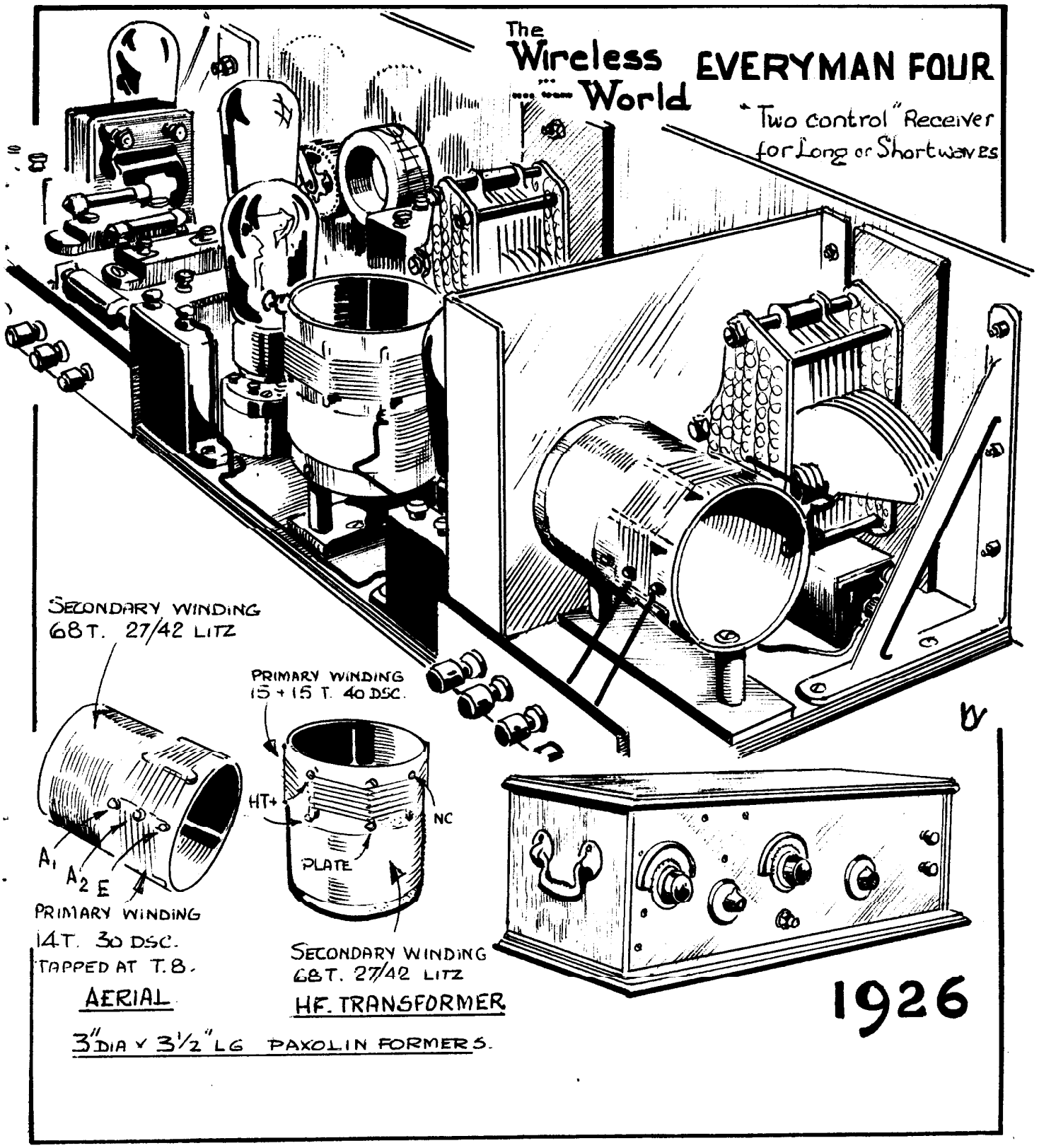
BRITISH VINTAGE WIRELESS SOCIETY



Bulletin Vol.4 No.1 June 1979

THE BRITISH VINTAGE WIRELESS SOCIETY

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DEADLINE FOR NEXT ISSUE: 20th AUGUST ..... Material of all sorts needed.

CONTENTS OF THIS ISSUE:

FRONT COVER ILLUSTRATION The Everyman Four first introduced in 1926 has become a classic of wireless set design. It has been very thouroughly dealt with by Ian Higginbottom in his article on page 4.

BRITISH VINTAGE WIRELESS SOCIETY

Volume 4 Number 1 BULLETIN June 1979

EDITORIAL

B.V.W.S. meetings are always pleasant affairs and the recent one at Harpenden (See page 5) was no exception. Members of the Society are now getting to know one another very well and meetings are becoming rather like 're-unions'. Trading is always very brisk at the meetings but there is little evidence of excessive commercial activity. The Harpenden Hall has now been used twice and looks like becoming a regular haunt. Any really practical suggestions (coupled with offers of real help from local members) of venues for future meetings would be greatly appreciated. Send suggestions to: Roger Rayment, 22, Grosvenor Rd., St.Albans, Herts or Tel: 56 50736.

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Restoration is a recurring theme in these editorials. Judging from the high quality of restoration work seen at the recent A.G.M., I believe B.V.W.S. members are acquiring extremely high standards and basing their ideas firmly on the notion of preservation before renovation. Of course, it is frequently necessary to indulge in very heavy restoration work because of the 'junk' condition in which collectors frequently find equipment. It is also necessary to manufacture missing parts when there is no other way of obtaining them. However, while it is acceptable to occasionally manufacture items on a more or less 'one-off' basis, it is questionable whether it is ever acceptable to manufacture reproduction components on a production basis - whether or not it is for commercial gain. Poorly manufactured articles are always objectionable but in other collecting fields this is not at all uncommon. In particular, I have seen some very badly made phonograph parts. So, if a reproduction part is indistinguishable from the original, is it then alright to encourage manufacture? Well, it is my view that, even then, we as a Society should not encourage such manufacture. My reasons for this view stem from a feeling that such items can only cause confusion in later generations of collectors. However, when some unavailable component is in considerable demand and would obviously be better produced if it were professionally manufactured then a way has to be found. I suggest that, if ever such a reproduction run is contemplated, individual items should be clearly stamped in some out of the way place with the initials B.V.W.S. This would label the item indelibly as a reproduction and so prevent to some extent one of the most insidious aspects of the reproduction 'trade', namely that such articles can be offered as genuine. Your ideas on this aspect of reproduction would be welcome ... please write to the Bulletin no matter what your views. It would be good to have some debate on this subject ... or, are we by any chance in total agreement??

.....

The Bulletin is still being produced on an ancient typewriter and then printed by the off-set litho method. If you have any views or practical suggestions on alternative methods please write and let me know. A properly printed Bulletin is still far too expensive for the size of our Society. However, it might help if it were produced on a typewriter with a more modern type face but really good typewriters are also very expensive..... unless some B.V.W.S. member knows otherwise! Failing all else, should we start a 'typewriter fund'? Your views please. Further thoughts on this subject will be found in the next Bulletin .... but please write to me on any aspect of Bulletin production, being, of course, as practical as possible.

