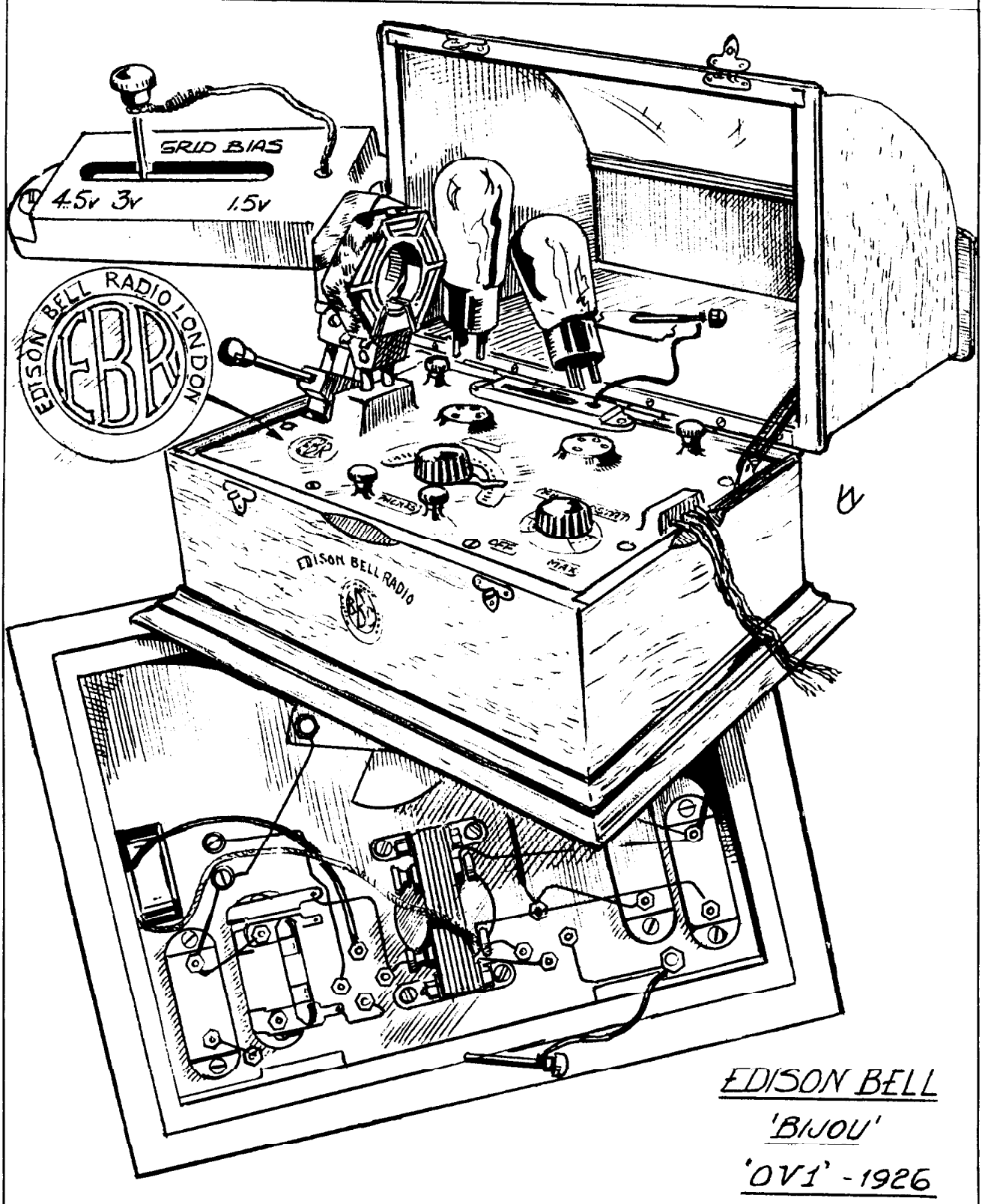
BULLETIN OF THE BRITISH

VINTAGE WIRELESS

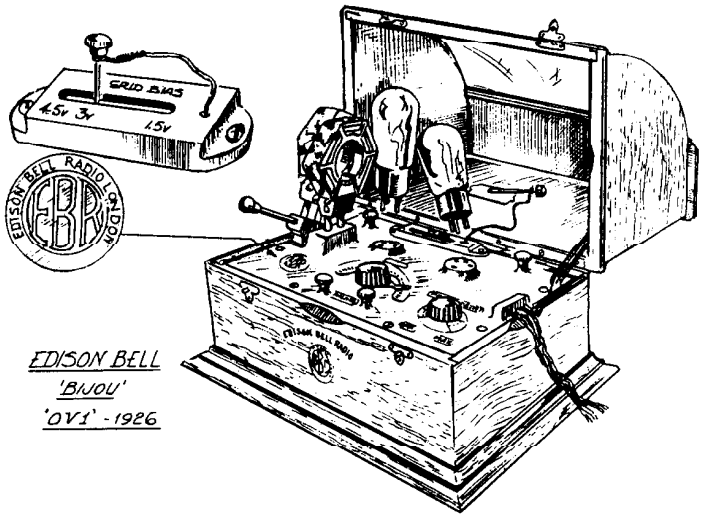
SOCIETY



EDISON BELL
'BIJOU'
'OV1' - 1926

BULLETIN OF THE BRITISH VINTAGE WIRELESS SOCIETY

Editorial and advertisement enquiries should be made to the Editor, Robert Hawes, 63, Manor Road, Tottenham, London, N17 OJH. Tel: (01) 808 2838. Editorial Assistant: Pat Leggatt.



Cover story:
Norman Jackson's drawing shows the Edison-Bell "Bijou" wireless-set, a two-valver contained in an oak case with a lift-up lid which had a celluloid window: a quaint looking set which is not often seen in collections. It was manufactured by a company which was set up at the turn of the century to retail phonographs: the compnay sold a phonograph in a similar windowed case which was used in "coin-in-the-slot" Talking Machine parlours where customers liked to see the "works" in operation, so perhaps the wireless design derived from that. The wireless-set, however, had unremarkable circuitry: leaky-grid detector with reaction transformer-coupled to the output stage. In the version illustrated, it sold at £5 but there was also a "flat bed" version without glass lid, which sold at fifteen shillings (75p) less and was called "The Gem" (also the name of one of the early Edison-type phonographs sold by the company). The "Bijou appeared in the "Wireless World Buyers Guide" in February 1926 and had no Post Office registration number. The date of original manufacture is thought to have been 1925. It last appeared in the buyers guide in November 1927, although the name "Bijou" was revived for a different set with a pentode output in 1929. Information on the set has been supplied to the Editor by Ian Higginbottom, who owns the example illustrated.

In passing

Correspondence for the Society's Bulletin should be addressed to The Editor, Robert Hawes, 63 Manor Road, Tottenham, London, N17 OJH. Telephone: (01) 808 2838.

BVWS Meeting

Our October meeting at Harpenden was, by all accounts, one of our most successful, attracting more than 300 members and guests. Business was hectic in the early-morning "fleamarket" and most people observed the request not to trade outside the building. This, and the willingness of members to observe the few "rules of the meeting" meant that everything went very smoothly. As previously the auction at the end of the day was also a great success, and thanks are due to Roger Snelling, Tony Constable and other helpers who disposed of 65 lots for a total of £258. Items raising a further £57 were donated and "commission" to Socety funds amounted to £78. Donations of equipment to the auction are much appreciated. Reserving the ante-room, free of stalls, to provide a social atmosphere where members could enjoy a chat over refreshments, away from the hurly-burly of the swapping activities proved to be very popular. Displays also helped the atmosphere, particularly Pat Leggat's demonstration of the Fultograph (see article in this issue) and the impressively restored radios brought along by Steve Ostler.

Annual General Meeting

The Society's annual general meeting proceedings were held during the Harpenden meeting, presided over by David Read, who has given up the job of chairman after many years, although he will remain as a committee member. Pat Leggatt was elected the new chairman. Desmond Thackeray, who was re-elected treasurer, reported a healthy financial situation despite increased costs for improvement of the Bulletin and the printing of our popular wireless posters. Others re-elected to the committee were: Bulletin Editor Robert Hawes and committee members Gerald Wells, Ian Higginbottom, Norman Jackson, Tony Constable and John Gillies.

