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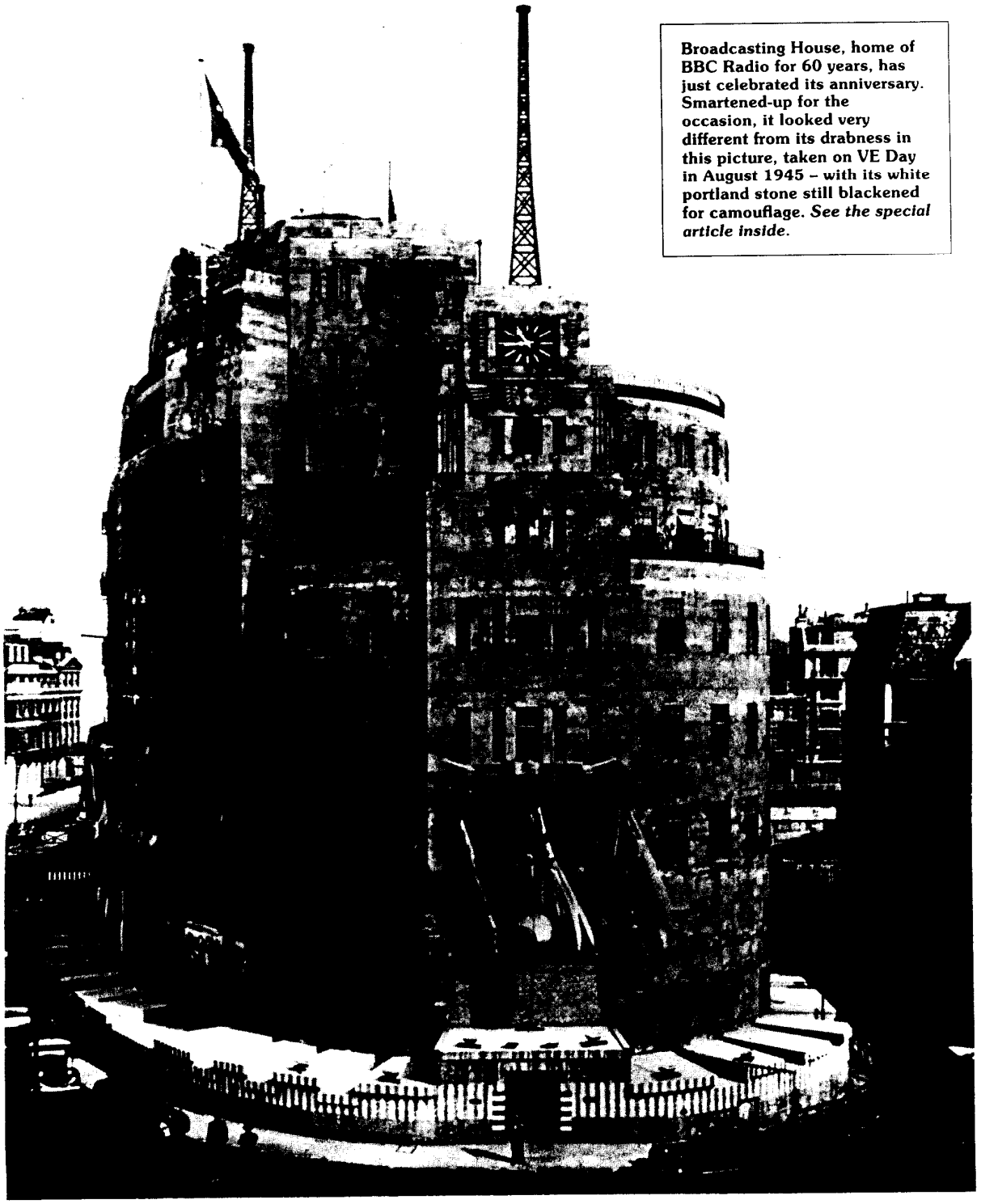
BULLETIN OF THE BRITISH

VINTAGE WIRELESS

SOCIETY



Broadcasting House, home of BBC Radio for 60 years, has just celebrated its anniversary. Smartened-up for the occasion, it looked very different from its drabness in this picture, taken on VE Day in August 1945 – with its white portland stone still blackened for camouflage. *See the special article inside.*

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: (081) 808 2838.

Editorial Assistant: Pat Leggatt.

Layout and design: Robert Hawes

Information Exchange: A Register of Members' Interests

Members are invited to take part in this scheme, which is designed to provide a sort of clearing-house for information of all kinds between members. You may want to contact other members with similar interests to your own, or to acquire data, historical information, advice on restoration etc. Or perhaps you are willing to share your knowledge with other enthusiasts or to exchange visits? If so, you are invited to send details of your interests and of the help you are willing to offer to others, to the Registrar: (SAE please)

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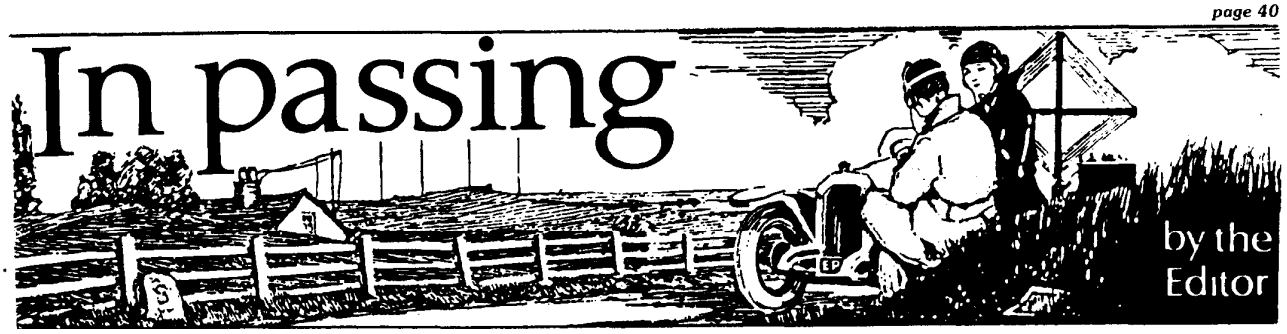
WEST WICKHAM, KENT BR4 0RX.
TEL: 081-776 1531

Contents: Bulletin of the British Vintage Wireless Society Volume 17 no. 4

VINTAGE WIRELESS MUSEUM

The Vintage Wireless Museum, headquarters address for the British Vintage Wireless Society is at 23 Rosendale Road, West Dulwich, London SE21 8DS. Telephone: (081) 670 3667. The Curator is Gerald Wells, whom visitors should telephone before visiting the museum.



Correspondence for the Society's Bulletin should be addressed to The Editor, Robert Hawes, 63 Manor Road, Tottenham, London N17 0JH. Telephone: (081) 808 2838.

Meetings in 1992

Members may like to make a note in their diaries of the dates of official Society meetings for 1993. We have already booked no less than nine meetings for the year, covering a large part of the country. Society meetings have so far been planned for every month except February, April, August and December.

Harpenden

Dates of meetings at our Harpenden, Hertfordshire venue are: March 7 (major Auction and mini-swapmeet); June 6 and September 19 (major Swapmeets with small auctions at the end of the day); November 28 (major Auction, mini-swapmeet and AGM). Enquiries regarding these meetings should be addressed to the organiser, Robert Hawes, 63 Manor Road, London, N17 OJH (Tel: 081 808 2838).

Portishead

Due to their growing popularity the number of swapmeets at our new Clarence House, Portishead venue in the West Country are being increased to three for 1993. The dates are January 10, May 9 and September 5th. After careful budgeting, the organiser of these meetings, Alex Wooliams, has been able to reduce costs to stallholders by 25 percent for those booked at least four weeks in advance. The meeting is a leisurely social gathering and plans are afoot for making it more than just a swapmeet by the addition of displays, demonstrations and talks. Members may write to him (SAE please) at 11 Norton Road, Knowle, Bristol, Avon BS4 2EZ or telephone 0272 721 973.