.....

THE EVERYMAN FOUR

By Ian Higginbottom

The Wireless World 'Golden Jubilee' issue of April 1961 contains a year-by-year review of wireless progress since 1911, and nominates the Everyman Four as the 'event' of 1926. This was a receiver of outstanding performance designed by W. James for the home constructor. Although the design was published by Wireless World, independent authorities agree on its importance - e.g. W.T.O'Dea in the Science Museum Handbook on Radio Communication (1934) (See BVWS Bulletin Vol. 2. No.1 page 13 for review) and Ferranti Ltd., in 'The True Road to Radio' (1931) (See page 14 of this Bulletin for a review of this book).

What then did the Everyman Four achieve, and how? It was virtually the first receiver to obtain really effective high frequency amplification from a single neutralised RF stage, using coils of exceptional efficiency designed for a specific type of high gain triode. The input signal could be amplified about 40 times without using regeneration, that is to say, with the valve perfectly neutralised. In practice, however, the set was operated with the neutralising condenser off-balance. A useful degree of inherent reaction could then be obtained, without the RF stage breaking into oscillation at any point in the broadcast band, and this greatly increased the 'pure' RF gain. It is probable that the effective amplification was at least equal to that given by some early screen-grid circuits.

The circuit in its original form, as described in the Wireless World issues of 28, July and 4, August 1926, is shown in Fig. 1. No separate reaction circuit was used and the set could be operated by the two tuning controls only, an important simplification at a time when tuning a receiver with an RF stage could still involve the simultaneous control of reaction, aerial coupling, and perhaps aerial inductance into the bargain. Actually, two further controls were fitted, both filament rheostats. One operated on the detector and LF stages together, while the other controlled the RF valve and served to reduce gain when later stages became overloaded, a common occurrence.

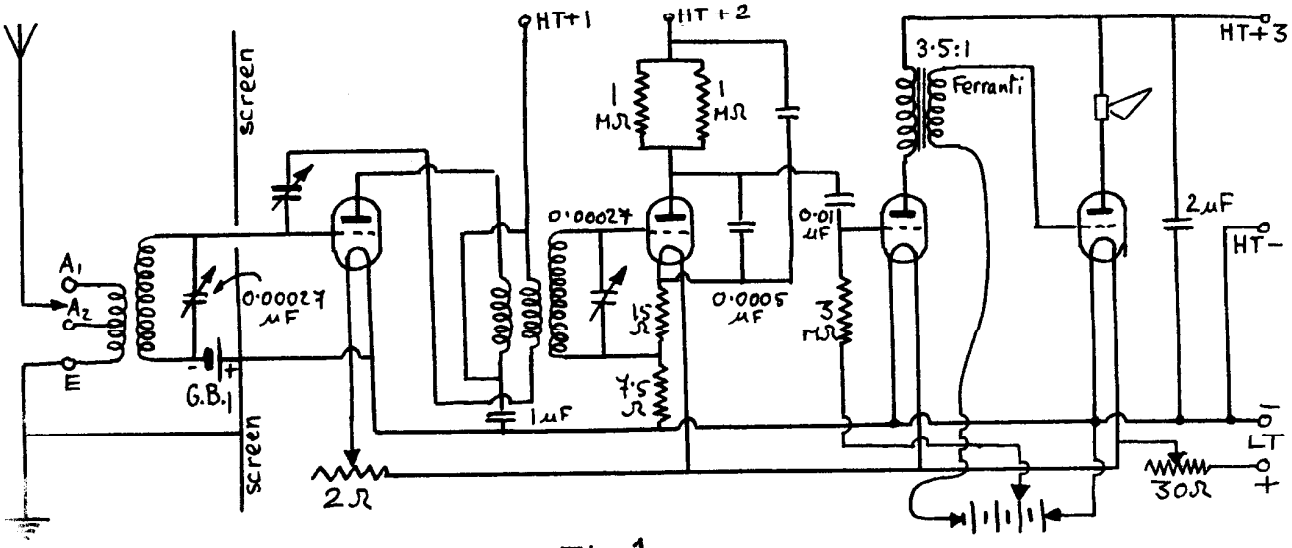


Fig.1

Because any grid current would 'load' the coils and reduce the RF voltage developed, the grid of the first stage was permanently biased to -1.5 volts by a separate grid cell. For the same reason leaky grid rectification was not acceptable and the detector was therefore worked as an anode bend rectifier. In the original version the valve line-up was DE5b, SP18 green spot, DE5b and DE5. The SP18 was of course a 1.6volt type and the necessary bias of about -3v was tapped off from a point on the 22.5 ohm dropping resistor in the negative filament return. The SP18 did not pass grid current until the grid reached a positive potential of about 1.5v, so a peak signal voltage approaching 4.5v could be accommodated. When worked as an anode bend detector, this valve had an impedance of about 150,000 ohms, so that RC coupling to the first stage had to be used.

At the heart of the receiver were the special aerial coil and HF transformer (Fig. 2.) These derived from the classic work of S. Butterworth (see footnote) who introduced the low-loss form of design using secondary windings of litzendraht wire on formers of relatively large diameter. The Everyman Four coils were wound to a fairly high inductance (about 280 microhenries) and tuned with rather low capacity condensers of 0.00027 mfd to keep the ratio of inductance to capacity in the circuit as high as practicable and so maximising the signal voltage developed across the secondaries. Capacitative coupling between primary and secondary is undesirable and was minimised by the use of fine wire for the primaries. The HF transformer was designed to the characteristics of the DE5b, which was taken to have an average amplification factor of 18 and an impedance of 21,000 ohms at an anode voltage of 156v. This rather high HT voltage was recommended, mainly to improve the ability of the output stage for handling the relatively high signal voltages which could be developed.

In its first form, the Everyman Four could be used on the medium waveband only. It was realised that effeciency would be compromised by the use of range switching, and in any case long-wave litz-wound coils would have been bulky and expensive. However, the demand for Daventry (then on 1600 metres) soon brought about a somewhat unsubtle modification in which a plug-in loading coil of standard two-pin type, with shorting switch, was inserted in series with the HF transformer secondary - on the side remote from the grid. This expedient enabled the set to be used as a 'detector and 2LF' on long waves, the entire RF stage being switched out (by the separate rheostat) and the aerial connected to the junction of loading coil and secondary. Perhaps this emasculating surgery was acceptable with an outdoor aerial, so long as only Deventry was wanted: After all, this transmitter put out 25kw in 1926 compared with the 3kw of 2LO, itself twice as powerful as any other 'local' ! At the same time, the detector biasing arrangements were modified to enable the new 6-volt RC type valves, such as PM5B or 610RC, to be used in this stage. The detector grid return included an additional grid battery (making a total of three!) and was taken to a variable potentiometer across the LT supply, since the optimum bias for anode bend detection with these valves was rather critical. My own set is of this type and certainly supports the reputation for sensitivity which the Everyman Four acquired. Radio 1, 2, 3 and LBC are receivable at loudspeaker strength in West London without aerial or earth - or rather with the 3 inch diameter coils acting as frame aerial. The valve line-up used is PM5X, PM5B, PM5X and PM6.