Retiring Chairman

Tony Constable Writes:"The Wireless Show held at the Victoria and Albert Museum in association with the BVWS in 1977 was a resounding success. This was in no small measure due to the hard work of the BVWS Committee member - David Read. As well as being the major exhibitor, he handled all the pre-1930 cataloguing with great skill and helped make the show an outstandingly memorable event. David has always been one of our most prominent collectors as he has so often demonstrated in his Harpenden displays - a constant source of delight (and sometimes a little envy) to those who have seen them. But it is for his role as Chairman of BVWS for the last seven years that we must now thank and congratulate him. During this time, the Society has grown five-fold and gained much in stature. He has kept the Society and sometimes the Committee on a even keel during fair weather and foul. These have been seven good years and we thank David very sincerely for his stewardship."

Contents of BVWS Bulletin Volume 12 number 2:

New Chairman

Pat Leggatt, our new Chairman writes: "We were sorry to hear at the Harpenden A.G.M. that David Read finds that pressure of work prevents him from continuing as our Chairman. Rather to my surpirse I was elected to succeed him. As regards knowledge and experience in the Vintage Wireless field I cannot claim to be in the same league as my two predecessors, Tony Constable who started the Society off on absolutely the right lines and David Read who has carried it on so ably for many years: but I look forward to doing everything I can to promote the interests of the BVWS and all its members. I am available at the address and telephone number given in this bulletin for anyone who wants to make suggestions.

May I thank you all for this welcome opportunity, and particularly the members of the Committee who do so much to keep the Society running smoothly: another successful Harpenden meeting is the latest evidence of this.

CQ Hams

Though the number of BVWS members who are licenced amateurs is probably not very great, their special interest in practical communication may extend to activities in, and knowledge of, vintage transmission that they might air in the pages of "Vintage Wireless" to the edification of themselves and non-transmitting members. The editor would be pleased to be offered written contributions, and interested in suggestions for articles and news items, At the same time, can the columns of "Vintage Wireless" help in making you known to each other? If licenced hams (and maybe even as yet unlicenced ones) who are BVWS members would write in and let us know their call signs, CB identifiers, pirate pseudonyms or whatever, we'll annotate the membership records and in due course publish a list in return.

STOP PRESS.....

DATES FOR YOUR DIARY: HARPENDEN MEETINGS HAVE BEEN FIXED FOR 26TH JUNE AND FOR 13TH NOVEMBER. REGIONAL MEETINGS WHICH HAVE BEEN PROPOSED BUT NOT CONFIRMED ARE: 20TH MARCH AT BRISTOL AND 17TH APRIL AT SHIFNAL.

continued from previous page

BVWS statistics

We have recently got off to a fresh start on the Society's computer-based membership records, and from this some statistics emerge which you may be interested to hear about, writes **Pat Leggatt.**

At the time of writing there are 636 members. Of these, 539 (85%) live in the UK: 47 (7%) are in Europe including Eire; 29 (4%) are in the USA and Canada; and 21 (3%) are in Australia, New Zealand and other areas of the Far East.

The 539 in the UK break down roughly as follows:-

London, including Middlesex	86 (16%)
S.E. England counties surrounding London	137 (25%)
Southern England	60 (11%)
West & South England	60 (11%)
East Anglia	13 (2%)
Central England	108 (20%)
Northern England	45 (8%)
Scotland including Orkney	14 (2%)
Wales	12 (2%)
Northern Ireland	2 (%)

I am aware that this does not quite add up to 100%. My figures must be rather approximate; or perhaps a couple of members are "of no fixed address" sleeping on park benches!

Hertz Centenary

In 1887 the young Heinrich Hertz was busily building and using his apparatus to demonstrate the existence and finite velocity of electric waves in space. Using spark generated short waves he verified all the theoetical predictions of electromagnet radiation so brilliantly laid out by Maxwell seventeen years earlier. In one glorious series of almost perfectly designed and executed experiments he paved the way for the work of Righi, Lodge, Marconi and all the other illustratious names associated with wireless history. Hertz's work was scientific discovery at its very best. He published his completed work in 1888 and so next year is the centenary of this greatest of all wireless experiments. A special article on the subject is being prepared by Tony Constable and will appear soon in the Bulletin.

Inventor's Archive

In a recent issue of IEE News, John Richardson wrote that the IEE archives have acquired a dozen tea-chests full of the papers of Albert Midgley, inventor in the wireless field as well as that of car electrics. The article notes that Midgley was born in Huddersfield, Yorkshire in 1881 and after his education and apprenticeship, joined Hugo Hirst the founder of GEC. He invented the dynamo for use in motor-cars which at that time had paraffin and acetylene lighting systems, and despite a warning from a group of eminent scientists that it would not work, went ahead and developed it, later joining Charles Vandervell and William Proctor to found the firm CAV which made car electrical equipment and wireless sets and was later bought out by Lucas. Two American students are at present collating the tea-chest archives and hope to have the material accessible by mid 1988. If anyone has a contribution to the archive, they should send it to the IEE Archivist, Mrs E D P Symons, IEE, Savoy Place, London, WC2R 0BL. (With a copy to the BVWS Bulletin Editor, please, if of wireless interest. Midgley was a prolific inventor: vintage wireless enthusiasts may know him for CAV sets and horn loudspeakers and a pioneering one-valver.

Wireless Seminar

There will be a one-day meeting at The Vintage Wireless Musuem on Sunday, ***February 21st.*** This meeting will be mainly for people who want to talk and listen.

If you have a favourite topic you would like to tell other members about then please contact Tony Constable as soon as possible so that he can put your name on the speakers list. Talks will be either short (5-10 minutes) or long (15-30 minutes). Your talk can be on any subject at all provided it relates to vintage wireless. It can be extremely practical, provocatively theoretical, annoyingly scientific, pleasingly technical, refreshingly historic .... just as you please. Have you solved some difficult problem recently (discovered a new way of polishing brass terminals or devised a new theory for the magnetic detector)? If you would like to tell us about it, then come and do so on Sunday February 22nd at Gerry Wells' Vintage Wireless Museum, 23 Rosendale Road, West Dulwich, London SE21. We will start the day's meeting at 10.00 a.m. and continue until about 5.00 p.m.

Applications will have to be taken on a first-come-first-served basis as accomodation is limited, so please register for the meeting as soon as possible whether you plan to give a talk or simply to come and listen. Fill in the form enclosed with this Bulletin and return promptly to:

A.R. Constable
34 Welsby Court
Eaton Rise
London
W5 2EY.
(Tel: 01-997 9564)

If you would like to discuss a possible topic for your talk or if you would like one to be suggested to you then please telephone. There will be a 35mm slide projector and either an overhead projector or blackboard writing facilities.

Some food and refreshments will be available at reasonable prices and there will be a small registration fee (no more than £2) payable on the day. We look forward to a very pleasant day packed with good conversation and argument.

Clandestine Field-Day

On Saturday 28th May, Norsk Radioshistorik Forening (NRRF, the Norwegian Vintage wireless society), will be taking vintage communications sets, including equipment used for clandestine operations during WW2, to an open-air location similar to those used for communication with the United Kingdom it is particularly hoped to work British CW stations during the event although calls will be taken from any country.

Station LA1D would like to make contact with anyone interested in vintage radio. Tore Moe, LA5CL, comments, "It will be nice if other stations use vintage equipment too, but we don't mind if stations with modern equipment call us. We may have some more up-to-date equipment ourselves in case conditions become too difficult - at least on the receiving side."

NRHF operate an "antique" net on 3.508 MHz CW and 3.603 MHz AM, every Saturday from 0730 UTC.
They would be very pleased to hear from British stations running vintage eqiupment.

Further information is available from Tony Smith, 1 Tash Place,London, N11 1PA. (Tel: 01 368 4588).

Elwell Wireless

Dear Editor: I am researching a firm called Houghtons or Ensign who retailed photographic and wireless goods and were associated with Elwell Wireless. I should be grateful for any information.

David Hughes, Sittingbourne, Kent.

A Chat on Crystals

Ah! Sweet Mystery...

by Desmond Thackeray

For around 30 years in this country we were fortunate enough to have wireless periodicals covering all levels of technical and journalistic quality, 'from the sublime to the gorblimey' to use a phrase from the vernacular.

No prize for identifying *"Wireless Engineer & Experimental Wireless"* as an example of the sublime; but I'll keep myself out of the law courts by not selecting a candidate for the booby prize. With hindsight, Scott-Taggart's creations did not achieve as high a position in this cornucopia (how many magazines were there, at the peak?) as might be expected from the names he got to head some of the articles, such as Percy Harris, Earl Russell, J.H. Reyner, William Le Queux, P.P. Eckersley, and the two ex-chiefs of the Wireless Section at RAE, Robinson and Crowther.

I notice in the issue of *"Wireless"* for 19 September 1925 that Reyner, for example, is plumbing the depths of triviality with mention of a sugar-lump as a detector, though he doesn't say whether it needed to be damped with a drop of tea before use. Was this experiment conducted with all solemnity in the costly new Scott-Taggart Laboratories at Elstree, perhaps during a tea-break between measurements on the inaccuracy of BBC wavelengths, also reported in this issue?