Southborough

The already well-established Swap-meet and mini-auction meetings at Southborough, Tunbridge Wells in the South East are to continue. The final meeting there for 1992 is on November 8 and although, like our other regional meetings, it is primarily intended for residents in that part of the country, all members are very welcome there. Indeed, some travel a considerable distance to attend an event which is now renowned for its *friendly and unhurried atmosphere.* The 1993 Southborough dates are: July 11 and October 17. The Organiser is John Howes of 11 Crendon Park, Southborough, Kent TN4 OBE. (Tel: 0892 540022).

New Venues

It is hoped to add two new venues during the year - one in the Midlands and the other further north. Details of the latter will be circulated as soon as *arrangements have been made and in* the meantime, we should be grateful if members in these areas would write to the organisers offering their support and help. If you are interested in supporting a meeting in the Hull area, please write to Ernie Roberts at 33 Charles Street, Hedon, Hull HU12 8HT enclosing an SAE or telephone him on 0482 898615. If you would like to support a meeting in the Stockton-on-Tees area, please ring or write to Fred Hay, 27 Crayke Road, Stockton-on-Tees, Cleveland. TS18 4E (Tel: 0642 674560).

Dutch meetings

Our friends in the NVHR in Holland have also fixed the dates of the main meetings of their Wireless Society for 1993. Quite a number of BVWS members like to visit there, so here are the dates: March 27; June 12; September 25; December 11.

Valve Seminar

The discussion-meeting arranged by Keith Thrower last November to view the unique Weston McVite valve collection at the London Science Museum annexe was over-subscribed, so a second one is to be arranged for early in December. It will be primarily for applicants who were disappointed last time, but there may be some extra places, so anyone interested should let us know.

Honour

We are proud to announce that television pioneer T.H. Bridgewater OBE, has accepted the Society's invitation to become an honorary member. "Tony" as he is familiarly known, is the sole survivor of the original technical team which set up the "30-line" studio in the basement of Broadcasting House London at the start of BBC television.

He is pictured here with Betty Bolton, who sang and danced on the first transmission in 1932 from that studio. The photograph was taken by Ray Herbert at the opening of the "BBC Radio Show" this September, where, in an interview for a television news programme, Betty sang one of her songs "P.S. I Love You".

Replica Contest

There is still time to enter for our *"Replica Contest". It has been* deferred and we hope to stage it at the next Harpenden meeting. A number of entries have already been received, ranging from crystal sets to multi-valve ones. The entries must be working receivers, built or restored by entrants, of designs published before 1940. They can be battery or mains and may be home constructed from specified original components or from kits.

Continued over page >

In passing

> Continued from previous page

Blumlein Lecture

A lecture and exhibition "The Life and Work of A.D. Blumlein" is to be held at the Institution of Electrical Engineers, Savoy Place, London WC2R OBL, 26th October. In his short life, Blumlein made many major contributions in the fields of telephony, electrical measurements, sound recording and sound reproduction, television and radar. Admission to the meeting is free and there are afternoon and evening sessions.

Radio on TV

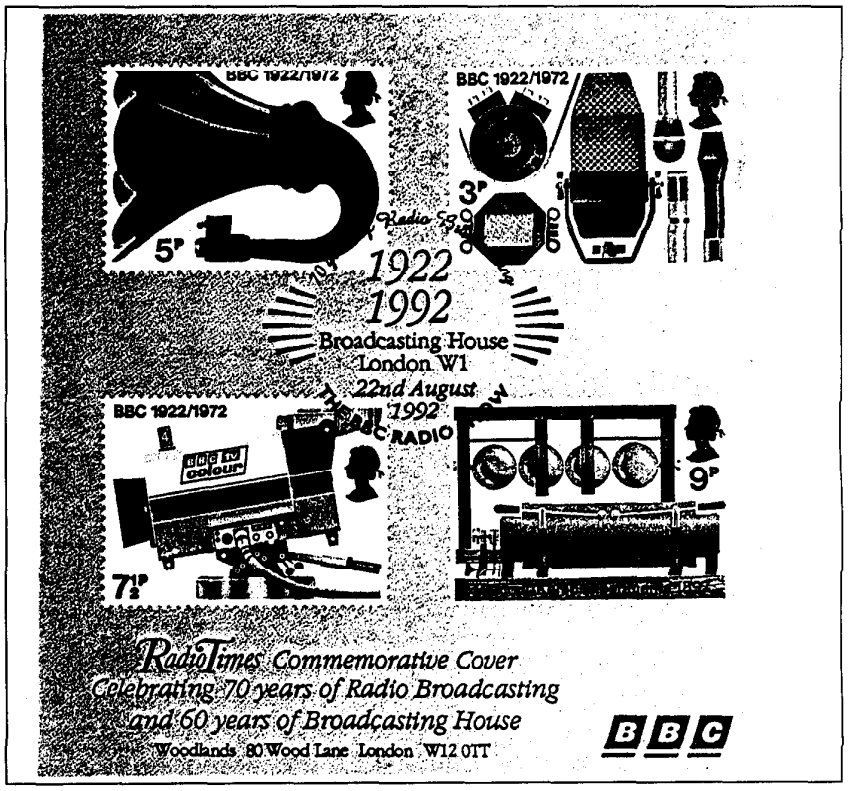
The programme "Prime Time" on BBC 1 on November 9 will celebrate the 70th anniversary of the BBC - the British Broadcasting *Company* which was replaced by the *Corporation* in 1927.

Included in the programme will be archive material of the early days, including a recording of Arthur Burrows reading the news, and vintage music in the style of Henry Hall and Jack Payne. Gloria Hunniford will interview radio personalities including Harry Secombe who will recall The Goons, and veteran broadcaster Frank Gillard - the man who invented "Any Questions" and killed off Children's Hour. The stage set will be in the 1930's "Art Deco" style of Broadcasting House and will be decorated with a "Milestone" radios selected and lent by our Editor.

Scott Society

A society dedicated to the preservation of the history and the radios of the E.H. Scott company of Chicago from 1925 to 1953 has been formed. They aim to make a collection of Scott equipment, to set up a museum, to research history, to publish a magazine and to provide an information service to members.

John Howes, a BVWS committee member, has joined the new society and may be able to help with further information. Donations of cash or equipment will be welcome and the subscription will be $20 a calendar year. The address is PO Box 1070, Niceville Fl. 32588-1070.



BBC Stamps

Wireless enthusiasts who are also stamp collectors were puzzled at a "Radio Times commemorate cover" set issued on 22nd August celebrating The BBC Show at Broadcasting House and 70 years of radio broadcasting. The card envelope bore four vintage photographs of broadcasters and four attractive stamps depicting a horn loudspeaker, a group of microphones, a television camera and an 1897 spark transmitter. Close examination revealed that the stamps were actually twenty years old, having originally been produced for the 50th anniversary of the BBC. Enthusiasts found that the stamps were not this time available at Post Offices, but only at the BBC, where they now appear to be sold out, although stamp dealers may still have some at a premium.

Commemoration "Net"

Members of the BVWS who are radio amateurs regularly take part in a "Net" on the first Monday of each month and in August they celebrated two broadcasting anniversaries when two historic callsigns "2TV" and "2LO" were put on the air again. [In passing, we apologise for using the term "Hams" (which most amateur broadcasters have never liked) in an earlier issue].

New Biography

Anyone who reads vintage wireless magazines will know of the writings and designs of Joshua Sieger CBE, who tells me he has almost completed his autobiography "I was there". [He certainly was there: at the start of wireless, having constructed his first set - a coherer receiver on which he managed to pick up Gibraltar - as a schoolboy. He went on to a long and distinguished career as an engineer, designer, writer and founder of a pioneering gas-detection company. He has recently been ill but is, I am glad to say, making a good recovery and expects to publish his book soon. We wish him well and look forward to an interesting read.

Magazine Jubilee

The Practical Wireless magazine, founded in 1932 has published a Jubilee issue containing stories and pictures from their sixty years. It was one of a number of technical magazines aimed at amateur home-constructors, in the fields of radio and mechanics, devised by the late F.J. Camm. They were popularly known as "Camm's Comics" because of the simple way in which technical matters were explained, the clear graphics and the designs that were within the capabilities of even the novice with modest workshop facilities and little cash to spare.

