Birmingham 19 (in 1950). In 1950, they made TV aerials and also offered an aerial erection service. Established in 1934. By 1956, they were a subsidiary of Gas Purification & Chemical Co (who also controlled Grundig (GB) Ltd and Grundig International Ltd), in 1955. In 1954, Wolsey Television Ltd, 43-45 Knights Hill, West Norwood, SE27. In 1956, they relocated to a new, larger factory: Wolsey Television Ltd, Cray Avenue, St Mary Cray, Orpington, Kent – making a Band 3 converter – still part of G P & C Co Ltd. Also made TV aerials, diplexers and aerial signal distribution equipment. In 1964, Wolsey Electronics Ltd, Ynysboeth Estate, Abercynon, Glamorgan. 1975, Wolsey Electronics, Cymmer Road, Porth, Mid Glamorgan. Later part of AB Metals (certainly, by 1982), now Lenson-Heath Triax.

World Radio Ltd, 950 North Circular Road, London, Nw2 (in 1964). UK manufacturer of "Motorola" brand car radios – actually Radiomobile.

Wrighton (F) & Sons Ltd, cabinet manufacturers (in 1964).

Wye Electronics Ltd, Queen Street North, Whittington Noor, Chesterfield, Derbyshire. In 1968, a maker of domestic audio systems.

Wylex – see George H Scholes Ltd.

Wyndsor Recording Co Ltd (in 1962). In 1967, at Wyndsor Works, Bellevue Road, Friern Barnett, London, N11. Maker of tape recorders.

XL Radio Laboratories, Chicago, Illinois (in the 1940's). maker of terminals and binding posts.

Xcelite Inc, of Orchard Park, NY (in 1955). Maker of hand tools. Later part of Cooper Industries.

Xerox – see Rank Xerox Ltd.

Xilinx. US semiconductor company, founded in 1984 by Bernie Vonderschmidtt. Inventor of the Field Programmable Gate Array (FGPA).

Xpelair. In 1965, Xpelair was a division of Woods of Colchester Ltd, 414 Chiswick High Road, London, W4. Xpelair manufactured extraction/ventillation fans. Later became a GEC subsidiary (see GEC).

Z & I Aero Services Ltd, 14 South Wharf Road, London W2 – with a retail branch at 85 Tottenham Court Road, London W2 (both in 1961). Supplier of test equipment and valves (under the Zaerix brand). Circa 1975, they acquired the Mazda (valves only) brand name from Thorn Electrical Industries.

Zenith Electric Company Ltd, Wavendon, Bletchley, Bucks (in 1971). Maker of variacs.

Zetex. UK owned and based analogue semiconductor manufacturer, formed (in 1989) following a management buyout of part of the former Ferranti Semiconductors business, which was initially bought by Plessey Semiconductors. This followed the bankruptcy of Ferranti International plc in the late 1980s. Zetex became a subsidiary of Telemetrix plc. Telemetrix renamed itself Zetex plc in April 2004, after selling its other businesses (Trend Telecomms) to concentrate on semiconductors.

Zettler (Alois) GmbH, Munich, Germany (in 1970). A maker of relays. Established in 1877.

Zenith Radio Corporation, of Chicago USA. Radio & TV manufacturer. In 1959, their products were distributed in the UK by United Mercantile Co Ltd, Park Lodge, Park Close, London, SW1. In 1966, United Mercantile Co Ltd, 13-14 Queen Street, Mayfair, London, W1. Zenith bought Heath Co (Heathkit) from Schlumberger. Taken over by LG or Samsung (?), in the 1990's.

Zilog. US semiconductor manufacturer. At one point, owned by Exxon. Long defunct?

Zolta Electric Co Ltd. Specialist filament lamp manufacturer, formed in 1962.