"One lump or two, Mr. Reyner?" "Oh, just one lump for my crystal set, thank you".

These matters were not by any means neglected in the Antiopdes in 1925. New South Wales had "The Wireless News", and in the 10 October issue of that year there is an unsigned article entitled "A Chat on Crystal Chemistry" a title which somewhat overdignifies a fairly informative article on the elemental composition of rectifying crystals.

The author states quite definitely: "Experiments ... producing crystals of an organic nature ... for rectifying purposes ... have proved fruitless". So what holds in damp northern islands is not necessarily so in arid southern continents. Had the author tried a stick of sugar-cane up in Queensland he might have been able to echo Reyner's revelation. He is on surer ground with an earlier statement that a rectifier mineral must possess the quality of partial electrical conduction. And here we must surely doff our caps to this unknown columnist for a very important observation, one which I cannot recall seeing so clearly expressed in print at any earlier date, though conduction measurements run right back into the previous century.

Who first dubbed these materials "semi-conductors", by the way, and when? Not that semi-conductor theory was much help in 1925 to the detector and rectifier maker, the birth of the copper sulphide and copper oxide rectifiers seemingly owing nothing either to such basic theoretical statements of "Crystal Chemistry". Yet, though the Westector, for example, emerged as the end-point of a tough empirical slog through laboratory and factory, folklore has it that the copper ore just had to come from one particular mine. Without that stroke of fortune, would Grondahl have turned to the sugar-lump detector, instead? Thanks to my Victorian correspondents for keeping me primed on the development of wireless matters in the Colonies.

First of the many

First of the many members of the British Vintage Wireless Society, were these fellows who assembled at the historic wooden hut at Chelmsford where Captain P.P. Eckersley's famous "Two Emma-Toc" station was set up to broadcast to the British listening public before the BBC came into existence. In May 1977, when this picture was taken, the BVWS was just a year old and had less than 100 members: now there are 600 members and the roll is constantly increasing.

Repairs:

Fire safety in old mains equipment

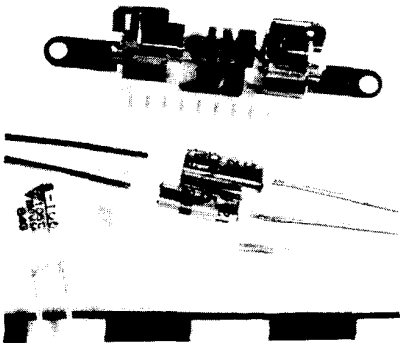
By Tom Going

It is quite rare for old mains equipment to be adequately protected against the risk of fire, and often there are no fuses within an old set at all. Shorted HT supplies, dial lamp leads and so on can easily occur, and although the overload of the mains transformer which ensues may be gross, it may be insufficient to blow a 3-amp fuse in the (British) mains plug. Even a 1-amp fuse corresponds to 240 watts, far more than a smaller transformer may be rated for. Selecting fuses, even anti-surge types, can be quite problematical.

One satisfactory answer is to fit, in series with the mains primary, a thermal fuse. Two types are shown in the accompanying illustration next to a 20mm fuse and holder. Of course ordinary fuses should also be used in order to protect individual parts of the overall circuit. The rectangular box-shaped unit is the easiest to use, since the casing of the fuse is non-metallic. The tubular metallic variety must usually be sleeved, since the case is connected to one of the leads. The thermal fuse is then tucked into a potential hot-spot on the transformer, for example into a cranny between the magnetic core and the winding. Fuses for 100-120 C are usually satisfactory.

Sources:

Trade only:R.S. Components Ltd., Corby (Tubular pattern) Farnell Electronic Components Ltd., Leeds (Rectangular box pattern)
Retail: Electrovalue Ltd., 28 St Judes Road, Englefield Green, Egham, Surrey, TW20 0HB. (0734) 33603, or, (branch) 90, Burnage Lane, Manchester M19 1NA. (Flat plastic rectangular type); and Maplin Electronics Ltd., P.O. Box 3, Rayleigh, Essex. SS6 8LR (0702) 554155. (Tubular Metal Type)



Pre-Marconi wireless telegraphy -

The following paragraph appeared in the Science and Arts section of Chamber's Journal, October 27, 1883.

'Some very interesting and successful experiments have lately been made in the Zuider Zee with Professor Holmes's Siren Fog-horn, which point to the conclusion that collisions can be rendered almost impossible by its use.

The object of the experiments was to ascertain how far the apparatus was available for carrying on a conversation between two ships by means of short and long sounds, on the dot-and-dash or Morse alphabet system.

Two vessels were chosen for these experiments, and on each was a fog-horn blown by steam and worked by a telegraph clerk. The ships separated until they were out of one another's sight: but in spite of this, a conversation was briskly kept up, and was readily read off and understood. We can easily understand how by means of such an equipment, a ship, on hearing another's fog-horn, could inquire what course she was steering, and other particulars which would happily prevent all chance of collision.

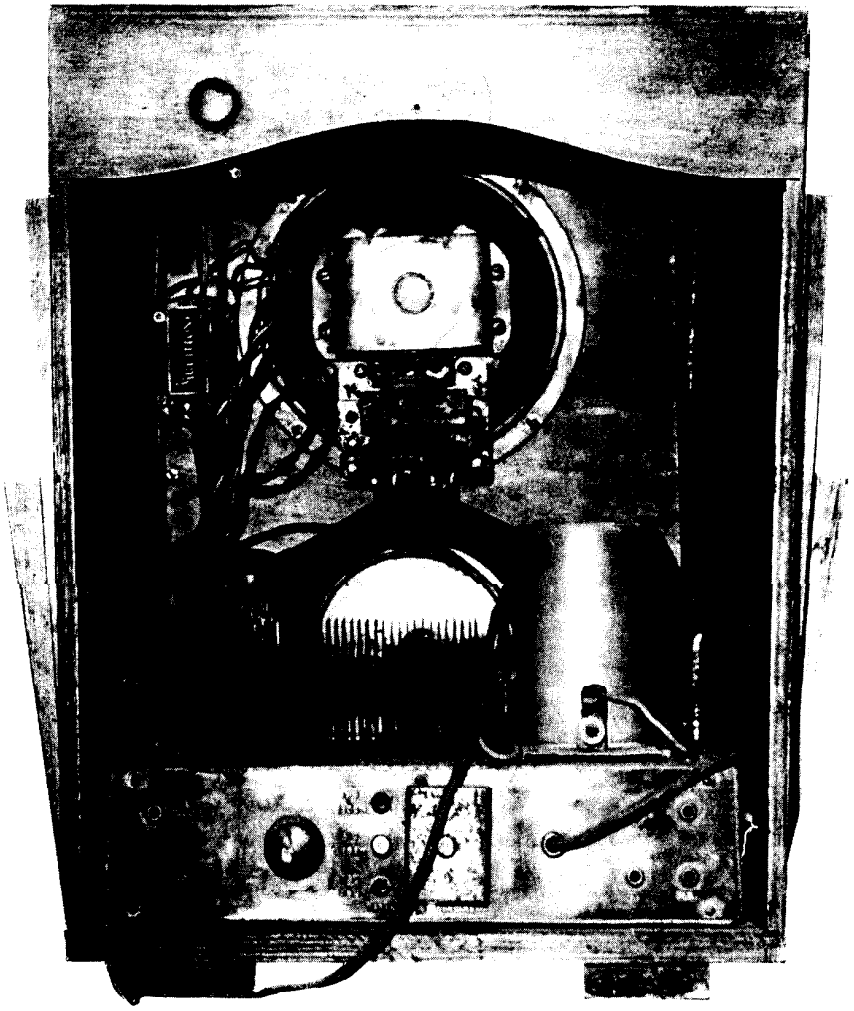
An amusing incident occurred during the progress of the experiments referred to. The captain of an outward-bound steamer, fancying that the unusual sounds represented the groans of anguish of a vessel in distress, bore down on one of the signalling vessels to render prompt assistance. When he found out the real cause of the unwanted noise, he turned back, and vented his disgust in no measured terms.'

Article contributed by Eric Westman, who justifies its inclusion in our Bulletin with the comment: Well, it was *wire-less* telegraphy!

Restoration :

The Kensitas coupon set, circa 1933

by Don Turner



Apart from the famous KB Cube coupon set known to many as "the Kitten" very little seems to be known about other sets provided through promotion schemes based on collecting cigarette cards. As recounted in a previous article about the search for my family wireless I eventually acquired a Kensitas mains model. The set was in poor condition, needing extensive restoration but was almost complete and original. There are several points of interest to collectors.