More early multimeters

By Ron Deeprose

I read with interest the article by Desmond Thackeray in Bulletin 17/3 on low priced **Multimeters**. I have a few similar ones which fit this description, these being an **"Electric 4 in 1 meter"** (0-6-15-150 V & 30MA ranges) **"Setaw Polymeter"** (0-8-16-240 V & 30 MA) priced at 9/6d and a **"Wates 3 in 1"** (0-6-150 V & 30 MA) priced at 8/6d; this was marketed by the **"Standard Wet Battery Co"**, 184/8 Shaftesbury Avenue W.C.2. BCM/WHT*. The **"Setaw"**, as Desmond observed, is **"Wates"** spelled backwards and both meters have the Monomark BCM/WHT. The meter in previous Bulletin (top left hand), marketed by **"Emicol"**, I have in my collection; this has the Patent No. 322558 as do the **"Pifco"** (top right and bottom) and also the meters I have already described.

I have never seen the **"Dix Onemeter B"** but I think I have an earlier version, a wood cased instrument, which has the name **"Suprecision"** and the ranges (0-6-120 V 12-120 MA & 6 A) and the formula for measuring ohms using a 6 V battery. You then reverse the instrument and slide it back into the case which then provides a stand for the instrument in use.

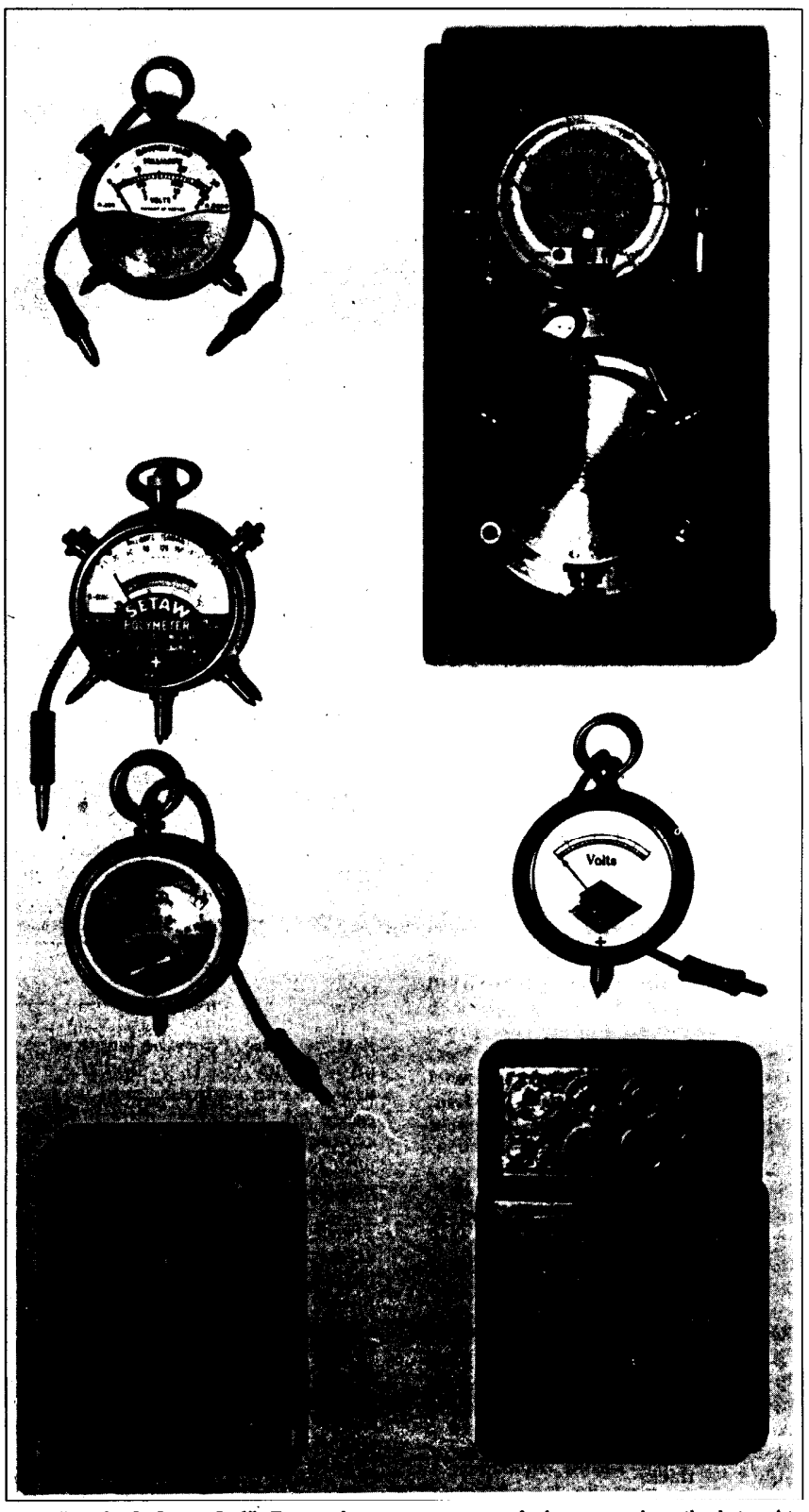
The **"AVO" model H.R.** I have in my collection; this is the same size as the D.C. **Avominor**, the ranges being 0-2.5-10-25-100-1000 V-250 micro-amp and the sensitivity 20 K ohms per Volt. The ohms ranges using external battery with resistance, meter and battery in series, are 5 & 500 ohms.

I collect all these types of meters, including the single and double range **"Pocket Meters"**. I thought I had a considerable number of different makes of these instruments but recently I decided there actually were only a few, as what I was looking at were meters made over a period of some 50 years, and the manufacturers would obviously have changed design and construction over the years. I had a careful look at these meters inside and out, and after comparison of construction, cases, test prods and meter movements, I began to discover they could be grouped. In actual fact one manufacturer was accountable for some 20 meters ranging from ca. 1910's to 1950's.

This manufacturer was of German origin, using a trade-mark that appears on several in this range and looks like this:

Another manufacturer having a large range was **"Sifam"** of France. In Bulletin 17/3 the meters shown as second down left and the third on right all appear to be connected with this manufacturer.

The earlier **"Pocket Meters"** which seem to have been built into watch cases are very varied. The one shown in the picture



is by **"Wade & Jones Ltd"**, Birmingham and probably of English origin (by the construction). They do not have much in common with one another and were probably made by small manufacturers which fell by the wayside.

If any members have information on meters of the type described in this article, I should be very interested to hear from them.

Ron Deeprose lives at 70 Hollington Old Lane, St. Leonards-on-Sea, East Sussex, TN38 9DP and his telephone number is 0424 428428.

*This is a business accommodation address.

A Clothespeg Crystal Detector

— 1923 Style

by Eric Westman

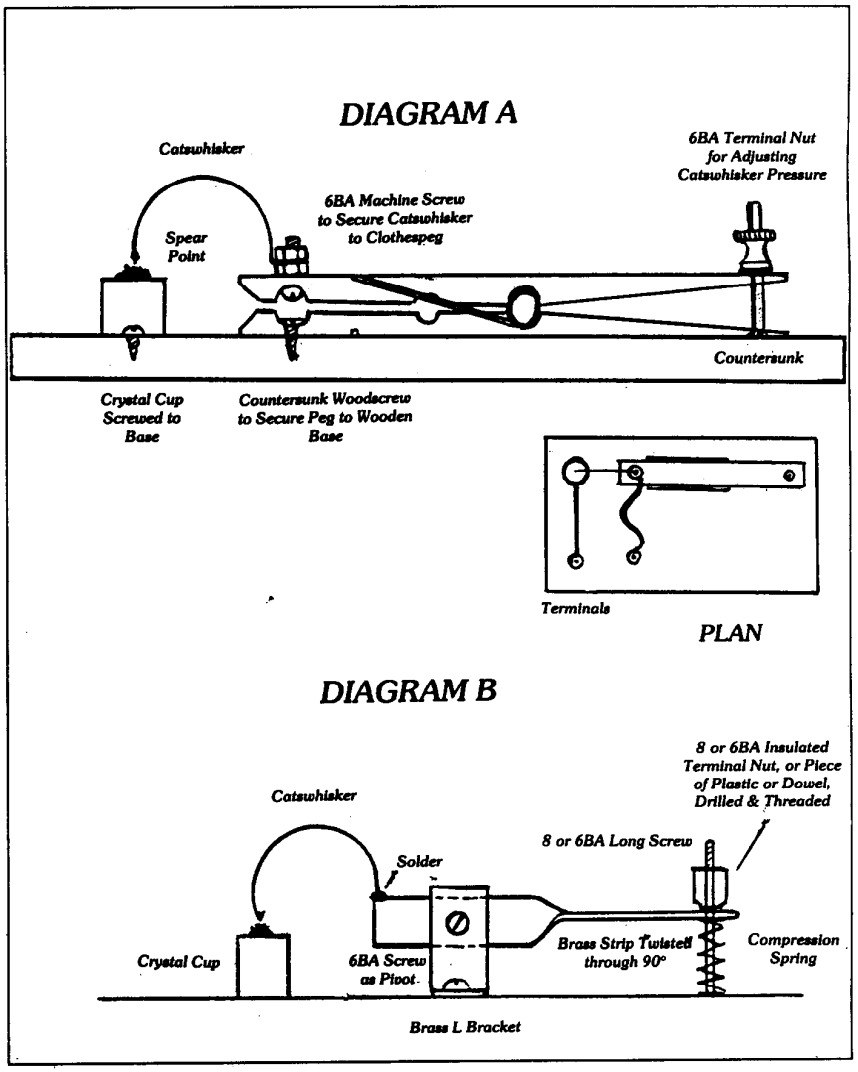
One of the joys of browsing through ancient radio magazines such as 'Popular Wireless', is the insight one gets into the ways the old-timers improvised components out of the most unlikely odds and ends.