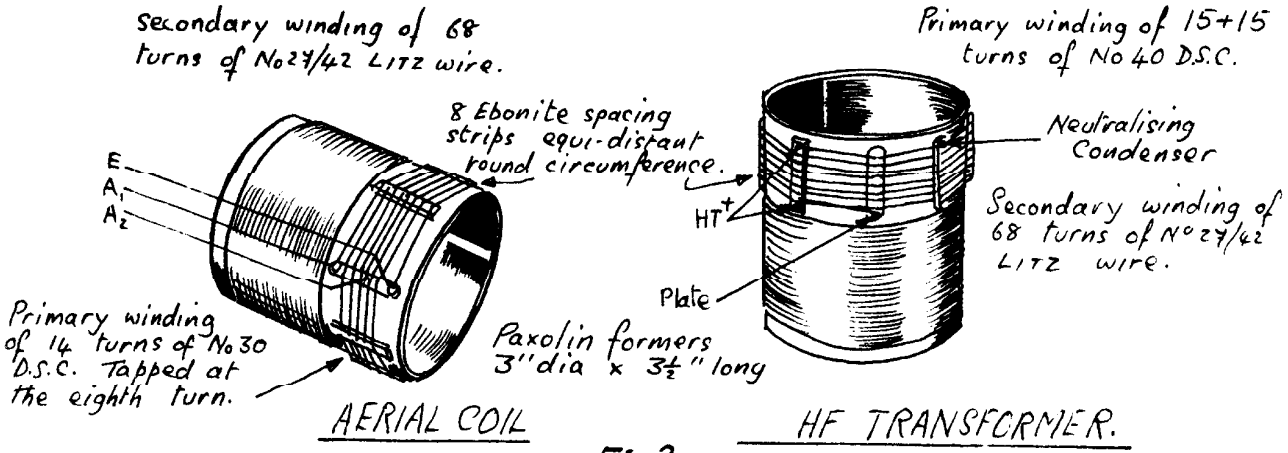


Fig 2.

The influence of this remarkable design is traceable for several years through the pages of Wireless World, as various developments, mostly aimed at providing alternative waveband coverage, succeeded each other. Taking the basic features of the coil design and four-valve configuration as the common link, one may list them as:
The All-Wave Four (April 1927), The Standard Four (November 1927),
The Two Range Four (September 1928), The Selection Four (January 1928),
The New All-Wave Four (June 1928), and, finally, the 1930 Everyman Four which, alas, sports a screen-grid stage and so becomes a barely legitimate descendant! A thorough search of the technical press of the period would probably disclose as many again. There was also a precursor of a kind, in that basically similar HF transformers were

used. This was the Long-Range Three-Valve Set of May-June 1926. But somehow, none of the many variants seemed to achieve the elegance, and perhaps the efficiency, of the original Everyman design.

Footnote: S. Butterworth wrote a first class series of articles (four in number) entitled 'Effective Resistance of Inductance Coils at Radio Frequency' which appeared in 'Experimental Wireless & The Wireless Engineer' over the period April to August 1926. The articles are well composed and are very factual and scientific in nature. They stem from work done at the Admiralty Research Laboratory, Teddington and include all the necessary data upon which designers of the period could base their calculations. Other articles by Butterworth and by Sowerby during the same period in the same journal emphasise the seriousness with which this subject was being treated at the time. This journal makes a refreshing change from the rather 'hammy' stuff so frequently encountered during the twenties in the popular wireless press. Editor.

MAJOR EDWIN HOWARD ARMSTRONG

Major Armstrong died 25 years ago and left behind him a wake of inventions without parallel in the history of radio. In addition to his usual Trans-Atlantic letter, Dave Brodie writes the following notes on this remarkable man:

It would seem appropriate at this time that we recognise the 25th anniversary of the death of this brilliant inventor who gave us the vital circuits which are used in virtually all radio apparatus to this day. After years of successful effort in his laboratory, but constantly interrupted by costly litigation in the courts, he deemed himself a failure and calmly dressed himself immaculately before stepping out of the window of his 13th floor apartment in New York on 1st February 1954. In 1967, 13 years after his death and 17 years after the last of his patents had expired, Armstrong's legal claims were finally settled and he was vindicated. Such was the tragic end of the man who gave us the regenerative feedback circuit for amplification, the super-regenerative circuit, the superheterodyne circuit we find so common today and his final achievement, the practical development of frequency modulation.

A condensed account of Armstrong's contributions and of his legal battles against monstrous odds is to be found in the February 1979 issue of the New Scientist (Vol. 81, No. 1140, Feb. 1st 1979, pages 306-309) and was written by Adrian Hope (consultant on audio/video to the New Scientist).

For those of you who are more deeply interested in the history of the development of radio try: 'Man of High Fidelity' by Lawrence Lessing (Lippincot, Philadelphia, 1956. Or, Bantam, N.Y., 1969). This is a comprehensive account of Armstrong and in the Bantam edition runs to 272 pages.... at a cost of $1.00 in the U.S.

RESTORING BROWN WRINKLE PANELS

Owners of the Cossor Melody Maker who are unfortunate enough to have acquired a set with rusted panels will frequently be tempted to try to get that original wrinkle look with various 'do-it-yourself' recipes. The end result in most cases is unsatisfactory and surely most collectors would prefer to pay for the real thing if it can be done. Well, Sidney Watkins has been making various enquiries in the Southampton area and is now confident he has found just the right firm for this sort of work. However, in order to make the job reasonably economical it will be necessary to work simultaneously on several panels. Panels will be very professionally prepared by sand-blasting and the painted panel will be properly stoved. So, if at least twelve people can submit Melody Maker (or other, such as Music Magnet) panels, it should be possible to do them for about £3 each. If you are in any way interested please contact Sidney Watkins, 21, Bridge Road, Parkgate, Southampton, Hants. Tel: 048-95-2091

THE THIRD B.V.W.S. ANNUAL GENERAL MEETING

HARPENDEN, JUNE 3rd 1979

This year's A.G.M. was held in the large Hall at Harpenden where we had the first Winter Wireless Swap last November. By 11.00 a.m. collectors were arriving with their cars loaded to the gunwales and trading got briskly under way very shortly afterwards. There is no doubt that combining a swap with the A.G.M. makes the occasion very popular and and makes the meeting a very lively affair. However, we had gathered together for the purpose of conducting a business meeting and I will now attempt to describe briefly what happened for the benifit of those who were unable to attend.

Jon Hill, the membership secretary, reminded us that many members have not renewed their subscriptions on time - so please, if you are one of them, don't hesitate, send in your renewal subscription immediately.