Zonal – brand name of magnetic tape used by Zonal Film (Magnetic Coatings) Ltd, Zonal House, Westfields Road, Acton, W3 (in 1962). In 1961, at The Tower, Hammersmith Broadway, London, W6 – maker of Zonatape. Became a subsidiary of Ilford Ltd in 1964. In 1965, at Holmethorpe Avenue, Redhill, Surrey. In 1971, Racal were negotiating to take over Zonal. In 1972, Racal-Zonal Ltd, Holmethorpe Avenue, Redhill, Surrey.

Zonophone. Trade name of a company that manufactured/marketed records, pickups, radio batteries and radio sets (at least circa 1930s).

3M Company Ltd, 3M House, Wigmore Street, London, W1 (in 1967 & 69). UK HQ of Minnesota Mining and Manufacturing Co, USA. By 1978, relocated to 3M United Kingdom Ltd, 3M House, Bracknell, Berks. Maker of Scotch Boy and Scotch magnetic tape.

20th Century Electronics Ltd, King Henry's Drive, New Addington, Croydon, Surrey. In 1950 and 65, a maker of specialist photomultipliers and CRTs. The company was previously called Centurion Tubes Ltd (of Dunbar Works, Dunbar Sterret, West Norwood, SE27) and changed its name in 1950. Production began with cold cathode tubes in 1946, followed in 1947 by CRTs.

Letters

Dear Editor
I am currently writing a book on The Early Years of Television and the BBC, 1923-1939 which will be published by Edinburgh University Press in a few year's time. Given Dicky Howett's article in the Summer 2008 edition of The Bulletin, I'm aiming to get everything right! I'd be grateful to hear from any members who may have documentation/ archival material from the period under consideration. I am looking at not only Baird Television, but also the interplay that existed between Baird, Marconi-EMI, the BBC, the government and the Post Office. I am also interested in the cross-Atlantic broadcasting cultural exchange between North America and Britain during this period.

If anybody would like to contact me, please write to me at

Department of Theatre, Film and Television Studies
Aberystwyth University
Parry-Williams Building
Penglais Campus
Aberystwyth
SY23 3AJ

or e-mail me on jsm@aber.ac.uk.

Best wishes,
Dr Jamie Medhurst
Lecturer in Broadcasting History

Dear Editor
On looking through back numbers of The Bulletin, in year 2005, I find an article with the title 'Special Operations Executive – the B2 Spy Set.'

Although the article is laudable enough, the title is erroneous.

Spies are to find out what the enemy is up to; such as plans and movements.

SOE operations were to carry out guerilla warfare and sabotage, in the words of Churchill 'to set Europe ablaze.' Additionally, SOE agents were to equip, train, and help resistance groups.

The SOE radios were never used by spies or for spy purposes. The radios were used by agents, in enemy territory, to contact base for supplies, arms or personnel drops by parachute or Lysander aircraft, or other such advice such as capture of personnel.

In the biography of SOE by the historian M.R.D. Foot, the wireless sets did not have the term 'spy'.

Sincerely,
Ralph Barrett

Dear Editor,
Dave Hazell is once again to be commended on his massive work on the history of British electronics manufacturing, part 17 of which appeared in the Summer issue of the Bulletin.

May I raise a small point? Dave mentions that Thorn Electrical Industries inherited a colour TV tube plant at Skelmersdale, Lancs., when they took over Radio Rentals in 1968. The other major acquisition from Radio Rentals was a plant in Bradford, where the tubes that had been made in Skelmersdale were assembled with other circuitry to make colour television sets. The Bradford plant had operated in a former textile mill since 1960 under the name of Baird Television. Unfortunately, neither of these plants lasted very long after the take-over by Thorn. Skelmersdale closed in 1976 and the Bradford plant closed in 1978 with the loss of over 2000 jobs. I'm attaching a photo of the derelict factory taken a few years after closure, with a trace of the Baird logo just visible at the top of the chimney.

Malcolm Baird

Dear Editor,
I must sympathize with Dicky Howett's problems in getting the straight facts on TV history (Television – a Warning from 'History', Summer issue p.26). Having been born in 1935 I am too young to have been a first hand observer of early television, although I do remember seeing colour television in my father's laboratory in 1945 on his cathode ray tube screen which was known as the Telechrome. That puts paid to one of the historical fallacies still widely believed in the USA, that my father never abandoned mechanical television techniques and contributed nothing to modern television..