When wages were often less than £2 a week, and components comparatively dear - and often difficult to come across - the would-be builder of a primitive receiver had to adapt whatever materials were to hand. We are all familiar with pieces of coal streaked with 'fool's gold' being used as detecting crystals, spark plugs pressed into service as lightning arresters and 'composition' beer-bottle stoppers utilised as knobs. A couple of years ago, among bits and pieces the writer bought from an ancient Somerset countryman, was a home-made spider-web coil: its spokes were not of ebonite or even dowel, but consisted of lengths of twig from the local willow trees. The coil worked fine, even after two-thirds of a century.

But back to the vintage constructors' magazines: one short article from 1922/3 described how to make a crystal detector out of a spring clothespeg! This was just too nonsensical to miss, so I made one - and its performance was excellent. Details follow for anyone who cares to try his hand at it.

Diagram A is self-explanatory. Drill four 6BA clearance holes in the peg to accommodate (1) the 6BA x 1/2" countersunk screw which passes through both halves of the peg and has a terminal nut fitted on the end; (2) the 6BA x 3/8" roundhead screw that passes through the top portion of the peg to secure the catswhisker by means of a nut; (3) a countersunk woodscrew to secure the peg to a wooden base about 5" long x 2.1/4" wide x 3/8" thick.

Use a couple of inches of thin copper wire to make the catswhisker. At one end form a loop to fit over the 6BA screw on top of the peg; at the other end, hammer the wire to flatten it for 1/4" or so, then using sharp scissors, cut a v-shaped spearpoint in the flattened wire. Form the length of wire into an inverted U so that the point will descend vertically onto whatever piece of crystal is fitted. Tinned copper wire is better than plain; silver wire is even better but is difficult to acquire in small enough gauge.



The crystal cup, which is retained by a screw about 1" from the end of the clothespeg, traditionally consisted of about a 1/2" length of brass .303 cartridge case (the firing-cap end). Equally good is a 1/2" length of 3/8" brass tubing with a crass screw-cup soldered on one end to enable it to be secured to the base. The leads from the detector go from the crystal cup and from the screw retaining the catswhisker. These leads can go to two terminals or machine screws on the base, for conveniently making external connections. The crystal itself can consist of a small piece of iron pyrites jammed firmly into the crystal cup by pieces of aluminium foil rammed around it. Good-sized chunks of this material, looking deceptively like gold nuggets, can be bought for £1 from "New Age" stalls that sell crystals. These are big enough to break into several useful pieces. Make sure all metal connections in the detector are 'brasso-bright' to avoid all resistance to the feeble RF currents that pass through.

A slightly refined version of the clothespeg detector can be made out of a few inches of brass strip about 5/16" wide. Diagram B tells all. The pressure of the catswhisker on the crystal needs to be adjusted very finely indeed, thus an 8BA adjusting screw is preferable to a 6BA. And, of course, the longer the horizontal portion of the brass strip, the finer will be the adjustment. The brass strip should pivot smoothly, but no play should be allowed between it and the L-bracket, for the slightest unwanted movement would almost certainly upset the contact between the catswhisker and the crystal.

The BBC Anniversary

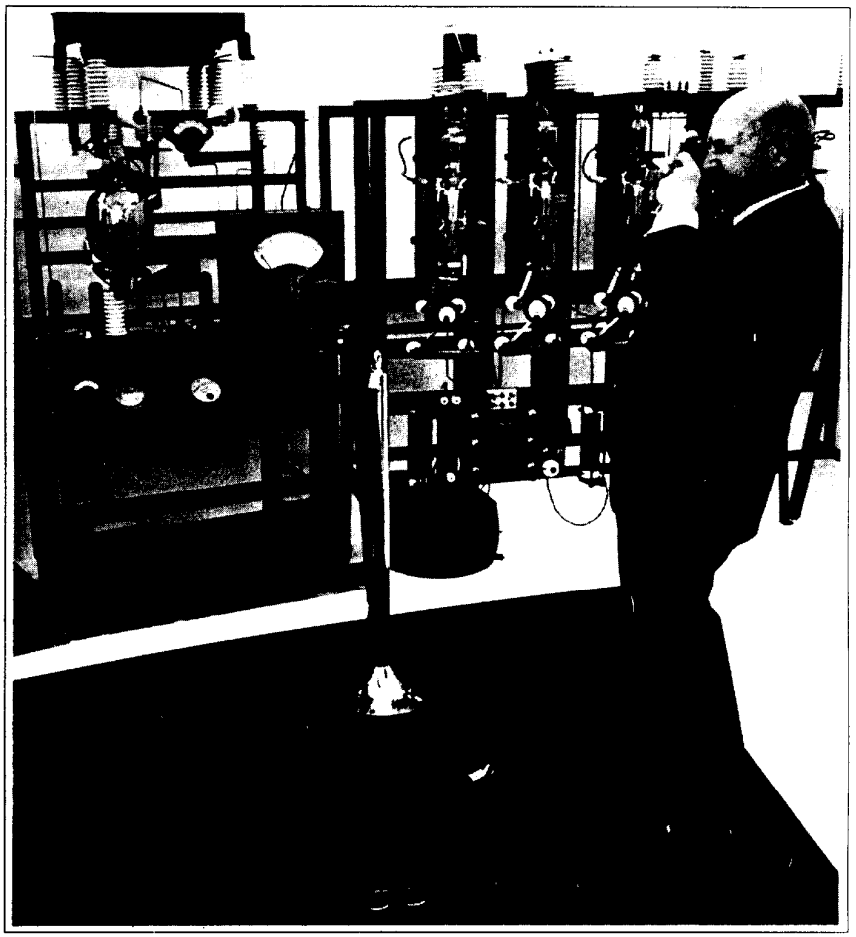
'The Greatest Show on Air'

by Robert Hawes

The enormously successful exhibition and multi-media presentation called "The Greatest Show on Air" celebrating the 70th anniversary of BBC radio and the 60th anniversary of Broadcasting House, in September and October, drew more than 50,000 visitors in its extended 8-week run. Now, suggestions are being made that the BBC should have a permanent museum of radio equipment and broadcasting history.

The show presented a rare opportunity for the public to enter one of the world's most famous buildings, a gem of "Art Deco" design, opened in 1932, when the old 2LO team closed down at Savoy Hill and moved in. In addition to a multi-media show which used the latest audio-visual technology to combine light-effects, multi-channel sound, vintage film and animated figures, there was a static exhibition featuring milestones of radio history which included photographic blowups as well as well as interesting relics. Visitors also had the opportunity to operate a studio mixing-desk, to watch a behind-the-scenes video of daily life in Broadcasting House, to see "bloopers" and ask questions.