Ian Higginbottom, the treasurer, produced his statement of accounts for the period 1st April 1978 - 31st March 1979 and a copy is included with this Bulletin. Members will see from these accounts that it costs all of their subscription to run the Society in the way it is now being run, hence, once again, the need for prompt payment of renewals. One big item in the expenditure side of the accounts is the postage (including envelopes and other sundries) and it can be seen that this is a sizeable proportion of the subscription income.

I, as chairman, referred to the main events of the year and announced to the meeting how our Society has come to acquire a large share in the Brookman's Park transmitters which have now been dismantled. The transmitters, vintage wireless enthusiasts will recall, were installed in 1929 and then constituted the first twin wave-length high-power station in the world. The transmitters were finally discontinued from stand-by duty a little over a year ago and certain parts have been stripped down into identifiable components, labelled and offerred to the B.V.W.S. for a nominal sum. The intention is to distribute these items (coils, condensers, valves etc etc) throughout the membership which collectively constitutes the most appropriate 'museum' for the purpose .... a very active, working museum if I may say so, in contrast with the dull, static, glass-cased mausoleum which the professional museum sometimes has a tendency to become. The most equitable way of distribution will be to have a draw for the parts which will be allotted numbers for the purpose. The details of this draw are now being worked out and we hope to have the whole matter organised in time for our next Bulletin. A nominal charge of £1 will be made for a draw ticket in order to cover the costs of transport, storage and other administration expenses. For both practical reasons and perhaps nostalgic reasons it is felt that these components should be distributed only to members resident in Britain. Many of them are altogether too large to be mailed and will eventually have to be collected by the new owners. All members present at the A.G.M. indicated that they would enjoy owning a part from these historic transmitters and it is assumed therefore that this would also apply to other members who were unable to attend. At least one of our younger members seemed overjoyed at the prospect and I got the impression that the bigger the component the better he would like it! .... The transmitting masts will <u>not</u> be available! The power supply also (Four 300-HP diesel engines, 220 volt DC generators and a 2000 amp-hour battery) is not involved!

Elections were held and the only change is that David Read now becomes Chairman. After three years of being Chairman of our Society I felt it was high time to step down from this very privileged position and thank the members of the Society for giving me their support throughout these years. My very best wishes to David and I trust his term of office will be at least as enjoyable as mine was.

Dave Brodie, our Committee's North American Representative, was unable to attend this meeting but one of our new members from California, George Durfey, stood in for him. He made his presence felt from a couple of days before the meeting until well after most people had headed for home. George's presence loomed large (sic!) throughout the day and his flashing camera was in nearly as much evidence as his sparkling (though sometimes positively misleading) wit.

As usual, there were some marvelous pieces of equipment on show and, in particular, we are grateful to Rupert Loftus Brigham for taking great pains to demonstrate to

us one of the very few commercial receivers to use the first screen-grid valve, the S625. His G.E.C. 'World Wide S.G.4' set sported two such H.F. stages followed by an anode bend detector and a power output stage which uses the P625. I commend Rupert's bravery for having his S625 filaments glowing brightly throughout the day. His magnificent American made frame aerial and Gecophone Standard Cone Loudspeaker rounded off a very fine 'working model' display. Other displays were in evidence and David Read's brightly lit bright emitters also caught the attention of many admirers. Basil Van der Syde's Marconi Scientific Unit Set (Now Dennis Yates' we understand) constituted perhaps the most unique item on display. Another rare item which changed handsduring the day was the two valve (or should one say five valve?) Loewe set. This unusual receiver uses the Loewe 2HF (which constitutes two tetrodes in one envelope with interconnecting components) ... and also the Loewe 3NF which has three triodes plus interconnecting components in one tube. The simple Loewe set which uses the 3NF alone was described in the very first Bulletin (Vol. 1. No. 1. page 3).

Judging by the restoration work done by BVWS members on some of the displayed sets, the standard of excellence is becoming very high indeed. A most outstanding example of high quality restoration work was seen in Steve Sidaway's G.E.C. Compact All Electric Three (1931) which he had found in extremely poor condition. It was necessary to strip down to base material and this was then treated to a professional finishing job and the whole effect was quite remarkable. There were other examples of good restoration work emphasising the seriousness with which collectors take this task.

There were about 65 members at the meeting and, as usual they were well looked after for refreshments by Jill Rayment and Margaret Snelling who have again demonstrated a catering expertise par excellence. Thank you both very much.

Dennis Yates volunteered to look into the matter of producing ties, badges or tie-pins with the new BVWS insignia. The meeting was anxious that the new symbol be used in this way and further announcements will be made when the information is available. The symbol (see p.10) was chosen by members attending the Winter Wireless Swap and the designer was David Robinson, the son of Mr W.G. Robinson of Boxmoor, Herts.

During the meeting Mr. Robinson suggested that we might try holding equipment auctions at subsequent meetings. He has offered to act as coordinator for an auction at our next winter meeting. So, if any members wish to offer sets or components etc for auction, will they please send a description to Mr Robinson together with a reserve price. If the response is good, a list will be published in the September Bulletin so that members will have as much information as possible before coming to the meeting. No equipment will be auctioned without prior announcement in the September Bulletin .... so send details NOW to Mr W.G.Robinson, Copper Beech Close, Box Lane, Boxmoor, Herts, or Tel: 0442 50287.

A.R.Constable

THE STORY OF PYE WIRELESS

This month's Bulletin does not include one of the usual short company histories because we are taking the opportunity of distributing a copy of the recently published 'Story of Pye Wireless'. This booklet has been published by Pye Ltd. at the initiative of the managing director Mr. John O'Neil and it was written by B.V.W.S. member Gordon Bussey. I am sure B.V.W.S. members will enjoy this account of one of Britain's leading wireless manufacturers. It is well written and well illustrated and provides the historian of wireless with a unique opportunity of having a large amount of factual material clearly presented to him. There is a foreward by Harold J.Pye, the son of the founder, W.G.Pye. It was Harold who designed the well known 700 series of early Pye sets.

The distribution of 'The Story of Pye Wireless' with this Bulletin has been very kindly arranged for us by Gordon Bussey and Pye Ltd. The Pye Company invite any interested party to write for further copies to: PYE LTD., Public Relations Dept., 137, Ditton Walk, Cambridge. They will be supplied free of charge.

Pye Ltd. are to be congratulated for producing a booklet of this sort and it is hoped that other companies will follow their example.

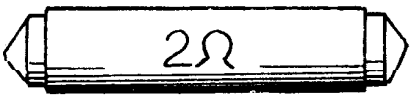
Editor.

REPAIR OF MARCONI-STERLING GRID LEAKS

By Philip Beckley

Quite a few members will have sets made by Marconi or Sterling which use resistors of the tubular clip-in pattern (Fig. 1.).

The early variety were solidly made and employ an ebonite tube and solid brass end plugs. The passing of some half century or so seems to make most of these resistors go high, in many cases very high.



NOTE: THE CAPITAL 'Ω' MEANT MEGOHMS AND THE LOWER CASE 'ω' MEANT OHMS

Fig 1

The effect in the case of a cumulative grid detector is horrible, when a one megohm leak has gone to five+ megohms.