After my father's death in 1946 I became interested in chemistry and later in chemical engineering, in which I had a full career of teaching, research and consulting. It was only after my mother's death in 1996 and my retirement in 2000 that I began to focus on television history. By that time, strange legends had started to grow around my father and fantastic webs were being woven. A writer from New York approached me with a treatment for an animated film in which Baird was a bee in a hive and invented television, much to the annoyance of the other bees, A British writer, a ventriloquist, produced a draft script in which the tailor's dummy "Stooky Bill" played a central role. A film production company in California produced a treatment which placed Baird in the control room of Fighter Command during the Battle of Britain, standing next to Winston Churchill.

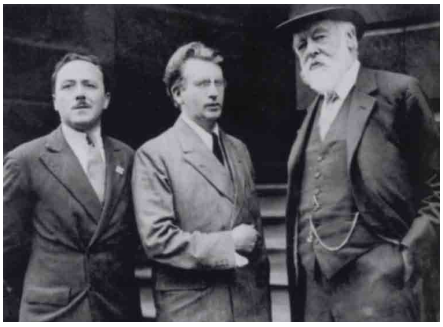
One of my best decisions at that time was to join forces with the historical writer Antony Kamm, on a full and factual biography of my father called "John Logie Baird – a life". (National Museum of Scotland, 2002). The book is long and rather expensive, but for the serious historian it is well worth a read. It firmly fixes the date of the 1926 demonstration at Frith Street as January 26th. The demonstration had been reported in The Times of Thursday January 28th which had clearly said that it was held "on Tuesday evening".

Several earlier biographers had assumed in error that the demo was held on the evening before the Times report appeared, i.e. January 27th. Among these offenders was my father himself! In mitigation I should point out that his memoirs had been started in 1941 while he was in a country hospital recovering from a heart attack and undergoing a strict diet of a few grapes a day. He had no access to notes or papers and the memoirs were dictated to a shorthand secretary at the hospital. They were just that – works of memory. They were first published by the Royal Television Society as "Sermons, Soap and Television" in 1988, and in 2004 a new edition entitled "Television and Me" (available from Birlinn Press, Edinburgh) came out. By that time I knew more about television history and was able to add editorial footnotes, dotting some of the i's and crossing some of the t's. My father had a tendency to misname people that he disliked such as his landlord in Hastings, a Mr.Tree, who was misnamed Mr.Twigg.

And so the research goes on. Two individuals, Douglas Brown and Adrian Hills, have earned their Ph.D. degrees through research on Baird. However, popular writers on television history face a conflict between readability and accuracy. There have been innumerable articles and TV and radio documentaries about Baird. These have not always been 100% accurate because of the perception by writers and editors that the treatments need to be made more "interesting" for the public. A recent offender in this category has been Jeremy Clarkson in a documentary shown a couple of years ago on BBC.

This letter is in danger of turning into an article, but let me round it off with a speculation in answer to Dicky Howett's question about the identity of the elderly scientist whose long white beard got caught in the spinning disc. The obvious candidate would be the radio pioneer Sir Oliver Lodge (1851-1940) who was an early supporter of Baird and who had the appearance of Santa Claus, as shown in the attached photograph.. J.L.Baird was a product of the Victorian era and he would not have wanted to name his eminent supporter in such an undignified context, but he may have felt that the story was worth including in his memoirs anyway.