Contrary to expectations the set turned out to be a well made piece of apparatus. Gerald Wells produced the name of the manufacturer: Amplion, a name well respected in the history of wireless in Britain. The date of manufacture can be inferred from the electrolytic capacitors which are marked 3 October 1933. A chalked date on the inside of the cabinet base gives 10 January 1934.

The components, of very good quality, were clearly all "bought in" and assembled on (presumably) an Amplion chassis.

The circuit is the well tried SG, DET, O/PEN with a Westinghouse copper oxide rectifier arranged as a voltage doubler for HT. The loudspeaker field is high resistance and fed directly from the output of the voltage doubler rectifier thus avoiding the huge increase in voltage which would otherwise have occurred at switch on. An end section of the same rectifier is used in half wave to provide negative bias for the output pentode and to feed the bias control for the VMSG to act as a volume control. This bias system is technically excellent but expensive.

Pick-up is catered for by a second volume control ganged to the bias potentiometer and brought into action by a pull on the shaft in the manner beloved by HMV. One design weakness is that the triode valve runs without bias when on PU – perhaps it was intended that an external GB battery be used. The solution is so simple where a separate bias supply is available, as here, that I wonder if I have missed something. There have been wiring changes (see later).

The tuned circuits took some unravelling. The wavechange switch had been completely removed and the coils strapped for MW only. The switch always gave trouble on our original set but complete removal is a little extreme! Worse than this was the fact that the wiring changes had been done so neatly that I had great difficulty in deciding what was or was not original. Fortunately I possess a Q meter and it was therefore possible to assess the performance of the coils in different configurations. The circuit I provide can be used with confidence.

Reaction with a separate control is used on the detector stage. A Band-pass input stage is fitted giving three tuned circuits overall. The Band-pass pair uses inductive coupling via two linked windings. This is aided by common impedance coupling due to the 300 ohm resistor and its 0.04 capacitor bypass. Such a system equalizes the gain across the tuning range and in this case it works very well. Shunting the 0.04 with something large drops the gain at the LF end but leaves the HF untouched – as it should. The coils are on a separate sub-assembly. They are manufactured by Bulgin. The measured value of Q and resonant frequency show that the matching is to very close limits.

Coupling from the anode of V1 to the tap on the coil feeding V2 the detector is via a capacitor built into the former of the HFC in V1 anode. This has been met before in GEC sets of the same era and is most confusing to the uninitiated. As in the GEC case the capacitor was leaky. There is room in the screening case to hide a modern component.

Looking at the detector there will be seen an attempt to run the earth from the cathode pin to a common earth point at the SG valveholder. To me this implies some problem with stability for there is an alternative path in parallel.

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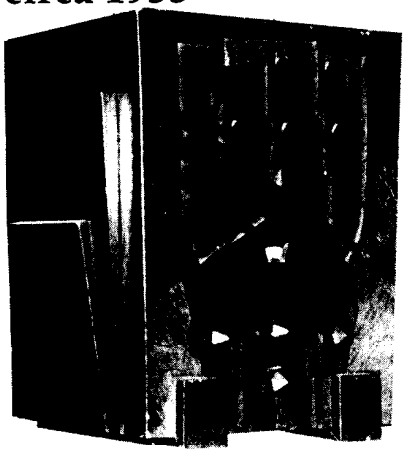
Project

The Kensitas coupon set, circa 1933



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The problem may have been caused by the poor practice of using the coil assembly mounting bolts and the ganged capacitor mounting screws for the earth continuity. This can work when everything is new but it can produce all sorts of strange effects. As part of the restoration, earth leads were run from the wipers on the capacitor shaft and the whole assembly bonded to the chassis using new phosphor-bronze shakeproof washers. This proved to be well worth while with the set turning out to be exceptionally stable. The selectivity curve had a good symmetrical skirt – always an indication of freedom from feedback.

Between V2 and V3 is a tone control network. This was partially missing, hence the dotted rectangle on the diagram. I will have to wait until Gerry Wells investigates his remaining set before I can be sure of the detail. V3 is fed from the fixed bias line by the two resistors forming a divider. The value of the resistors is far too high if the valve is at all prone to grid current as mine was; the values can be considerably reduced.

The mains transformer is straightforward but the voltages shown are deduced as mine was burnt out and has yet to be rewound. The electrolytics were original and reformed (maker NSF) but as ususal, the tubular capacitors and blocks had to be rebuilt (maker Muirhead).

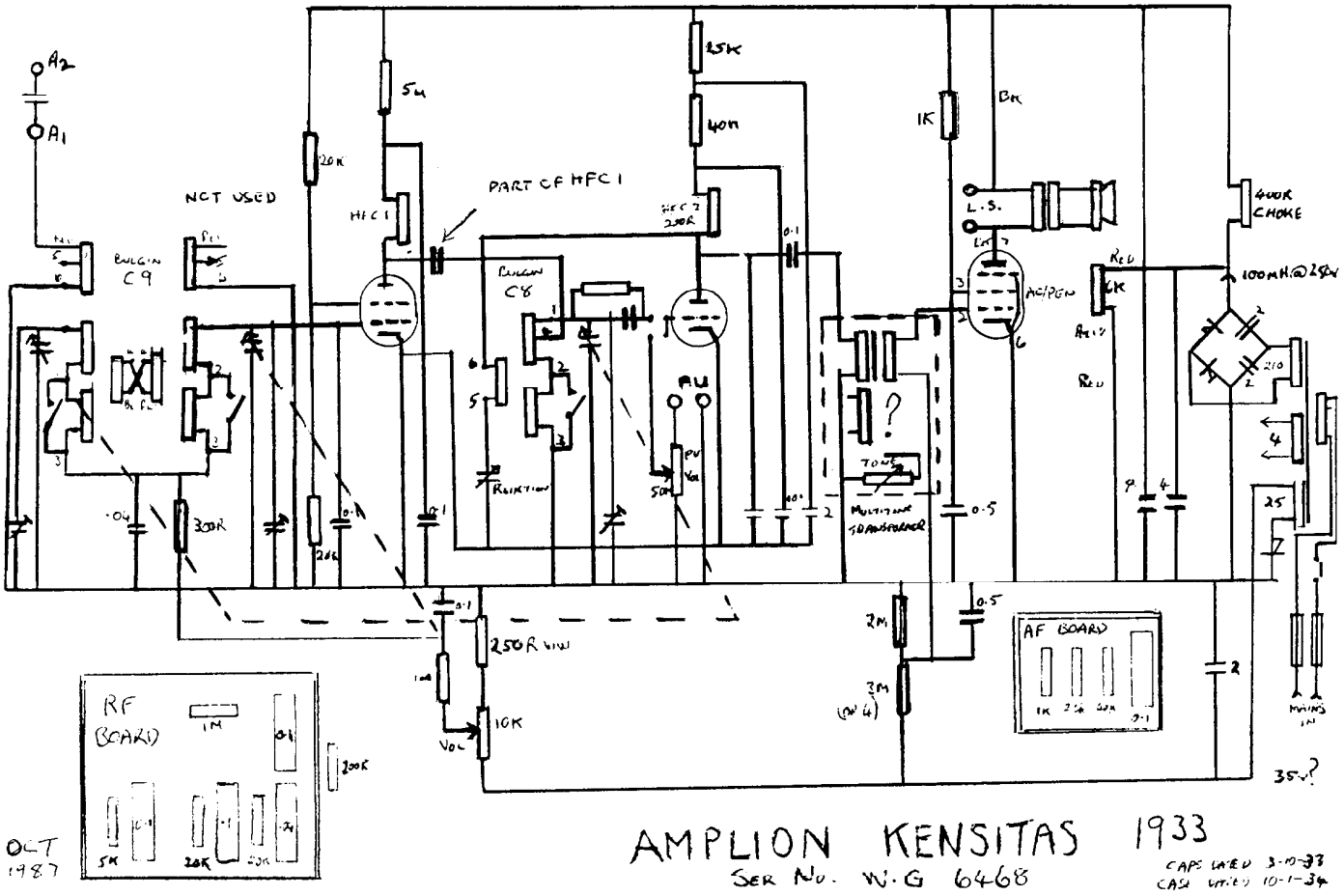
I provided supplies from my gigantic BBC/Scroggie power unit and found the performance to be excellent. Sensitivity over the waveband is fairly uniform and the set feels like a superhet – as good as some of the Philips straight sets.

The single eight inch loudspeaker sounded quite well even before rebuilding it but I decided on a complete overhaul as the frame was quite rusty. The valves seem original and were of the order of 60% emission. The SG valve may have been changed for it was a Cossor (no label) whereas the remainder were Mazda.