When used as discharge leaks for aerial series capacitors, gain control resistors in parallel with L.F. intervalve transformer secondaries, carborundum feed resistors and the like the effects are not so dire but at least unhelpful.

How to repair them?

Firmly grasping an end plug with (padded) pliers enables it to be pull-twisted out revealing inside apparently nothing but empty space! The ohmic value appears to have been arrived at by a conductive coating on the inside of the tube. At first sight it would seem sufficient to solder a small modern resistor of the right value to the end caps - job done. But beware, the end caps still contact the conductive coating so unless a resistor is chosen which, in parallel with the existing (probably high) leak, gives the correct result, all will not be well. And even so, a reliable modern component doing the whole job is the better bet on noise and stability.

My solution is to open out the hole at one end just sufficiently to allow an insulating sleeve to be fitted over the end plug for the full length of the plug. Then the new fitted resistor does all the work. Suggested procedure (see Fig. 2.):

1) Dismantle.
2) Tin inner face of plugs.
3) Solder ristor to one end plug.
4) Drill or ream one end hole oversize.
5) Solder 5amp fuse wire to other end plug.
6) Fit sleeve to plug in 5 (when cool).
7) Solder free end of resistor to fuse wire & sleeve it with loose sleeving.
8) Fit end plug with resistor on it.
9) Cut fuse wire just outside end of tube.
10) Put adhesive on insulating sleeve.
11) Solder two fuse wires together and press home second end plug.

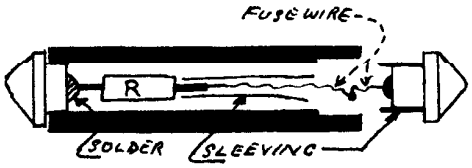


Fig 2

Repairing the eight reistors in a Marconiphone V3 is a lengthy task, but the improvement in performance pays handsome dividends.

NEW MEMBERS: Brazil, Rob't, 31 Blackheath Pk, S.E.3 9RW Tel: 01 852 1130
Brewster, Rich'd 454 Diablo Drive,Pittsburgh PA, 15241 USA Tl: 412 833 4287
Corby,Pat. 23b Blackheath Pk., SE3 9RW Tel: 01 852 5012
Creasey, Anthony A. 25 Mornington Ave., Ipswich, Suffolk. Tel: Ipswich 43923
Dighera, Larry G. PO Box 12100, Santa Ana, CA 92712 USA Tel: 714 842 6348
Groom, Paul S. 2/22 Allambee Ave., Camberwell, 3124, Australia. Tel: 03 8367805
Marcovitch, Allen J. 184, Alton Ave., Toronto, Ont Canada. M4L 2M5 Tel: 416 461 1959
Stephenson, Alan. West Lea, Smithy Brow, Ambleside, Cumbria LA22 9AS
Vangstrup, John H., Jaegersborgvej 2, 9520 Skoerping, Denmark. Tel: 08 39 14 58
Ward, Fred C., 5, Uplands Ave., Littleover, Derby. DE3 7GE. Tel: 0332 21931
Western, John A. 'Brockfield' Cricketers Lane, Warfield, Berks. Tel: 034 47 3844
Wilson, John. 5, Lyndhurst Rd., Holland-on-Sea, Essex. C015 5HT Tel: 0255 813627
CHANGE OF ADDRESS: Mike Kemp is now at 10, Rue Babie, 92190 Meudon, Paris, France
Tel: (010 33 1) 534 39 72.

VINTAGE WIRELESS REGISTER

It was decided two years ago, at our first A.G.M., to establish a register of vintage wireless sets owned by members of BVWS. At the time, we requested members to let us have lists of their equipment (pre-1929) with details of model numbers, trade names and other descriptive details. Many members responded ... but certain key members didn't ... and still haven't ... but they promise to do so shortly ... don't they?

Last year Mike Field gathered together all the information so far available and now informs me that he has established a filing system from which he is able to extract all sorts of information about who owns what.

The purpose behind the establishment of the Vintage Wireless Register is to enable members to locate other members with similar equipment when restoring or otherwise working on receivers for which no manufacturer's manuals are available. The way in which it was originally intended that the system should work was as follows:

a) You have a set about which you have a query.
b) Send details of the receiver to Mike Field. Address below.
c) Mike will then forward the information to members with similar equipment.
d) The member thus contacted will then get in touch with you and exchange information. But, of course, if the contacted member doesn't wish to be 'involved' he should notify Mike Field immediately.

This method was 'dreampt up' to avoid the feeling that some members had that the information on the register would be available to all and sundry. Thus our register is confidential and should present no objections to those collectors who wish to exercise a certain amount of discretion concerning the contents of their much prized museums.

So now. Mike tells me he is sitting on a pile of useful information simply waiting for people to make use of it. So why not give it a try:

Write to Mr. D.M.Field, 116, Tanhouse Lane, Malvern Links, Worcs. (Tel: 08863 2107)

There is another aspect to the Vintage Wireless Register which, in the fullness of time, may well become quite important. Ownership of any valuable objects always presents 'responsibility' problems viz: To insure or not to insure; How to identify to everybody's satisfaction that a certain recovered stolen item is really yours; Evaluations for purposes of insurance, bankruptcy, executors etc etc. It seems that a well established register might well become of great importance in these matters.

So please, send your details to Mike Field <u>and</u> update from time to time.

INSURANCE COVER

Philip Beckley kindley undertook the task of looking further into the matter of insurance of the increasingly valuable items in your collections. In the first instance, he contacted Royal Insurance who have provided preliminary information on the subject. It appears that, for the Insurance Trade to do a special 'deal' for BVWS they would want 1000+ members ... so that is off for the time being.

Most people will find no difficulty in negotiating extensions to their domestic home contents insurance, having made sure that the sum is adequate and noting the 5% rule (...if one item exceeds more than 5% of the total Contents Sum Insured in value, this item must be separately listed...). Insuring in this way, no valuations are required. It would always be advisable to take photographs to enable easy settlement in the event of a claim. If you wish to have cover for taking items to exhibitions and for accidental damage inflicted at home, an 'All Risks' policy would be required....but this is expensive....maybe better to be careful.

Members are advised to keep good records of what they own and to keep a careful note of unique identification marks etc. Also, if your equipment is adequately recorded on the Vintage Wireless Register, you may find it very helpful in the event of some unfortunate occurrence when both your hardware and your records are damaged (say) by fire. It is probable that the BVWS Committee could provide evaluations where necessary or in the event of a dispute between a member and his insurers.

Of course, it is hoped that there will never be a need for these precautions ... but in this best of all possible world's there exists a chance, small but finite, that somewhere, sometime, something nasty could happen.

To end on a happy note. An acquaintance of mine who owned one single vintage radio set had his house burgled. The burglers took a lot of valuable furniture and small items including the old radio set (of 1927 vintage). The dismayed owner gave all the details to the police and included a description of the quaint old radio set. The burglers, who turned out to be a well organised gang, 'off-loaded' the 'stuff' very quickly but the receivers didn't particularly want a junky old radio set. During a visit by the police, in connection with quite a different matter, one of the 'men in blue' spotted the radio set and his good memory did the rest. So the thieves were taken to task by what might be termed a 'vintage electronic trap'....