The exhibition, from an idea of Sandra Chalmers, head of BBC Radio Publicity, was designed by Neal Potter, whose best-known work is the London Museum of the Moving Image. His bright and innovative approach gave the Show immense popular appeal, although its "theme park" approach to the subject may have made it seem somewhat superficial to people who prefer traditional museums. But of course, it was a show intended for the general public rather than the specialist and despite the razzmatazz, there was much for the serious student to experience.



Part of the 2LO transmitter in the foyer of Broadcasting House. Taking a picture is Ray Holmes of BVWS. Photo: by Sean Smith, courtesy The Guardian newspaper.

The Show demonstrated the pioneering achievements of the BBC from its foundation in 1922 and celebrated the universal admiration and respect it has earned. Perhaps it is no coincidence that "The Greatest Show on Air" was presented at a time when the institution, which has weathered so many storms, is again subject to a crisis of public and governmental examination and reassessment.

The script and research for the Show was in the hands of historian John Cain, who has been engaged in researching the history of the BBC since his retirement as controller of Public Affairs in 1984. Unfortunately, recent expenditure cuts have closed down his BBC "History of Broadcasting Unit" but he has been able to produce an excellent book "The BBC: 70 years of broadcasting"* in time for the Show. He describes it as " a sketch rather than a detailed portrait" but manages to cram in an enormous amount of information and pictures.

In these days of financial constraints, the BBC, like most large undertakings, seems necessarily to be more concerned with the present and the future than the past, although they have zealously preserved written and recorded archives. Apart from some very special items- some of which were on display at the Show- not a great deal of vintage equipment seems to have been officially saved from the scrap-heap. Luckily, however much has been preserved by museums , and of course, by private collectors like the members of the British Vintage Wireless Society- some of whom are willing to loan items for exhibition.

The general public were given the rare treat of penetrating the great bronze doors (traditionally reserved for VIP visitors rather than callers of the "tradesmen" sort) and entering the marble entrance hall. It seems to

> *Continued on page 47 after BBC picture pages*

The BBC Radio Show

King Edward VIII broadcasting to the Empire in 1936.

King George V making his first broadcast to the Empire on Christmas Day 1932. The microphones used by him and by Edward VIII are now preserved at Broadcasting House.

Joyce Grenfell, a much-loved entertainer, broadcasting in 1947.

The Goons: Harry Secombe, Michael Bentine, Spike Milligan and Peter Sellars in the studio in 1951.

The Beatles broadcasting in "Saturday Club" in 1963: John Lennon, Paul McCartney, and George Harrison

The original "Archers" broadcasting in 1954. The show rapidly became accepted as "real" to such an extent that when the fictitious character Grace was killed off, many listeners sent wreaths to the BBC. A brass coffin-plate was made, which was in the exhibition.

Tommy Handley with his team, in the studio in 1942. Everyone listened-in to his "It's That Man Again" show - including King George VI who gave specific instructions that if the war should end during the half-hour programme he should not be disturbed.

Broadcasting Children's Hour in 1942: Wilfred Pickles, the presenter, shocked listeners who were accustomed to standard BBC "posh" accents, with his Yorkshire sound.

Frankie Howerd broadcasting in 1951.

Tony Hancock posing for the camera at Broadcasting House at the height of his career. His first show got an audience of only 12 percent but very soon everyone listened-in.

Photographs by kind permission of the BBC

News

> Continued from page 44

have escaped the recent marshmallow-pink refurbishment of other parts parts of the building, remaining largely unchanged since its opening in 1932 and still confronting the visitor with a huge Latin inscription describing the building as "a Temple of the Arts and Muses dedicated to Almighty God by the first Governors of Broadcasting". Installed there was the most impressive artefact on show: the near-complete "2LO" transmitter, apparently assembled from the remains of both the equipment installed at Marconi House, London in May 1922 (which was taken over by the British Broadcasting Company in November 1922) ; and the 1925 equipment originally installed on the roof of Selfridges store, London. Next to the old transmitter, which occupied a whole wallspace, was the tiny backpack Marconi satellite system which was carried around the world by Simon Bates of Radio 1 on his 76-day tour to raise money for Oxfam.

The central display was a selection of "Receivers through the Ages" which I was asked to mount, surrounding a life-size waxworks figure of a Twenties enthusiast busy constructing a crystal-set. Other sets on display ranged from a replica of an enormous 1918 home-constructed crystal set (made by fellow-BVWS member Eric Westman), a magnificent 1926 AJS 4-valver with horn speaker, a pre-war Pye sunburst portable and a Wartime Civilian receiver, to a round Ekco, a Philco "Peoples Set", post-war hybrids and the latest piece of "Green" technology- a transistor-set powered by plugging zinc and copper electrodes into a sour apple to form a battery.

Research brought to light some vintage equipment which was exhibited, such as a selection of "microphones through the ages" including ones used by Royal broadcasters which were disguised as ziggurat-style objets-d'art to conceal their technological purpose. Also in Potter's "Heritage corridor" was the original Charter with its grand seal, an official BBC hymn-book, a Jack Payne songbook, badges of BBC "Radio Sunbeams" children's' clubs, Radio Times cartoons, scripts scribbled in by famous broadcasters and even Tony Hancock's original black homburg-hat and astrakhan overcoat.

The show was, of course, meant to sing the praises of steam radio, so BBC Television, which also celebrates a 60th anniversary this year, didn't get much of a look-in. It was allocated a small showcase in which was included a brass plate brought up from the original studio in the basement of Broadcasting House from which the the service began with 30-line transmissions in 1932. Unfortunately the plate perpetuates an error: it reads "From this studio the BBC conducted its first public ***experimental*** television service which opened on 22nd August 1932", but in fact, it was not by that time "experimental" any more. On hand at the opening to point out the error was none other than T.H. Bridgewater OBE, honorary member of the British Vintage Wireless Society and sole survivor of the original technical team which began the service. He was accompanied by Miss Betty Bolton, a singer who took part in the first programme. and Ray Herbert. an authority on early television, who is also an honorary member of the Society.

As a result of painstaking research by Norma Gilbert, an impressive display of vintage photographs was mounted in "The Heritage corridor" and various departments and individuals contributed to the items in showcases. It hoped that at least part of the display will continue as a permanent installation in Broadcasting House.

Apart from an original "meatsafe" microphone from Savoy Hill, one of the largest artefacts on show was a Blattnerphone recorder, used particularly in the early Thirties for repeating programmes to suit the world's different time zones. It had been "lost", but following a request for a piece of Blattnerphone metal tape from David Price, the head of BBC recording services, who was mounting a display case for the show, I was able to tell him "I can do better than that- I can tell you where the machine is". I put him in touch with Jim Butterworth of the BVWS, who worked for many years at the Washford transmitter at Minehead where he built up an unofficial museum. One of Jim's projects was to lovingly restore to working order the 1932 machine, which had been last used to record Chamberlain's declaration of war in 1939. David Price rushed to the old Washford Station to rescue this last surviving example and it is now at Broadcasting House.

As visitors viewed the exhibits, they were entertained by compilation by David Price's department of vintage recordings including the voices of Marconi, Melba, Reith and Eckersley and songs such as "Little Bouncer loved an Announcer down at the BBC".

The multi-media show in the concert hall, directed by ex-BBC producer John Powell and researched by Charles Chilton, traced the history of broadcasting from 1922 to 1992. It began with the dramatic appearance of a giant rotating waxwork of Shakespeare's Prospero- an icon originally selected by the BBC establishment to lend an air of classic scholarship to the institution, which coupled well with the authority suggested by its dedication to God as a "Temple of the Muses". As the show began, a flash on screen displayed Puck's boast: " I'll put a girdle round the earth in forty minutes" , followed by Marconi's: "I'll put it much quicker than that !" There followed some fascinating archive material- a brilliant kaleidoscope of words, pictures and music, tracing the history of the BBC from Marconi's 1901 tests and the early days of 2LO and Savoy Hill, through the war, the death of George VI and the Coronation of Elizabeth 11, to the developments of the comedy classics and definitive dramas, the burgeoning of news and comment programmes, the progress of the Proms and the final embrace of Pop. An informative commentary introduced quotations from broadcasters ranging from Lord Reith, Uncle Mac, Chamberlain, Churchill and Lord Haw-Haw, to Henry Hall, The Goons, The Archers, Laurence Olivier, the Beatles and Freddie Mercury. A most informative commentary linked it all together beautifully but the presentation became increasingly loud and showy: full of sound and fury, signifying ... well ... what's called a "promotion" and a very impressive one. But then it must be said that the BBC has every justification to blow its own trumpet after such a long and distinguished service. It was a splendid celebration, which came at the right time to remind us how important a part of our culture the BBC is and how carefully the prospect of changing it should be considered.