An unusual point is the absence of a back even though the metal rectifier is easily accessible. My father had cut a piece of cardboard and fitted it with drawing pins but so far as I can see the manufacturers made no provision at all.

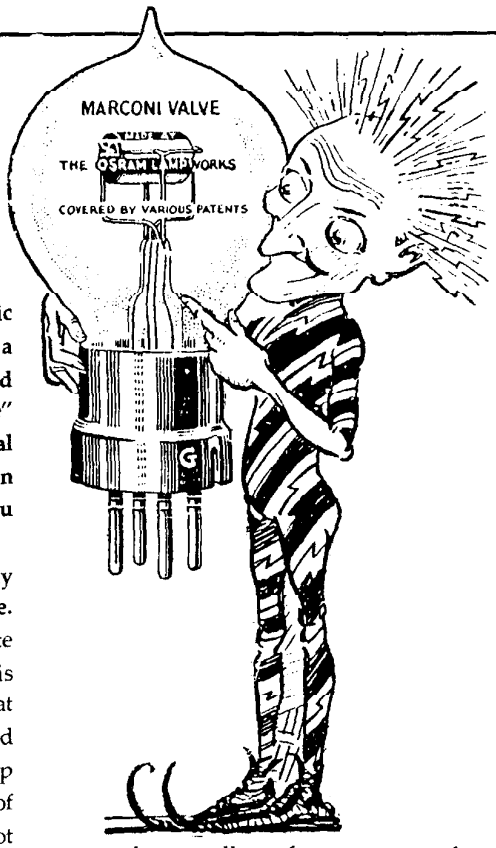
The last detail is the serial number WG 6468. Could this stand for "WIX GIFT"? We will have to check the Dublin and Dulwich sets. Any further information will be most welcome: there must have been a catalogue or advertisement. There certainly was a matching extension loudspeaker, for we possessed one.

My Uncle, who obtained the set, must have been a very heavy smoker!



Simple valve repairs

by Philip Taylor



Sitting in the radio shack on the Baltic Ferry with a valve in one hand and a soldering-iron in the other, I was asked what I was doing. "Repairing a valve" was the reply. The feedback came several weeks later with a question passed on from one of my colleagues: "How do you get the vacuum back in?"

The answer is that you don't necessarily have to open the bottle to repair a valve.

With some popular valves from the late 1920's becoming hard to find, it is becoming more important to ensure that valves that do turn up are not rejected because of poor pin and top cap connections. The original soldering of these connections sometimes leaves a lot to be desired and it can fail after 60 years exposure to the atmosphere. When valve bases and top caps become lose, strain is placed on the joints and weak soldering will fail.

Tools needed

Tools and materials needed for repairs to bases and top caps are as follows:

(1.) Square section needle file - a very fine file sometimes called a key cutting file. The right one tapers to a sharp point.

(2.) An ordinary fine cut file 8 or 10 inches long, with handle.

(3.) A very small watchmaker's screwdriver - often the best one is the smallest from a set of watchmaker's screwdrivers.

(4.) Epoxy adhesive, preferably the quick cure kind, and shellac.

(5.) Fine side cutters.

(6.) Cored solder, preferably in 18 and 22 SWG sizes.

(7.) A sharp knife with small blade or a Stanley knife.

(8.) Soldering iron of at least 30 watts rating and with a screwdriver bit of about one eighth inch or 3mm size. A thermostatically controlled iron adjusted to maximum temperature is ideal.

(9.) Solder wick. The close woven kind is best.

Loose Bases

With valves that have very loose bases, it is best to remove the base altogether. Start off by filing the ends of the pins with the ordinary file to remove excess solder, and continue until the brass shows through at the end of the pin. Using a little solder, tin the end of the pin and mix new solder with the remains of the old. Heat up the pin end by applying the iron directly and then vigorously shake the valve downwards, simultaneously removing the iron. The result should be removal of the old solder from the valve pin. Provided you haven't shaken solder all over the carpet, treat the other pins in the same way. If the wire inside the pin is still sticking to the side of the pin, gently prize it free with screwdriver, using solder wick if necessary.

When all the wires are free, the valve base will fall off or can be pulled off. With a 4-pin base, note the anode pin lead out wire; with a 5 pin base, note the cathode and anode leads if the valve is a mains type, using coloured sleeving if necessary over the lead out wires. Filament connections can be identified with a meter and the grid connection must be the remaining one.

When the valve has a side terminal on the base, this will need to be made free, probably with solder wick. It may be necessary to heat up the terminal whilst pulling off the base.

Where the valve base is only slightly loose, it can be fixed by running a little shellac into the join between base and

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Repairs

continued from previous page

glass. Clean off surplus shellac with methylated spirit. A rubber band around the valve and base will hold things together while the shellac dries.

To resolder the pins when the shellac is dry, clean off the surplus solder as before, shaking out the old solder and freeing off the leadout wires. Using the needle file very carefully, scrape round the inside of the pins to expose new metal. This scraping will usually clean up the lead out wire as well and the pin ends can be resoldered. This is best done by heating up the edge of the pin and letting the solder melt on the pin and not on the iron. This ensures that the solder runs exactly where it is required. Use the appropriate size of solder and poke the end of the solder into the valve pin.

Should a wire be accidently pushed back up inside the pin, it can be retrieved by carefully opening up the pin quadrants with a knife or small screwdriver. The wire can then be straightened out and pushed back up to the end of the pin. This cannot be done with solid pins of course and to ensure that leadout wires are not pushed back up the pin, do not push the needle file too far up the pin when cleaning up the end of the pin.

Fixing loose top caps is a similar operation. Very lose caps can be removed by heating up the soldered join and pulling off the cap at the same time. The connecting wire is scraped clean as before and the top cap hole reamed out. Take great care with the top cap leadout wire and do not tin it before putting the top cap back. This ensures that minimum heat is applied to this wire. Fix the top cap on with adhesive and resolder the connection as quickly as possible.

The wire connection sometimes breaks off if the top cap has been loose for some time. If there is a stub of wire left, this can be scraped clean and a piece of very fine wire soldered to it - typically a piece of 5 amp fuse wire or strand of wire from a piece of flex. Try to tie a half hitch or half a granny knot so that the new wire will not fall off when it is soldered. If there is no stub of wire left, it is sometimes possible to file away some glass carefully and expose a stub of wire. Sometimes this practice and the soldering of the wire destroys the seal at this point and the valve will gradually go soft. However, nothing ventured, nothing gained.

The technique of removing and replacing valve bases can be applied when the right type of valve is available, but has the wrong base. For instance, a 5-pin base can be converted to a 4-pin plus side terminal for early mains receivers needing this type of base. A valve imported from abroad with an American base can be converted to a British base in the same way. When bases are fixed on very tightly, it is sometimes possible to loosen them by soaking the base in methylated spirit for a day or so. If there is a hole in the bottom of the base, make sure the meths goes up inside the base. Bases can also be removed by sawing right round the base, sawing at right angles to the first cut and cracking off the ring of bakelite with a screwdriver. The lower part of the base will then be free and this will fall off when the pins are unsoldered. Great care is needed when doing this to avoid sawing through the leadout wires or cracking the glass.

With practice, the layout of connecting wires will become familiar and with many valves, the connections can be seen going through the pinch to the electrodes. The wires can then be matched to the eletrodes. The valve base being off, connecting wires can be scraped clean at the ends and tinned. The pins are reamed out with a fine file to expose clean metal.

Before attempting to glue the valve back on to its base, it should be tried first without the glue. Dress the lead out wires carefully and poke them down the valve pins. Try to avoid bending the lead out wires where they emerge from the pinch, as this is the weakest spot. Likewise, when straightening out the wires, do not pull too hard.

When it is clear that the valve and base can be matched up, mix up some epoxy adhesive and smear a little on the cement which originally held the base on. If this cement has crumbled away, smear the adhesive around the top inside rim of the base. Put the valve back on to the base, make sure the wires have reached the pin ends and hold the valve and base together while the expoxy cures, otherwise a lopsided repair will result, especially when the original cement is missing.

Valves with side terminals need extra care. The wire to the side terminal needs to be straight where it enters the terminal, and to have a curve where it leads down to the inside of the terminal from the pinch. It may be necessary to slack off the terminal fixing nut and push it inside the base a little whilst the base is being put back on, to ensure that the wire reaches the end of the terminal. It can then be seized and pulled out and the terminal nut tightened up. If the lead out wires are visible, make sure that there are no shorts due to poor lead dressing before the epoxy cures. Use a meter if the wires are not visible.