If any member has further suggestions, information or advice on matters of insurance in connection with their collection would they please write to Philip Beckley, Church Farm House, Bettws Hill, Bettws, Newport, Gwent. (Tel: 0633-213906).

NEW ZEALAND - THE EARLY DAYS.

These notes were sent to us by BVWS member Arthur Williams of Invercargill, N.Z. and much of the information was taken from the N.Z. Radio Times of 1st April 1932.

Wellington's First Transmitting Station. In 1922, Mr Charles E. Forrest set up the first transmitting station in Wellington, N.Z. This was a very crude affair, using a single 'double ender' valve with its plate connected directly to the A.C. mains supply! Despite causing a terrible ripple and buzz, this arrangement worked well. The outfit was installed at the top of a building in Courtenay Place and, despite not having the required 1st class Wireless Operator's License (which dealt only with spark transmission, and Forrest didn't want anything to do with that!) he went ahead and began broadcasting recorded music.

He then imported a couple of transmitting sets from America and without bothering (or even knowing) about wavelength tuning, he commenced regular concert programmes. However, he was soon caught red-handed when Mr Gibbs, the Chief Post and Telegraph Engineer, and another inspector burst in on him with his gramophone parked next to the microphone and playing away merrily. The authorities had been tracking him down for some time as the music had been interfering with other official broadcasting in the area.

But the officials were not as annoyed as they might have been and showed considerable interest in his broadcasting equipment. Through them, Mr Forrest was able to obtain a special license to broadcast his concerts on a regular basis. As well as records he used 'live' singers to add variety and had the habit of leaving the microphone on after a song had finished to try to capture some interesting anecdotes. The Wellington Station remained in operation until about 1924 whereupon Mr. Forrest left for Australia where he established the firm of 'International Radio'.

Ultimate Radio, N.Z. The New Zealand radio industry developed more or less along the same lines as it did in Britain with a natural progression from the crystal sets and battery operated valve receivers of the early 1920's to the mains operated sets of the late '20's and 1930's. In the 1920's about half of all radio sets were home constructed. Among the first companies manufacturing commercial radios was a firm called 'Ultimate Radio' which manufactured their first set, a two valver, in the mid-1920's. New Zealand's Radio Engineers were said to rank with the world's most competent men, a situation brought about to some extent by their geographical isolation and the consequent opportunities they had to experiment on reception from distant stations under good conditions. Some of the best of these engineers worked for Ultimate Radio and the Ultimate receiver became permanently established in New Zealand in 1928 when the firm introduced the first all-wave 5-valve model. About 600 of these were sold in 1928 and a console model was introduced in the following year which had sales figures in the region of 800. By 1930, when superhets were first used in N.Z., the Ultimate model 856 Senior Console receiver was released at the price of £69. 10s. About 1000 of these were sold. By 1932 the company moved into larger premises capable of producing 15,000 receivers annually. After the second world war the company became Ultimate-Ekco and this is now part of the Pye group of companies.

B.V.W.S. EMBLEM

The Society's new emblem was designed by David Robinson (Son of B.V.W.S. member Mr W.G.Robinson) and will gradually come into use as the distinctive symbol of our Society.

At present, Dennis Yates of Nottingham is looking into the question of having ties, tie-pins and lapel badges made and it is hoped to have further information available for the next Bulletin.

The design was chosen at last winter's Harpenden meeting from the several designs submitted.

THE SEARCH FOR A TOP-FIP BRIGHT EMITTER

PART IV

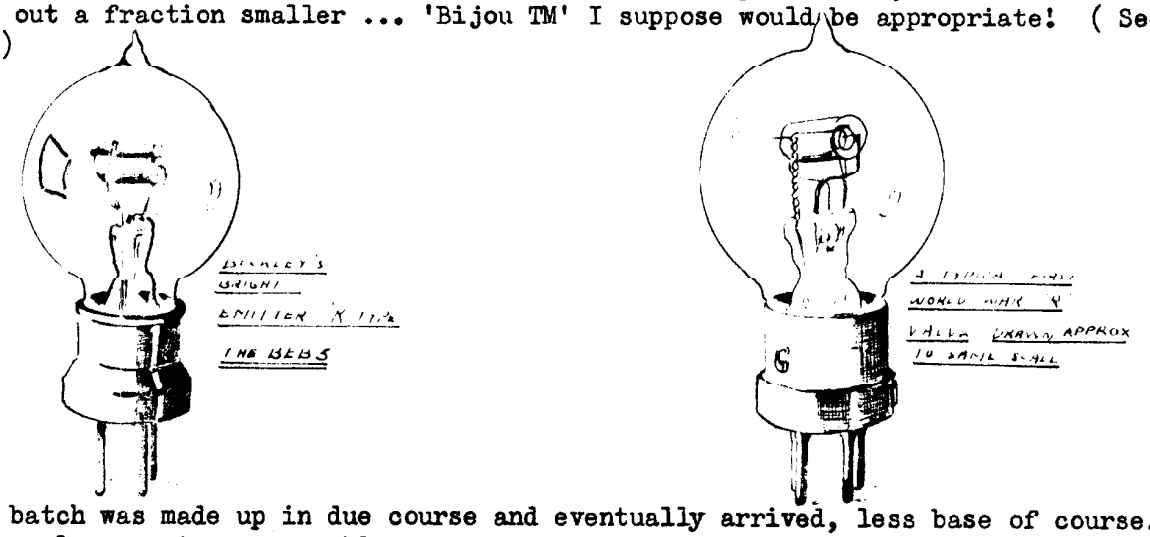
By Philip Beckley

Quite by chance a contact was made in America with an establishment which, among other items, produced reproduction vintage motor car lamp bulbs and a few types of early radio tubes.

No, the 'R' or French TM had not been produced by them and what specification would I like? First stop was Rupert Stanley's book (See BVWS Bulletin Vol.1 No. 4, page 13, March 1977) which gives considerable detail of the 'French' valve and based on this a specification of anode, grid, filament and spacings were drawn up.

It was necessary to fend off offers of gettering and thoriation of the filaments. Such restraint no doubt appeared as a manifestation of the English madness since copious low temperature emission saves so much effort. Although I have used American UV200 and UV201 tubes with tungsten filaments, the dull emitter seemed to take hold earlier in the U.S.A.

Although I wished to reproduce the exact French 'TM' shape of bulb, convenience made it come out a fraction smaller ... 'Bijou TM' I suppose would be appropriate! (See diagram)



A trial batch was made up in due course and eventually arrived, less base of course. This new valve required a freshly designed base, and a protracted search of the central heating fittings catalogues yielded union which, with a little lathe work, provided a suitable copper base shell. Builders merchants always asked, "What is it for?", and I always replied, "To fit a special valve", which they assumed no doubt to be hydraulic.