Malcolm Baird



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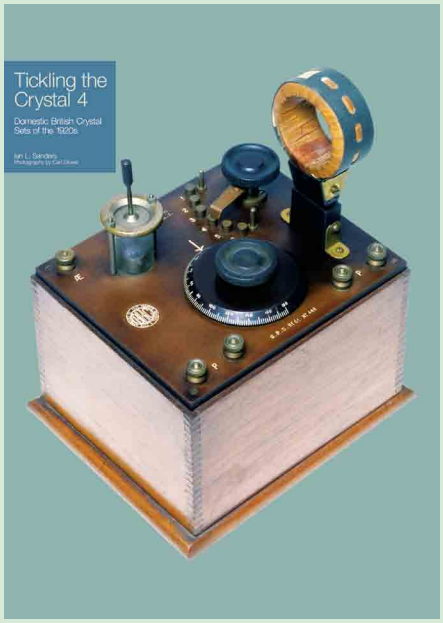

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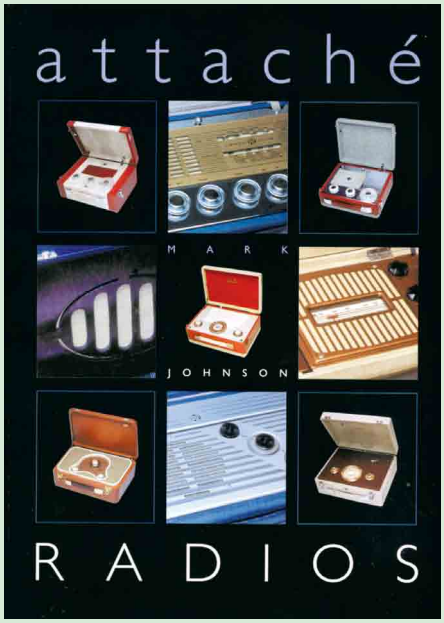

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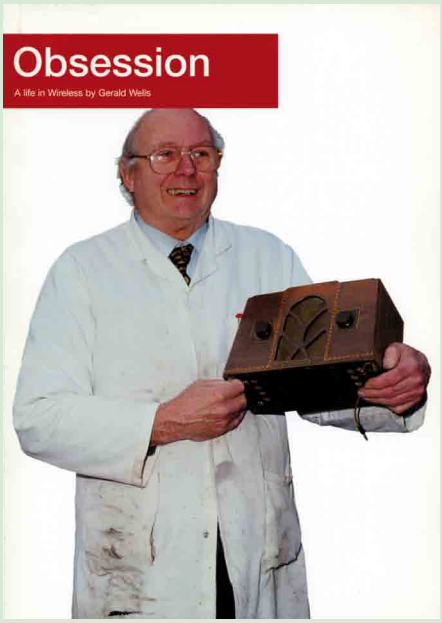

Obsession

by Gerald Wells

Gerry Wells had led an extraordinary life. Growing up in the London suburb of Dulwich in the inter–war years, he shunned a conventional 1930's childhood, preferring wireless and other household items. After the war he managed a career as a radio and TV service engineer and even designed and managed amplifiers, PA equipment and TVs. Today he runs the Vintage Wireless and Television Museum from the same family home from where he was born in 1929.

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BVWS Books

British Vintage Wireless Society Statement of Accounts - Year to 31st December 2007

	year ended 31st December 2007	year ended 31st December 2006
Receipts	**£**	**£**
Subscriptions	31,580	33,895
Sale of publications	931	2,943
Capacitor sales	1,675	-
Meetings	2,759	3,480
Estate sales receipts	26,953	23,639
Valveman DVD sales	668	-
Donations	326	-
Bank interest	738	624
Advertising	513	896
Miscellaneous	25	202
NVCF Profit	818	4,112
Recovery of NVCF support costs	-	1,000
Total receipts	**66,986**	**70,791**
Payments		
General expenses	8,849	10,698
Meetings	1,862	1,990
Bulletin costs	22,311	19,636
Estate sales payments	26,393	15,720
Capacitor costs	2,416	-
Other publication costs	1,925	3,176
30th Anniversary	-	5,056
Support costs for NVCF	-	35
Total payments	**63,756**	**56,311**
Surplus for the period	**3,231**	**14,480**
Total assets at beginning of period	**39,264**	**24,784**
Total assets at end of period	**42,495**	**39,264**
Assets		
HSBC current account	13,183	8,507
HSBC deposit account	24,415	26,678
NVCF assets	4,897	4,079
Total assets	**42,495**	**39,264**

At 31st December 2007 £431 (2006 - £1,704) was owed by the BVWS to the authors of various publications that the BVWS sell on behalf of these authors. There was also a liability for Corporation Tax on bank interest received of £265 (2006 - £119). These liabilities are not recognised in the accounts.