Letter to the Editor:

With regard to Mr Russell's query about corrosion in battery receivers, I can offer some thoughts.

I was reminded of a telephone switchboard installed in the office of a local nurseryman in the early 1950's. This office was heated by a sort of gas radiator device without a flue. The jack and relay contact springs of this switchboard used to regularly corrode and cause faults, and we telephone engineers always blamed this on the gas heaters. Now it occurs to me that someone using a battery set in the early broadcasting days, may not have had a mains supply, and would use gas lighting. Might it not be that the sulphurous fumes released into the atmosphere caused the corrosion? Gas lights used to smell I seem to remember. Another theory is that it was the fumes given off by the accumulator.

Corrosion usually forms on the positive side of a circuit, and I suppose the small positive voltage developed on the grid of a leaky grid detector would account for the corrosion here. But why not the anode pin as well? Perhaps it was the much higher current here that kept the resistance between the pin and the socket broken down to a low value which prevented this. The grid current would only have been micro-amps, and may have allowed a high resistance to build up.

from: *G D Rudram*
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Worthing
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Dame Nellie's Broadcast: was a record made?

by Tim Wander

The famous Australian Prima Donna Dame Nellie Melba gave her historic 30 minute concert from the Chelmsford works on 15th June 1920. The event was a turning point in the history of British broadcasting and was the first broadcast by a recognised professional artiste.

Some months ago readers of the BVWS Bulletin might recall that I requested some information on Dame Nellie Melba's famous broadcast – specifically whether a 'live' record or disc was cut of the concert, recorded off air. Unfortunately I received no replies but perhaps the following may be of interest.

History records that the concert was resounding success, Dame Nellie's voice had spanned the world and produced excellent signal reports from Sultanabad in Northern Persia, from Madrid, the Hague, Sweden, Norway and Berlin.

Some of the congratulatory telegrams are perserved in the Marconi archives. Dame Melba described the event as being the "most wonderful experience of my career" and maintained an interest in broadcasting throughout its early days and took a great personal pride at being the first singer to broadcast all over the world.

The concert was heard with surprising clarity on every kind of wireless set imaginable, and it has often been stated that reception at the Eiffel Tower was so strong that gramophone records were cut of the concert. I have not been able to trace the origin of this story. In 1970 the French broadcasting service, RTF could not find any evidence of a recording and there is no mention of the event in the Marconi Company archives.

However, on Wednesday 16th June 1920 The Daily Mail reported that in Paris the French Radio Electric Company of 79 Boulevard Haussmann attached an aluminium trumpet as a "resonant amplifier" to one of their receivers and relayed the concert to crowds that gathered in the street. Representatives of the Pathe Film Company made a film record of the scene and the Radio Electric Engineers also switched the sound through another line into the receiver of a gramophone which recorded the concert on a wax disc.

Perhaps this is the origin of the Eiffel Tower story- has anybody ever seen the film, heard the disc, or knows of a possible avenue of research to discover if either still exist?

What is it?

Mysteries are fun, but only if they can be solved in a reasonable time, and this one's been puzzling me for years. The glass is stamped "OSGLIM GEC Ltd. MADE IN ENGLAND" and on the other end (faintly) some sort of logo in a circle, and "A.P. 1188." I know about Osglim lamps and GEC, but just what is this and what did it fit? — Alan Douglas

The Early Days of Wireless

No. 1:
"Home Built"

by Walter Dalton

Before 1928 the majority of receivers were home-made or made by the boy-next-door – he also repaired it if it went wrong. These were all made from components which could be purchased from any hardware or cycle shop, or from the local garage, and each had an enthusiastic salesman who gave advice to all customers. In fact, such was his interest, any set brought to the shop was repaired, or correctly wired, free of charge.

Connections were not soldered, wires were held down by knurled nuts, and faults that occurred were mainly from loose wires, the aerial, earth, or loudspeaker being disconnected, or the batteries run-down; these could be seen – a burnt-out valve did not light-up.

The components rarely failed, for long before they gave trouble the set was modified to a new circuit using new components. When a factory-made set went wrong, the boy wired it to 'his own circuit' and rapid developments had usually caused this to give better results, giving more stations than before and enhancing the boy's reputation as a young genius.

The only tools required were a screwdriver, pliers, and a penknife, and all testing was by the rule of the wet-finger. If the valves lit, the grid of the last one was touched with a finger, suitably moistened, and a "plonk" was heard in the loudspeaker. The grids of the preceding valves were then touched in turn and a grid which gave no "plonks" was the faulty stage. Reaching the detector, the reaction was set at maximum and the aerial coil was touched to stop the valve oscillating.

Resistances and condensers, with a tolerance of ± 200% or more, gave no trouble as a rule, but occasionally a break could develop in a transformer winding. This was usually due to 'perspiration', on the fingers of a girl-winder in the factory, so when going to cure a receiver some boys carried a spare transformer. This was more to effect a cure than to confirm a diagnosis, for this was one way of turning unwanted components into cash so that other components could be bought.

The coming of dull-emitter valves made a meter necessary: the valves did not light up brightly and a 2.5V flash-lamp bulb gave a poor indication of the state of a battery. All valves were very similar and the boy could substitute one of his own to prove another one was faulty.

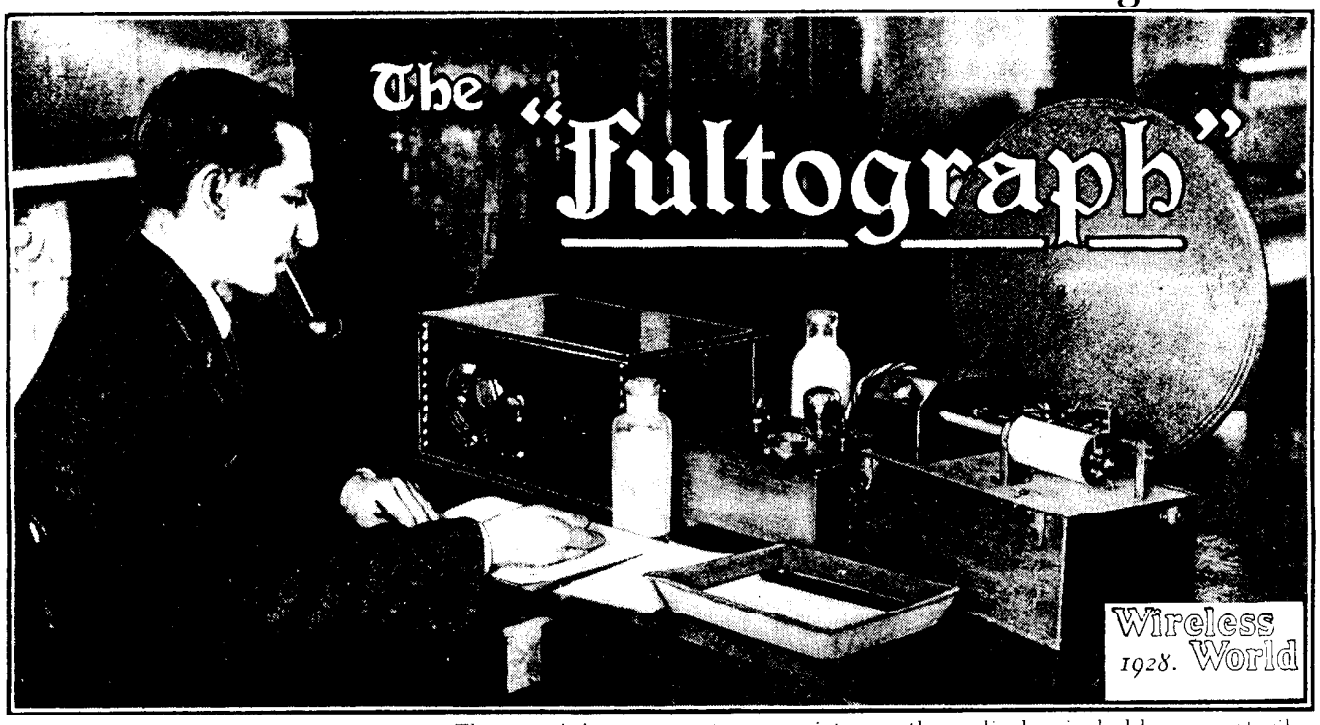
Cheap meters with a full-scale deflection of 30 mA were made, with a spike at the bottom for the negative terminal and two flying leads for positive: black to 6V and red to 120V. Later two terminals were added at the top to read current. These cost 2s. 6d. (12.5p); a lot of money for a boy. Accurate meters were not needed, all faults were a 'dis' or a 'short'; when the anode of an r.c.c. stage read 10V, instead of 60V, this was about the reading expected.