The shells were nickel plated (not bright please ... a silk-matt finish followed by aging on a windowsillin an industrial town - remember how sulphur attacks nickel!) Again ebonite base discs and custom turned pins were used. Making up these base shells and their pins and discs, fitting and soldering them all adds up to a very long,very slow job. Combine this work with the cost of manufacture of a tube, air freight, import duty, V.A.T. etc and you will see that to fit out your multi-valve set is no light,inexpensive task.

Looking back, it must be much cheaper and easier to wait for genuine R's to turn up in your friendly West Country Emporium I suppose - but not nearly so much fun!

You will have guessed, of course, that I did not refrain from determining the characteristics of the valve before making up a base etc. Happily they came out very like an R or TM. Briefly stated, this amounted to:

Filament: 2.5 - 3.0 volts 1.0 amps. V_A 20 - 100 volts.

$\mu = 11$ $R_a = 40\ k\Omega$ $g_m = 0.3$ ma/V

(at $V_a = 80$ volts, $V_g = -1.5$ volts, Fil: 3.0 volts)

The filament power amounted to some 3 watts, compared with about 2.8 watts for an

'R' valve. The lower filament volts related to the available gauge of tungsten.

The valve oscillated well and a pair of them gave good results in a Marconi V2 they fitted tidily and it was possible to use the original rheostat. A four volt accumulator was appropriate for filament lighting. The appropriate filament voltage was determined from trial plots of emission/temperature and comparisons with 'R' valves. By now the quality control manager's eye was more useful than £1000 worth of pyrometer to judge the correct temperature. How grand to be able to assign an operating voltage rather than look it up in (say) Harmsworth!

Not every member of a batch was found to have exactly the same characteristics; one may be perceptably better as a detector etc. Dear me, does that not sound like a quote from a 1920's magazine!

It's no good having valves without type numbers so this latest member had to be christened the BEB3. By some oversight the base shell department forgot to stamp the new number on the base before plating and mounting the bulbs. No amount of bravado could bring me to use metal stamping dies after fitting the bulbs, so this type will have to have paper labels round the base. Alas the printers bill and hundreds of spare copies of the label.

Experience with BEB6 (See part III of this series) had whetted the appetite for loud speaker power valves. Why not something like an LS3 (Look it up if you can't reel off its vital statistics from memory)? It would team up nicely with the BEB3 and go in an NB2 Marconi L.F. amplifier (See Harmsworth) which could be driven from the V2 set.

Part V tells how to get from TM to LS3.

SOUNDS VINTAGE

'Sounds Vintage' came into existence early this year and certainly did so with great professional flair. The printing and photographic reproduction is high quality. The layout and art work show a sound adherence to the principles of good traditional magazine format....and the quality of the paper puts this new magazine firmly into the ranks of the well produced 'glossy'.

From the point of view of the wireless collector, the contents of the magazine have so far provided a few interesting morsels. The broad aim of 'Sounds Vintage' is perhaps very adequately achieved and there is a strong probability that it will continue to have a very wide appeal....when all said and done, a vast number of people have a strong nostalgic interest in the sounds of yesteryear. By and large, so far (Numbers 1 and 2) the vintage wireless content has obviously not been designed to appeal to the vintage wireless enthusiast - but rather to inform the reader with no knowledge of the subject. This, of course, is a very commendable approach and will hopefully be instrumental in introducing potential wireless enthusiasts to the subject. To mention some of the wireless subjects so far dealt with, the article by W.G.Rumbold in the first issue entitled 'Those Were the Days' was really a very good account of the early years, and the unauthored article in the same issue on the Marconiphone V2 was somewhat 'thin' but a good introduction for the novice. In the second issue, there is a pleasant article by George Jessop on 'Early Valves' which is attractively illustrated with some of the more common vintage specimens. The ITT Story, also in the second issue, was written by Norman Stevens (one of the editors) and is a very informative account of the complicated interactions of several companies. The magazine is copiously illustrated with vintage advertisements and photographic material. Its main emphasis is more strongly leaning towards the phonograph world than the world of vintage radio and at £5.80 for an annual subscription for six issues is good value. The address to write to is: Sounds Vintage Subscription Dept., 28, Chestwood Close, Billericay, Essex, U.K. The editors, Norman Stevens and Colin Riches are to be congratulated on a very noble and professional effort.

A.R.C.

TRANS-ATLANTIC LETTER

From Dave Brodie.

On May 5th 1979 the annual Western Regional Meeting of the Antique Wireless Association and the co-sponsoring California Historical Radio Society was held at the Foothill Electronics Museum which, as you may recall from my previous letter, is located about 40 miles south of San Francisco. The total attendance of 130 was considerably less than originally expected. However, in view of the critical shortage of petrol together with an unseasonal rainfall, the attendance was quite good. The equipment contest attracted 33 entries in eight classifications, namely: A.C. sets, valve transmitters, superhets, wireless equipment, crystal sets, T.R.F. sets, regenerative sets, and home-built equipment. A beautiful Metro T.R.F. receiver with matching speaker won best of the show. After a morning of swap or sell (curbed by heavy dew) and luncheon at the college cafeteria, we enjoyed a slide/audio presentation by A.W.A. and B.V.W.S. member Bruce Kelley which depicted a day at the 1978 A.W.A. conference in Canandaigua, New York. This show was followed by an informative discussion of the origin and development of the Hallicrafters Company which was presented by W.I.Orr (W6SAI) who is one of the leading amateurs in the U.S. and is a prolific writer of articles for our various 'ham' magazines. Fortunately he shares our interest in the early days of radio and has written a number of authoritative articles on the subject.

Valve collectors interested in U.S. valves may like to know of the small but informative booklets sold by Puett Electronics, P.O.Box 28572, Dallas, Texas, 75228, U.S.A. In particular note the following:
Booklet number 4 "When was that old tube made?" $2.00
Booklet number 5 "Antique radio tube substitution"..... $2.00
Booklet number 11 "Cross reference list of military vs commercial tube types" .. $1.00

The Vintage Radio Company has been publishing a series of books covering various aspects of the subject for a number of years. These books are available in the U.K. through Bampton Books & others. I am in close contact with the owner of the company, Morgan E. McMahon, who is the editor of the series. I have just been advised that, due to the pressure of his other interests, Mr. McMahon will dissolve the company on July 31st of this year - unless he finds someone interested in continuing the business. The company now has a limited stock of the final printing of the following titles: Vintage Radio (1887-1929). A Flick of the Switch (1930-1950). Most Often Needed 1926-1938 Diagrams. 1921-1932 Radio Collector's Guide.

I have been asked to provide information on sets produced during the 20's and 30's by U.S. manufacturers. Needless to say, space does not permit a listing of the thousands of models marketed during the period. However, I shall be most happy to attempt to furnish circuit diagrams etc of specific sets upon receipt of inquiries. Meanwhile, I provide below a partial list of receivers made by R.C.A. during 1922, 1923 and 1924 as listed in the above mentioned Radio Collector's Guide. The column headings D, T and P signify number of dials, number of tubes and power supply though it is necessary to see the book to get full information from the columns.