The accounts of the Society reflect the receipts and payments on a cash basis and do not reflect any prepaid or accrued income and expenditure. As an unincorporated club, all surplus is passed to members by way of bulletins, supplements and events. At the same time a prudent asset balance is maintained in order to provide for the unexpected.

Treasurer

Auditors Report to the Members of the British Vintage Wireless Society
We have examined the above Accounts and the attached Accounts of the National Vintage Communications Fair for the year ended 31st December 2007 together with the accounting records and supporting documents and vouchers and confirm the same to be in accordance therewith.

Keens Shay Keens, Limited Chartered Accountants, Christchurch House, Upper George Street, Luton Beds, LU1 2RS 29th February 2008.

Don't forget! 10 May 2009
National Vintage Communications Fair
The Warwickshire Exhibition Centre

10.30 to 4.00 **£5 admission** (under-14s Free), early entry 9.00 at £20
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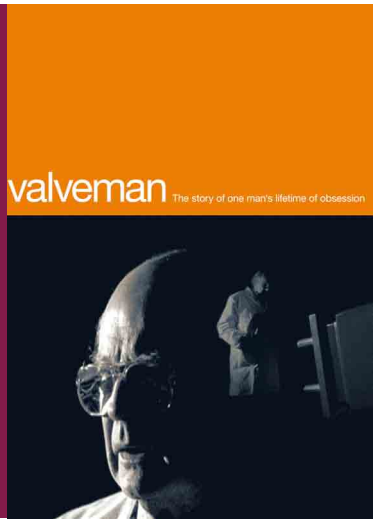

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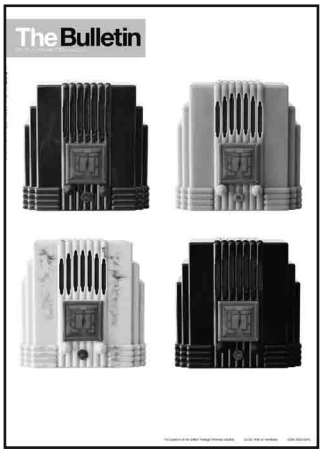

Back issues

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 'The story of Burndept'.
2 'WW 1927 data sheet'
3 'Seeing by wireless' the story of Baird Television
4 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.
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Cheques to be made payable to 'The Vintage Wireless Museum'.

News and Meetings

GPO registration Numbers

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

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

2008 meetings

14th September Table top sale at Vintage Wireless and Television Museum
28th September Special auction of high quality equipment from the pre–broadcast era to the late 1920's and early 1930's. Wootton Bassett.
12th October Audiojumble, Tonbridge
19th October Harpenden swapmeet
2nd November Workshop at Vintage Wireless and Television Museum
23rd November New swapmeet. The Pennington Room, Lowton Civic Hall. Hesketh Meadow Lane, Lowton, Warrington, WA3 2AH. Stallholders 9.00am General entry 10:00am entry £3.00 on the door. Light refreshments will be available in the hall.
Organizer: Mark Ryding. See enclosed stall booking form.
7th December Wootton Bassett

2009 meetings

5th July Wootton Bassett
6th December Wootton Bassett

Workshops, Vintage Wireless and Television 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
Audiojumble:
The Angel Leisure Centre, Tonbridge, Kent.
Enquiries, 01892 540022
NVCF: National Vintage Communications Fair
See advert in Bulletin. www.nvcf.co.uk
Wootton Bassett: The Memorial Hall, Station Rd. Wootton Bassett. Nr. Swindon (J16/M4). Doors open 10:30.
Contact Mike Barker, 01793 536040
For more details with maps to locations see the BVWS Website:
www.bvws.org.uk/events/locations.htm