***Published by BBC Books, at £9.95.**

The Editor is most grateful to the BBC for permission to use the photographs reproduced here and to their personnel for their help with research and information, including Sandra Chalmers, John Cain, Norma Gilbert, Judy Leighton, Claire Bostock, Nilam Ashra, David Price, Peter Graham and the staff of the BBC Photograph Library.

BBC Radio Show

Raymond Glendenning, commentator, with the crew of the Margate lifeboat in 1942.

The difficult task of editing from disc: engineers pictured in 1937.

The BBC's steel-tape Blattnerphone recorder of 1930 now preserved in the exhibition.

A tough, pioneering, outside broadcast: the 1928 Boat Race.

Workshop

Wattless mains droppers

by Bill Williams

A considerable fraction of all the mains valve radios which were ever manufactured are of the so called AC/DC or universal type. This form of radio circuit remained popular to the end of the valve era in spite of the fact that DC mains supplies were very rare after World War II. The probable reason for this continuing popularity of a circuit form, which had some very real disadvantages when AC mains were available, was cost. It avoided the expensive, heavy and bulky mains transformer which supplied isolated low voltages for filaments and high voltages for HT in "AC mains only" sets.

To heat the filaments of the valves in AC/DC sets, current is drawn direct from the mains supply. All the valve filaments and dial lights, which must have the same current rating, are connected in series. In the case of American sets, some models achieved a total filament voltage of 117v, permitting direct connection to the mains supply.

In the UK, with a common mains supply of 240v, this mode of operation is not very practical. Here the filament voltages often total only 60 or 70 volts and the surplus 170 volts or so is dropped across a series resistor - the mains dropper in the title of this article.

The mains dropper appears in three distinct forms: line cord, which is a resistive mains lead; a tubular wire-wound resistor mounted on the chassis; and the barretter, resembling a light bulb, which passes an almost constant current over a range of voltages.

Line cord disappeared from the market a long time ago, although it still appears as electric blanket elements. Suitable wire-wound droppers are still available, but becoming quite hard to find. Barretters suffer from relative fragility and have not been manufactured for radio replacement purposes for a long time. They are technically the best form of dropper because fluctuating mains voltage is absorbed by the barretter with negligible resultant change in valve filament current. This very desirable feature is of less necessity these days unless you happen to live in a rural area where the mains voltage is still subject to wide variations due to load changes on long lines.

Whatever the form of the dropper, it dissipates a lot of watts as heat - as much as 50 or 60 watts in the case of the popular 300 mA heater chains. I remember my aunt having her curtains set on fire by a radio line cord. We have all seen blistered cabinets and scorched backs in the vicinity of chassis-mounted droppers or barretters in midget radios, where lack of space for a mains transformer makes the AC/DC circuit mandatory.

Recently I had two AC/DC sets on the bench, both with open circuit barretters. Having had a good check around and replaced some leaky capacitors, a couple of doubtful electrolytics and out-of-tolerance resistors, and tested the valves, the next step was to power up for test and alignment. I looked around for a suitable temporary substitute for the open circuit barretters. The thought occurred to me that any impedance of the right value which could pass the filament current would do. If the mains were DC, this impedance would have to be a resistor, but who has DC mains these days? On AC the dropper could be a choke or a capacitor. Pure capacitance or inductance of the right value would not only do the job but would waste no power, and produce no heat. A practical choke would be quite a long way from pure inductance at 50 Hz and rather bulky, but capacitors are almost perfect at mains frequency, disipating negligible power.

A quick bit of mental arithmetic showed that only a few microfarads were required. I sorted out some old 1000v paper capacitors and soon had the sets going with a mains dropper which did not produce any heat that I could detect: a "Wattless" mains dropper.

Now to the practicalities. First the capacitor value must be calculated. To do this, we start by calculating the total impedance, including the valve filaments, which will pass the correct current for the valves. Assuming a mains supply of 240v at 50 Hz, we arrive at:

Filament Current	Total Impedance
100 mA	2400Ω
150 mA	1600Ω
160 mA	1500Ω
200 mA	1200Ω
300 mA	800Ω

Next we must find the hot resistance of the total chain of valve filaments plus dial lights, if these are in series with the valves. To do this, we add all the filament voltages and divide by the current required. The difference between this resistance and the total impedance must be supplied by the capacitor. We can now calculate the capacitor value.
If:-

C is the required capacitance in microfarads

Z is the total impedance in ohms

R is the total filament resistance in ohms

$$C = \frac{10000}{\pi \sqrt{z^2 - R^2}} = \frac{3183}{\sqrt{z^2 - R^2}}$$

For example, if we have 160 mA filaments totalling 60v, the required capacitance is

$$\frac{3183}{\sqrt{1500^2 - 375^2}} = 2.2 \text{ microfarads}$$

The capacitor must, of course, be a non-electrolytic type, rated for mains voltage AC operation. This is 250v AC working or 630v DC working in the case of one particular currently available type. It is not likely that you will find a capacitor of the exact value you have calculated. Capacitors are often manufactured to 10 per cent or 20 per cent tolerance. The required value may be built up from a number of capacitors in parallel,

eg,
2.6 microfarad is 1 + 1 + 0.47 + 0.1

The exact value is not critical within a few per cent and we could also use 1 + 1 + 0.68 or many other possible combinations.

The old metal-can type 1000v paper capacitors will do very well, but are bulkier than modern plastic dielectric capacitors. (Maplin sell a 1 microfarad 250v AC capacitor which is only 31 x 28 x 18 mm.) It is therefore easy to fit capacitors in the volume occupied by a barretter or mains dropper resistor and no heat is produced by the capacitors.

Another strategy is to choose a capacitor from available values which is a little larger than the calculated value and add a small wire-wound resistor to the heater chain to bring the current down to the desired value. If you have no means of measuring capacitance, connect a meter in series with the valve filament. If the current is too low with a capacitor of near to the right value, add another small capacitor, say 0.1 or 0.22 microfarad in parallel. The current needs only to be within a few per cent. If the current is too high, add a bit of series resistance, say, a 50 or 100 ohms 10 watt resistor.

If you can get them, suitable negative temperature coefficient surge-suppressing thermistors can, with advantage, be connected in series with the heater chain. The type CZ13 for 300 mA heater chains was still available at the time of writing.

Always remember that you are working on potentially dangerous equipment when repairing mains radios. Make sure that the AC/DC set chassis is connected to neutral, not live, and always switch off and unplug before making any test connection or adjustment. If you must make adjustments to powered equipment, eg, for alignment, do what the old radio repair men did: stand on an insulating mat and keep one hand firmly in your pocket so that you only ever touch the radio with one hand at a time.

I am sure that someone will point out that if the capacitor fails, and goes short circuit, full mains potential will be applied to the heater chain with serious consequences. But modern metallised film capacitors designed for continuous AC operation are very reliable indeed: our domestic electrical appliances use them for interference suppression and they almost never fail. I have seen, however, examples of both line cord and wire-wound droppers which have had the resistive element shorted by insulation on the live lead failing due to prolonged exposure to heat. Any mains radio, AC/DC or otherwise, should be fuse protected if it is intended for use rather than for display only.

Receiver Techniques of the 1920's

Part 3

by Pat Leggatt

A new Series:
Here is the third of a series of short articles by Pat Leggatt reviewing the circuitry and other features of wireless sets of the 1920s. Each article will outline a particular aspect of sets of this period.

Improving Sensitivity: Reaction

As we have seen earlier, the BBC tried to put as many people as possible within 'crystal set range'. But a large proportion of listeners could not be so well placed and needed sets of greater sensitivity to pick up more distant stations.