Some amateurs had ex-government meters, f.s.d. 10 mA, with a number of shunts and multipliers to read other currents and voltages, but the choice was limited. Microammeters, costing three guineas, were available but these, and the bridges for measuring L, C, and R, were only for laboratory work. There was a need for a meter to read small currents but rugged enough to be portable, and some makers started to produce small moving-coil meters with a full-scale deflection of 5 mA, 2000 ohms/volt. Low current meters for a.c. were not obtainable. Moving-iron and hot-wire meters required over 50 mA for full-scale, 200 ohms/volt, and the hot-wire meter burnt out with a very small overload. This problem was solved in 1928 by the use of tiny copper-oxide rectifiers, small enough to go inside the case of a d.c. meter, which enabled measurements over the whole of the audio range.

More articles in this series to follow

"POPULAR WIRELESS."

FATHER: "Hark, Cook, that's The Hague!" MOTHER (from the door): "Smell, Cook, that's the dinner burning!"



Visitors to the October Harpenden meeting were fascinated by the display of a 1928 Fultograph machine by Pat Legatt, who demonstrated how it was used to convert signals from a wireless transmitter into a still picture built up line-by-line on a revolving drum wrapped with sensitized paper. Here, Pat explains the machine and tells how he restored his example and made it work.

The Fultograph was a still picture facsimile device designed by Otto Fulton and marketed in 1928 by his company Wireless Pictures Ltd. Facsimile systems were in common use by that time, largely by newspapers, but the novel aspect of the Fultograph was that it was intended for domestic use with signals transmitted from broadcasting stations. The price of the machine was £22.

The BBC co-operated in experimental transmissions of Fultograph signals for 25 minutes a day, Tuesday to Friday, from October 1928 to October 1929; and on Tuesdays and Thursdays only from April 1930 to June 1932. The 1930-1932 transmissions were to assist research into atmospherics rather than for entertainment. The idea did not catch on with the public and was of course being superseded by the fledgling television.

Many readers will be familiar with the Fultograph of which there was a comprehensive description in the December 1928 and January 1929 issues of Wireless Magazine and a historical review in the October 1975 issue of Practical Wireless. But for those who have not come across it, a brief description follows.

The receiving apparatus consists primarily of a metal cylinder round which is wrapped a 6"x 4" sheet of paper still moist from soaking in potassium iodide solution. A metal stylus rests on the paper and a small direct current modulated by the facsimile signal passes from the stylus through the moist paper and to the cylinder. Passage of this current releases free iodine by electro-chemical action, creating a brown stain on the paper.

The cylinder is made to revolve by a clockwork motor, and the stylus traces a track on the paper, the density of the track varying in accordance with the signal modulation. A lead screw mechanism causes the stylus to move slowly along the length of the revolving cylinder, so that the stylus scans a 5"x 4" area of the paper in a series of closely-spaced lines, thus a complete picture can be built up, the whole process taking about five minutes. The cylinder revolves at about 3/4 revolution per second, so the complete picture is composed of 225 lines. For equal horizontal and vertical resolution this requires a maximum modulating signal frequency of 170Hz, easily accommodated within a normal medium wave broadcast transmission channel.

It is of course important that the cylinder revolves in synchronism with the incoming facsimile signal. This is accomplished by sending at the start of each scanning line a synchronising signal which first energises a solenoid to withdraw a locking catch on the cylinder, and then operates a magnetic clutch to apply the clockwork motor drive to the cylinder. At the end of each revolution the cylinder is held momentarily stationary by the locking catch until the next synchronising signal arrives.

The transmitted facsimile signal took the form of amplitude modulation of a 1Khz audio frequency tone. This was received on a conventional wireless set, the output from the loudspeaker terminals being fed to the Fultograph. The modulation was then converted into varying DC by an anode bend detector valve biased almost to cut-off in the absence of incoming signal.

I have a complete Fultograph machine, together with its associated valve and relay unit. After quite a lot of cleaning and oiling, the mechanism was restored to good order and the time had come to set it to work, potassium iodide was easily obtained, but where were the signals to operate the system? The BBC is preoccupied with moving pictures these days and it seemed unlikely that they could be persuaded to re-start Fultograph transmissions for an audience of one, so it had to be self-help once again.

The obvious approach was to use the Fultograph machine itself as a picture signal generator, record the results on tape and then use them to operate the machine in its reproducing mode. The proper way do this would be to wrap a photographic print round the cylinder, mount an optical system on the stylus carrier to focus a very fine spot of light on the print; receive the reflected light on a photo diode; and use the photo diode output to modulate an audio oscillator.