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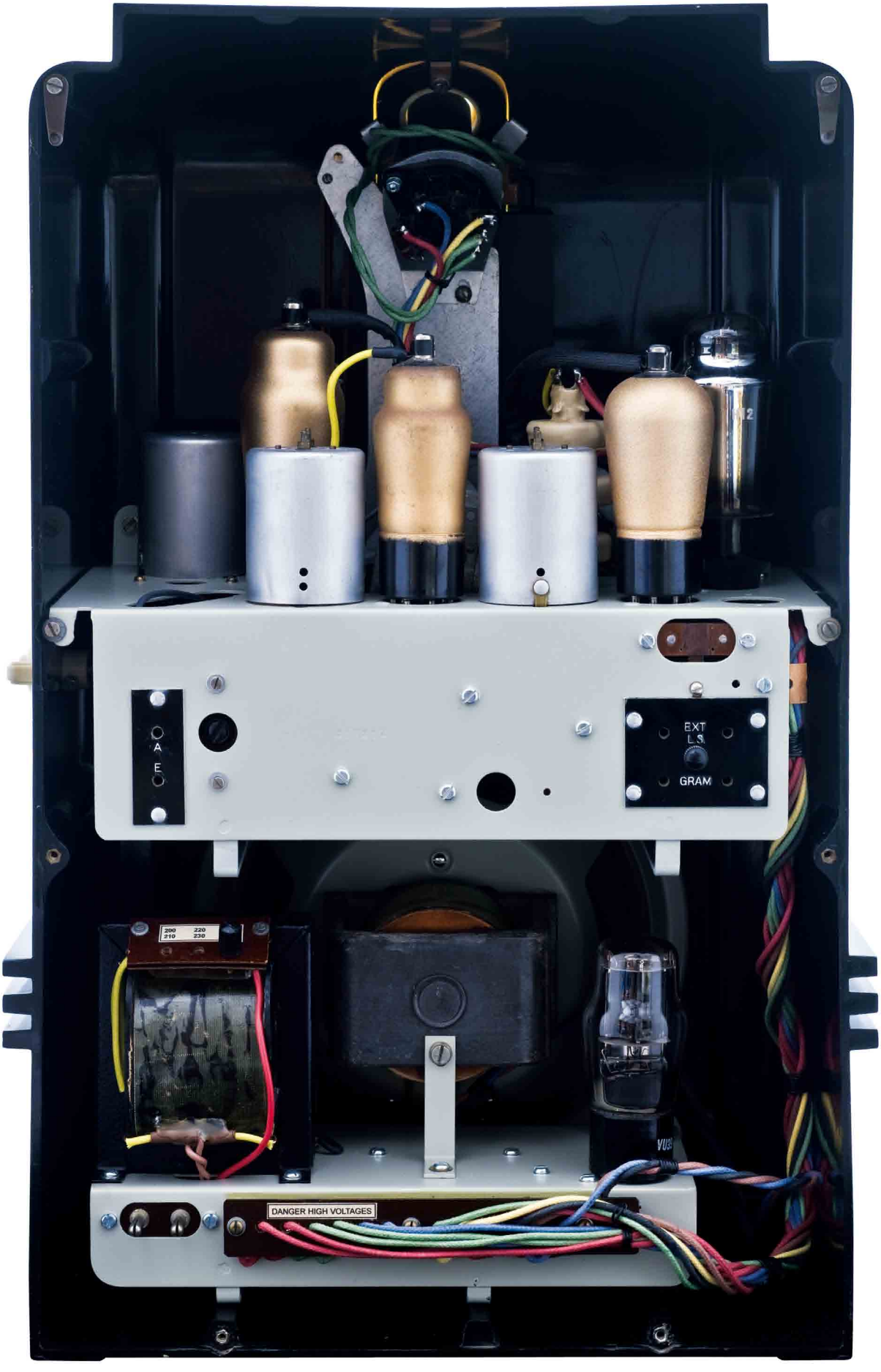
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