In 1914 Armstrong in the United States had patented the HF regeneration principle which became known in England as reaction or retro-action or even, erroneously, as 'reactance' [3]. In its most commonly used form a controllable amount of HF from a triode detector anode was introduced into the tuned grid circuit in such a polarity as to constitute positive feedback. As the amount of feedback was increased, losses in the tuned grid circuit were progressively counter-balanced and the circuit 'Q' steadily improved with very beneficial effects on receiver sensitivity and selectivity. Application of reaction feedback could be taken to the point where the grid circuit losses were almost reduced to zero; but beyond this the stage would burst into oscillation and become unusable for reception of modulated carrier, although useful for heterodyne reception of continuous wave telegraphy.

Reaction was often explained as repeated feedback of the valve anode signal back into the grid circuit so that the signal was amplified many times in succession by the valve. This explanation is misleading: it is much more valid to regard the positive reaction feedback as cancelling grid circuit losses, raising grid circuit 'Q' and hence increasing stage gain.

The reaction technique offered a cheap and easy way to design receivers of very adequate sensitivity and it was employed in the great majority of valve sets of the 1920's. There was however a less agreeable aspect in that to operate it to the best advantage required appreciable care and skill. Careless or inexpert operation could drive the receiver into oscillation; and it was often put into this state while tuning across the band, using the heterodyne whistles to locate a transmitting station. If the aerial were coupled to the oscillating stage, the oscillation would be radiated as an interfering signal to all other receivers in the neighbourhood.

Because of this potential for interference, the Post Office regulations in 1922 forbade anything other than a limited fixed amount of reaction to be applied to the aerial circuit [4]; but this regulation was rarely observed and reaction whistles ('howling' in contemporary jargon) were a continuing scourge.

When properly used, reaction was of great benefit but it did not necessarily make a poor circuit into a good one. It was almost impossible to make the reaction feedback truly aperiodic such that the phase did not vary with frequency; but unless this was so, the resulting response characteristic could be markedly lopsided and the selectivity improvement appreciably less than expected. It was much better to start with a high 'Q' tuned circuit rather than relying on reaction to do all the work, a philosophy not adopted by Marconi's who compounded their lossy tuning system in the Type 21 and 31 receivers by controlling reaction with a 20kΩ variable resistor shunting the detector tuning coil.

References:

3. W. M. Dalton: "The Story of Radio" Vol.2 Page 61: Adam Hilger 1975

H. M. Dowsett: "Wireless Telephony & Broadcasting": Vol.II Page 68. Gresham Publishing Co. circa 1923/4

K.R.Thrower: "Evolution of Circuit Design for a.m. Broadcast Receivers" J.I.E.R.E. Vol.56 No.10/11/12 1986.

4. General Post Office "Conditions which Broadcast Receivers should fulfil to obtain Post Office approval": /G391 October 1922.

The next article in the series will be on "Improving Sensitivity: HF amplifiers".

In the beginning ...

by Tony Hopwood

A fascinating bundle of correspondence came into my hands recently – it's the GEC end of commercial correspondence between one Captain the Honourable Ernest Cochrane of Red Castle near Londenderry, and the General Electric Company of 16 Andrew Street, Dublin, in late 1903.

It seems that the Captain was busily fitting up his residence with the latest electrical gadgets like telephones and lights. And in the best traditions of the gentleman amateur, he was interested in wireless too...

Let's start with GEC's letter of the 4th December 1903...

"Dear Sir: We beg to acknowledge your favour of the 3rd. inst., enclosing remittance, value 12/9d., and herewith beg to hand you our receipt for same. "We cannot give you the address of the Marconi Telegraph Co's Works, but we belive that they are in Camberwell, London..."

From there we jump to the next GEC letter of the 30th December 1903, in response to the Captains's request for more detail when faced with GEC's commercial reticence about a potential competitor...

"Dear Sir: We much regret that we can add nothing to our letter of the 4th inst., as we are not familiar with the cost of Marconi's apparatus, and we believe that there are a few different patterns, which it would be necessary to specify. The address we gave you will certainly find these people if you write direct.

"Furthermore, we do not think that wireless telegraphy has yet become practicable, and is at present merely in the experimental stage. We must regret that we cannot give you more satisfactory information regarding these matters, but you will readily understand that as a wholesale commerical firm, we do not dabble in these things until they become of marketable value.

"We should be very sorry to supply our clients with any apparatus that we could not thoroughly guarantee as being efficient. Yours etc..."

Did Captain Cochrane ever get his wireless? Will the mighty GEC ever have anything to do with Marconi?....

That's the trouble with ephemera – it gets you wondering!

Feedback

Letter:

from Geoffrey Dixon-Nuttall

I was very interested to see the article on early Philips sets by John Stokes. He is obviously as puzzled as I was by the strange power supply arrangements used by them. The story of N.S.F. is also interesting; I hadn't realised that they pre-dated Philips. Their later sets were sold under the name "Hilversum" and were, of course, Philips chassis in different cabinets, like Mullard in this country. In fact some of the Hilversum cabinet designs were used for Mullard sets, and vice versa; but that is another story.

If I might comment on his notes on my original article.

1: The numbers on my circuit were copied from an original Philips drawing. The volume control is definitely referred to as R6, R7, with the values stated. I agree with him that this is impossible, but that is what it says!

2: I still think the filament current of the output valve is more likely to be 600 than 60mA. If the screen grid valve takes 250 mA, the output valve can't take less!! As I said, the "Illustrated History of Philips Valves" is unfortunately not to be relied upon.

It is interesting to note that his diagram actually gives the number of turns on each coil; presumably in case anybody should wish to rewind one.

On another topic, Ray Whitcombe's very thorough article on insulation is somewhat worrying. I wonder if he had met the more usual leaks caused by old systoflex, especially when in cable forms! I have even met leakage on switch wafers in transistor sets.

Letter:

from Ian McWhirter

Regarding Frank Trier's letter "Getter Again" (Bulletin Vol.17 No.2.) there really is no mystery about the origin of the word getter. It was indeed coined to describe the action of devices used to "get" the last trace of gas from a valve.

As no-one is likely to believe that it could be just so simple, I have verified it from two notable sources. Firstly from Stuart Woodcock, formerly chief engineer of the CRT laboratory in Ferranti who spent over 40 years in vacuum device development and also from Bernard Eastwood, formerly chief engineer at the Edison Swan Electric company at Ponders End and Brimsdown who also spent a life time with vacuum devices, but specifically with radio valves.

I find many early references to "gettering" which name the process in commas e.g., WW September 30th, 1925 "Valves in the Making" by W. James and also in Palmer's "Wireless Principles and Practice" of 1928. Chaffee's "Theory of Thermionic Vacuum Tubes" of 1933 also refers to "getters" and to a patent by Malignani in 1884 who used "vaporisable reagents" (also in commas) to take up residual gases in an incandescent lamp. Kaye's book "High Vacua" of October 1926 which has nothing to do with valves, refers to the use of "getters" in making electric lamps. Van der Bijl's masterly "Thermionic Vacuum Tube" of 1921 makes no mention of the process, possibly because the thoriated filament had not then the importance it was to develop just a few years later.

On the subject of valve vacua, perhaps I could point to a possible error in referring to a gettering process by John Stokes in his book "70 Years of Radio Tubes and Valves" in which he refers to the use of lime as a getter on a Met-Vick DE11 which was already hardened with a magnesium flash. The wire coating on the pinch was almost certainly not lime but Magnesium Oxide. In the early days of Cosmos production runs, there were troublesome instances in which too much nickel was vaporised from the electrodes during the eddy current heating and which settled on the pinch causing a leakage path. E.Y. Robinson, the designer, went to the US to find a production technique to overcome this and cabled an immortal solution back "It's a cinch, magnesia on the pinch". So my old cronies in valves production at Ediswan at Brimsdown told me, for I too had the privilege of working there.