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Pictures by Wireless

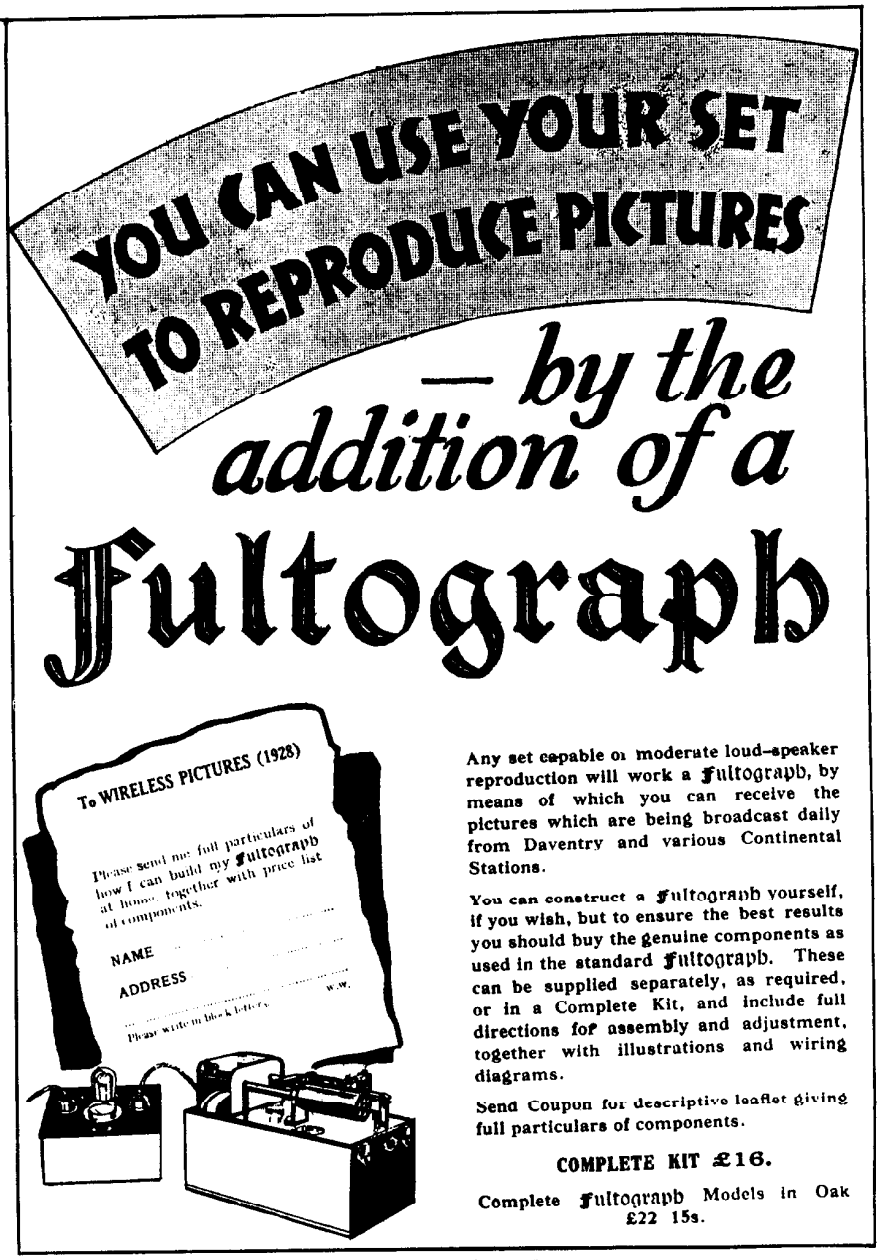
By Pat Leggatt

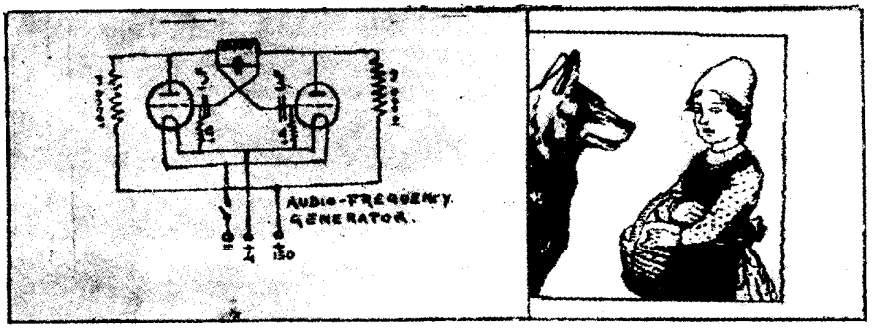
But all this seemed a bit daunting, so I settled for the much simpler task of generating a signal from a silhouette. First I made up an oscillator from a 7400 TTL chip which could be started and stopped by an external contact; I found that a frequency of 5Khz suited the Fultograph detector better than 1Khz. The external start/stop contact was formed by the Fultograph stylus resting on cylinder, so that the oscillator would be stopped whenever the stylus and cylinder were in contact, I then stuck adhesive paper on the cylinder, cut to form a simple silhouette pattern, and as the cylinder revolved the oscillator generated an output only when the stylus was transversing the paper and insulated from the cylinder. The Synchronizing signal, a longish burst of 5Khz tone at the start of each scan revolution, was looked after by a wide strip of paper along the length of the drum positioned to come under the stylus when the cylinder was in its locked rest position. With little artistic imagination and less modesty, I arranged the silhouette pattern to form the letters of my Christian name.

I temporarily disabled the locking catch to allow the cylinder to run continuously, setting the motor governor so that it revolved rather more slowly than would be the case when receiving; this was necessary to allow for the momentary pause at the end of each revolution in the reproducing mode to permit synchronisation. I set everything going and recorded onto tape the oscillator output, modulated on and off by my silhouette pattern.

This done, I reset the locking catch and motor speed for normal operation and removed the paper silhouette from the cylinder. I soaked a piece of paper in potassium iodide solution and wrapped it, while still moist, round the cylinder. All was now ready for the big test and I set everything in motion.

Glossing over a few abortive attempts followed by some modifications and re-runs, I finally saw the magic letters building up on the paper! The results were pretty bad, with streaks and smears and poor resolution; and I could well understand why the public did not queue up in their thousands to pay £22 for a machine. Nevertheless the system was a going concern after 56 years and I was delighted to see the picture, however poor. Even this pleasure was short-lived, for exposure to daylight caused the picture to darken steadily, and by the end of the day there was little left to be seen. But I can repeat it whenever anybody wants a demonstration, so all in all the project was a success.



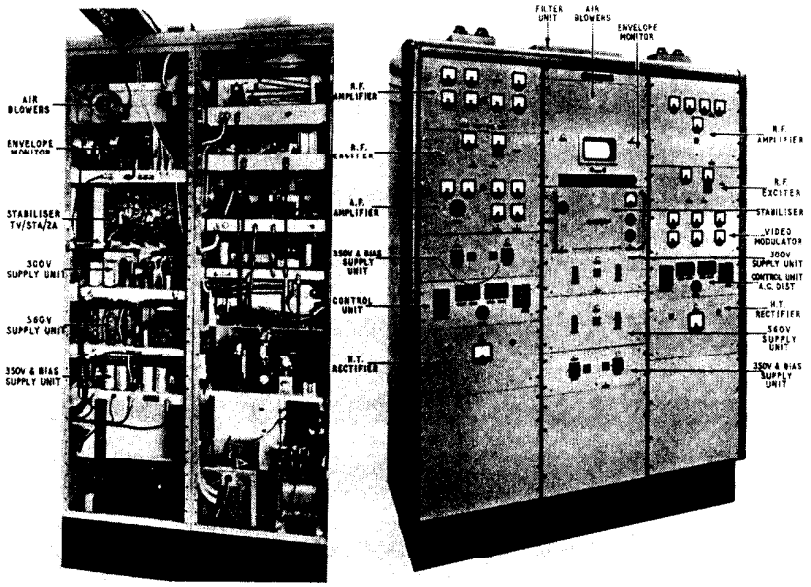


To justify the title of this article, I have fed my recorded signal as modulation to an RF signal generator, picked this up on a vintage receiver and fed the loudspeaker output to be Fultograph, so it really has been "pictures by wireless".

Note:

Better sensitivity can be achieved using a mixture of 1 part potassium iodide to 20 parts of starch paste to 40 parts water.

A 405-line Transmitter Preserved



by Tim Wander

It may have slipped your attention but on January 4th 1985 405 line television left us. Breakfast time TV managed a brief goodbye but for the most part the final close down took place with little or no ceremony. Just short of its half century the 405 line VHF system finally gave way to its 625 line UHF counterpart.

The rumour that nobody noticed is incorrect. The BBC estimated that 5,000 people watched the old service, many in remote mountainous areas of Scotland and Wales. During 1984 the BBC used caption generators on each transmitter site for two minutes in every hour inviting viewers to write to the BBC for advice and help concerning the forthcoming closedown. The BBC had 1,000 replies – but found that over 700 could receive 625 lines which left 300 hidden in valleys who were advised on setting up small relay stations or long cable runs from advantageous aerial sites.

The rapid march of progress especially in the electronics and communication fields has made the turnover in obsolete equipment very high. The vast majority of these regular clearouts go for scrap. Perhaps in 50 years' time the museums will wish that more had been saved. The close-down provided a chance for a small team of enthusiasts from the BVWS to save a piece of broadcasting history. As January 1985 came to an end the BBC parted with the last CG1 405 line transmitter at their Sutton Coldfield Station and a group of dedicated members travelled half way across England to save it.

The CG1 dates from November 1955 and was built by Standard Telephone and Cables as a band one Sound and Vision transmitter between 40 and 67MHz. It generated 125W (carrier) of sound from tetrodes in conventional class C push-pull. The vision transmitter (occupied the right hand rack) and produced 500 watts (peak white) into 50 ohms from two QY4-250 tetrodes in conventional class B push-pull. The central cabinet houses the control logic (using NORBIT's as a later addition) and the power distribution. If you do not remember NORBITS, they were large 'chips' containing several NOR gates built from discrete components. When tested they were encapsulated in plastic but compared with modern LSI (large scale integration) chips they appear more than a little crude. Today upwards of half a million capacitors, transistors, diodes and resistors sit on a single sliver of silicon. Anyone who has worked with NORBITS might also remember that when soldering or desoldering the 'chip' the internal components usually fall apart.

The transmitter was powered from a normal 240Vac supply and each valve was individually air cooled. The transmitter consisted of three seven foot high nineteen inch racks and has one other overriding statistic – it is very heavy. It took the best part of 5 hours for three people to dismantle and load it and a lot longer for one person to unload it. Its first new home was in my own collection where the plan was for reconstruction (most visitors thought it more than a little mad). The TV old channels ran: 1-45.00MHz; 2-51.75MHz; 3-5.675MHz; 4-61.75MHz; 5-66.75MHz.

The band between 50-52HMz has recently been opened to the UK amateur radio community. However a number of European and African countries within range of the UK do still use Band 1 VHF TV so power levels for the amateurs are limited to 20dbw ERP – (i.e. 25 watts of anything other than SSB into a dipole.) Other potential users of this slot in the radio spectrum are Public Mobile Radio and Cellular Radio Systems.

Some may say that the CG1 is not truly vintage but perhaps while the equipment is still available, the society should consider preserving more post war technology. I wonder if too much emphasis is being placed on the words 'rare' and 'valuable' among collectors at BVWS meetings. Someone remarked to me at the recent Harpenden event that they were amazed how rude people were as they rifled the newly arrived boxes. Is this the new image of the BVWS? Luckily as the now obsolete 405 line equipment came up for disposal some members of the society were prepared to invest time, money and effort into restoring pieces of this country's broadcasting history. Gerry Wells and assorted helpers did an excellent job in saving various pieces of equipment including the large standards convertor now returned to full working condition. With this thought in mind, visitors to Gerry Wells' Garden Party will have noticed something new growing in the garden. On 24th June 1987 the CG1 transmitter made a second journey from North Essex down to SE21, severely straining the hire van that developed a nasty ignition fault on the way. It now resides as a permanent exhibit of the Vintage Wireless Museum in West Dulwich and in due course will gain its own conservatory.

The transmitter is complete, with large quantities of spares, circuit diagrams and engineering notes. Great care was taken with each move and I wonder how long before it runs again?

My thanks to Phil Marrison and Dick Wander for the original removal up in Birmingham in the early hours of a very cold January morning. My thanks to Nick Keighley and John Mayne for their help during the first assembly and to John, Michael Paskins and Gerry Wells for help during the final move.

Layout and Design: Robert Hawes