Letter:

from Eric Westman

Information wanted

I wonder if any readers can provide information on the following three topics:

1: The Bristol "Evening Post" of 12 October 1991 printed extracts from the schoolboy diary of the city's illustrious son Archibald Leach, better known as the film star Cary Grant. For Monday 21st January 1918 the young Archie notes that at the Empire Theatre, Capt De Villiers's wireless balloon is at the Top of the Bill, and that the balloon "flies around hall 20 feet long" (the balloon, I suppose, is 20 ft long). The next day he records that in the Second House at the Empire, "wireless balloon went out of control and went on people in Circle". Does that mean that in January 1918, during the First World War, a Captain was displaying a wireless-operated airship - which might well be considered a military secret? Or is Archie, who used to "haunt" the Empire, thinking of Captain Raymond Phillips who, in the early 1920's in peacetime, demonstrated in theatres his wireless-controlled airship? Does anyone know about Capt de Villiers?

2: During a Radio 4 interview a few years ago, a Poldhu resident claimed that steel masts eventually replaced the wooden ones blown down in the 1901 gale at Marconi's Poldhu transmitter. When the station closed, he said, these masts "were transported to Daventry and they became Daventry 5XX and 5GB." Does any reader know if this was so?

3: The same man said that his uncle worked as a stoker at Marconi's Poldhu station and always found Marconi, whom he met several times, "a perfect gentleman". However, Marconi "was known for chasing one rather attractive lady in those parts, but she didn't want to know about him. She lived in the Penzance area and was no one local". Does any fellow-romantic know who this lady was, or anything about it?

> More letters on following page

Reviews, crossword, letters

Record Review
by Dave Adams

In the mood

"The Continent Calling", Diamond Jubilee...1932 - 1992 Connoisseur Cassettes SE/OXO-4 from F. Hurlock, 58, Francis Avenue, Southsea, Hampshire, PO4 OHN. price 4.75 inc. P&P.

I bought this tape as a mere indulgence in nostalgia. I am ancient enough to have been one of the millions who tuned from the BBC to the new commercial station. Most of us, appreciated the eminent worthiness of the BBC but we did sometimes seek some lighter relief - especially on Sundays. I thought I would like to hear again some of the programmes we all enjoyed so much. One at least, 'The Ovaltineys' has passed into folklore. I was not disappointed. If you are of similar vintage I heartily recommend this cassette to you.

Enjoying this wallow in happy memories I began to recall something of the mood and tempo of the times. It was not that easy to tune to Radio Normandie or Radio Luxembourg or any of the others. There were still many straight sets, many without an RF stage, soldering on. It called for a little skill with the reaction to get a good enough signal. I lived in London's east end and it was not difficult to get either on our detector, two LF, battery set (when we could afford the HT battery). For people living further north or west or in otherwise difficult areas it was a different story. I think that the coming of these stations boosted the sales of new sets (superhets).

I think you may enjoy the comparison between advertising 'then and now'. I was never irritated then, as I am now, by the 'commercials'. Perhaps this was because the sponsor had the whole programme in which to give his message instead of having to try to blow our brains out in a minute or less.

One side of the tape is devoted to Radio Normandie and the other to Radio Luxembourg. The Ovaltineys and other famous programmes and names are included.

Letter
from R. G. Christian
Re Cap.

Regarding Pat Leggatt's note on "The Headphone Condenser" (BVWS Bulletin 17.3, page 38), the theory of the diode detector was published by Terman in 1930 and repeated in countless textbooks ever since. Whilst the capacitor (I don't like 'condenser') does bypass RF its main purpose is to increase the detection efficiency, the larger the capacitance the greater the efficiency. However too large a value will cause the voltage across it to be unable to follow the modulation waveform giving rise to a form of distortion known as diagonal clipping. This can be avoided by limiting the value of capacitance that given by

$$C < \sqrt{1 - m^2} / (2\pi f m r)$$

where m=modulation depth, f=highest modulation frequency, r=resistance of load (=headphone impedance).

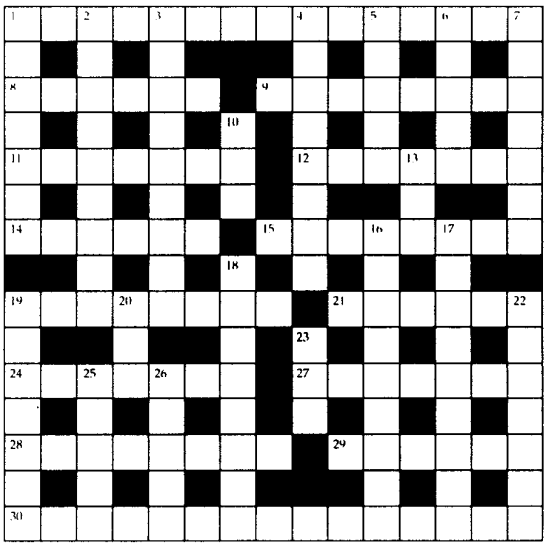
Using Pat Leggatt's suggestion of C=2000pF and assuming f=8KHz, R=2000 ohms would suggest that the modulation depth should be less than about 83%.

Reply from Pat Leggatt:
Mr Christian makes an interesting comment and quite rightly draws attention to the unfortunate consequences of too low a ratio of AC to DC loads on a diode detector. However the main purpose of this paragraph of my brief article was to clarify some of the more eccentric 1920s explanations of the shunt condenser, without too much technical detail. In any case is not my simple analogy with a reservoir condenser just one way of explaining the increase in detection efficiency?

I use 'condenser' rather than 'capacitor' since the former was the commonly accepted term in the decade to which my article relates.

Wireless Crossword No.5

Here's an attempt at a crossword using a few "wireless words" of which there really aren't enough in our vocabulary. Readers who think they can do better are invited to contribute their efforts. (This one comes from Geoffrey



Clues Across:
1. R.F. shunt baps pay (acrostic) (anag.) (2-4,9)
8. Tone colour the French stamp. (6)
9. Sounds like the seaside resort for cheer. (8)
11. Disturbed? Enter L.A. for ever! (7)
12. Ejection as the tilting doesn't start. (7)
14. A sort of doodle, or Atwater Kent. (6)
15. Man stood over early form of Jumbo. (8)
19. Conservative laid out before procrastinating. (8)
21. When there is a "R" in the subject it gives some latitude. (6)
24. Look! Porcelain! (Apparently). (7)
27. I interrupt the song and I finish the wine. (7)
28. Tut! I deal wrong height. (8)
29. Incorrect P.E., aunt, increases the risk. (4-2)
30. Chassis shaker makes the picture. (5,10)

Clues Down:
1. Form of assault that gives one power. (7)
2. Flower that went underground in Paris. (9)
3. If tight, enter; just ring, enter! (9)
4. Owned by relative gangster. (8)
5. A hundred times:- hold the animals! (5)
6. Everybody together now! (5)
7. His discovery was rated "X". (7)
10. Work diligently to fold a layer of rock. (3)
13. Implement has its end broken off, as well. (3)
16. Lo, rations become twisted. (9)
17. Pen tended to become relative, when upset. (9)
18. Army groups raid, begs assistance. (8)
19. Sad tiff upsets wool holder! (7)
20. Member's weapon. (3)
22. Ship that can make the waves square! (7)
23. This one is the top. (3)
25. Another minor actor. (5)
26. Cut down thistle to get fibre. (5)

Answers to crossword:-

Across: 1 By-pass capacitor. 8 Timbre, 9 Brighten, 11 Eternal, 12 Ousting, 14 Yankee, 15 Mastodon, 19 Dilatory, 21 Tropic, 24 Seeming, 27 Chianti, 28 Altitude, 29 Ante-up, 30 Frame Oscillator.

Down: 1 Battery, 2 Pimpernel, 3 Stringent, 4 Personal, 5 Cages, 6 Tutti, 7 Rontgen, 10 Ply, 13 Too, 16 Torsional, 17 Dependent, 18 Briagades, 19 Distaff, 20 Arm, 22 Clipper, 23 Ace, 25 Extra, 26 Isle.

A rare photograph of a studio which existed only for a short period in the 60 years of history of BBC Broadcasting House: the "Listening and viewing hall, Studio BB" as it was in March 1933, about seven months after the BBC began television broadcasting there. Two "Lookers-In" (they were not called "viewers" then) can be seen in the plush "Art Deco" suite, monitoring a programme on a 30-line mirror drum receiver. The image on the screen is a familiar one – the singer Jane Carr, taken off-screen but in this picture may have been added by a piece of photographic trickery, so as to appear to be on the screen of the Televisor.