MANUFACTURER	YEAR	MODEL NO. & NAME	PRICE	STYLE	D	T	P	CIR & STAGES
R C A VICTOR CORP. OF AMERICA (Radio Corporation of America)	1922	Aeriola Jr.	25.00	Box	1		-	C - - -
		Aeriola Amp	68.00	Box	-	2	B	AA
		Aeriola Sr.	65.00	Box	1	1	B	Reg. - - - -
		AR 1300	50.00	T	2	-	-	C - - - -
		Aeriola Grand	350.00	CT	1	4	B	Reg. - - - 2*
		Radiola Concert	40.00	MT	1	-	-	C - - - -
	1923	RE Ant. Tuner	↑	T	1	-		PT
		AR R. F. Amp	(225.00	T	-	3	B	RF
		RA Reg. Tuner	Comb.)	T	1	-	-	PT
		DA Det-Amp	↓	T	-	3	B	DAA
		Radiola Special	30.00	MT	1	1	B	Reg. - - - -
		RC (RA,DA Comb.)	142.50	T	1	3	B	Reg. DAA - - - 2
		Radiola Sr.	65.00	Box	1	1	B	Reg. - - - -
		" AC AA-1520	80.00	2 Box		5	S	RFDAA 2 - - 2
		" Grand	350.00	CT	1	4	B	Reg. DAA - 1 - 2*
		RS	87.50	T		2	B	DA Reg. - - - 1
		Radiola I	25.00	Box	1	-	-	C - - - -
		" II	97.50	Por	2	2	B	Reg. DA - - - 1
		" IV	275.00	CT	3	3	B	DAA - - - 2
		" V	142.50	2 MT	2	3	B	Reg. DAA - - - 2
		" VI	162.50	2 MT		6	S	RF 3 - - 2
		" VIIB,IX	245.00	CT	2	5	B	Reg. TRF - 2 - 2
	1924	III	35.00	Box	1	2	B	Reg. DA - - - 1
		III Amp	30.00	Box	-	2	B	A - - - 1*
		IIIA	65.00	Box	1	4	B	Reg. DAA - - - 2*
		VIII Super	425.00	C	2	6	B	SH - 1 2 2
		X	245.00	CT	2	4	B	TRF Reg. - 1 - 2*

RCA was first set up to prevent British controlled Marconi from taking over the U.S. market. In its earlier years RCA sold sets made by General Electric, Westinghouse and Wireless Specialty Apparatus Co.

CAUTION: The Victor Division and RCA Victor Corp. of America used similar type numbers for different sets. For instance, Victor R-32 is not the same set as Radiola 32.

Models VIII, Superheterodyne, 24, 25, 26, 28, 30, and 32 use the impregnable "Catacomb" structure and a complex circuit. Get help before attempting repairs.

FROM THE EDITOR'S BOOKSHELF

The True Road to Radio, by Albert Hall, published by Ferranti Ltd., 1931 (3rd ed) 243pp

When ordering a very expensive piece of equipment recently, I was assured by the manufacturers that it was the most advanced 'state of the art' equipment on the market. The use of modern expressions when describing equipment, books or ideas from a bygone age always sounds anachronistic. But, in the case of this Ferranti book, the expression 'state of the art' most accurately describes its contents. Starting at a deceptively simple level, the author discusses carrier waves, modulation, overmodulation, side-bands and neutralisation. He then goes on to discuss the merits of the Everyman Four receiver (See Ian Higginbottom's article on the Everyman Four in this issue of the Bulletin) and then goes into good detail on the subject of RF amplification generally. Methods of rectification are dealt with and and the square law and perfect linear rectifier are discussed with some mathematical details. Various ways of correcting interference from cross talk between stations are discussed and one definitely gets the impression that there is an underlying aim throughout this work - to achieve as near to perfection as possible in selectivity and sound quality. It may seem an obvious aim for a manufacturer of radio sets but, judging from the very indifferent performance of many receivers of this period it is an aim which seems to have escaped the attention of many manufacturers. Several Ferranti receivers and components are illustrated in the various editions of this book and several useful circuits are presented to illustrate the subject matter. The output stage of a radio set is described in considerable detail and the modern reader will find little to fault in the very technical approach taken by the author...output transformers and speakers are properly included in this section.

When manufacturers publish a book as a public relations venture, the authorship is (or used to be) frequently obscure and, no matter how factual the contents, the aim of the book is usually quite clear - to promote the firm's products. In the case of 'The True Road to Radio' the contents are of sufficient merit to stand alone and it is a pity the publishers didn't tell us more explicitly who the author was. However, I am assured by our Ferranti expert (Jim Foster) that the writer of the preface, a Mr Albert Hall, is the author of the book .... despite his 'third person' references to the author. The various editions of this book that I have seen do not differ much in content but the earlier editions of about 1927 have not yet been seen by any B.V.W.S. member so far contacted. The collector should value which ever edition he is fortunate enough to acquire as a fine account of the late 1920's 'state of the art'. A.R.C.

Wireless by P.J.Risdon; Ward, Lock & Co., Ltd. About 1924. 384pp.

The dedicated wireless collector spends a lot of his time browsing in old book shops in the hope of finding some of those old classic works without which his library will be incomplete. In the course of his hunting, all sorts of miscellaneous wireless books are acquired - most of which were churned out in the 1920's and 30's to fill the large demand for popular works on the subject for birthday and Christmas presents. Of all these popular books, many of which were written for young boys, the one by Risdon bearing the simple title 'Wireless' is perhaps the most desirable. The content of the book is, like so many other popular books of the period, not very inspiring. But this book has 44 splendid photgraphs and is well worth collecting for this reason alone. One of the photographs (facing page 176) shows the switchboard at 2LO. The collector will recognise a fine example of a T.M.C. loudspeaker on the right-hand side and a row of two valve Western Electric amplifiers on the wall. It has always intrigued me to note that the amplifiers each have only one valve instead of two in place. Does anybody know the reason why this is so? This may sound like digression - but it is not intended to be. So much of our information comes through pictures that a collection of good ones is an important aim of the serious wireless collector. Contemporary pictures are not easy to find and many books of this type were really very poorly illustrated. The content of the book is no better and no worse than many other popular books of the period - many of which were authored by famous names. I do not know who the author (P.J. Risdon, F.R.S.A.) was - but the introduction is by J.A.Fleming who commends the author for his clear exposition of abstruse scientific matters and then goes on to give a very creditable account of the early history of wireless telegraphy. Definitely for its pictures, and perhaps a little for its content, this book is worth having.

A.R.C.

EXCHANGE

SEARCHING Circuit or manual for Hunts CR bridge model CRB3 and Rogers-Majestic radio model 12/7 (English make from the label on the set but could be American). Also, Manuals for Marconi VVM model TF1040B. Source of moulded track ganged pots - various values. Philip Taylor. 14, Willow Walk, Canewdon, Rochford, Essex. Tel: 03706 598.

Drive unit for Marconi 11¼" dia Horn spkr 0.875" dia socket. John Hudson, 44, Knightthorpe Court, Burns Rd., Loughborough, Leics. Tel: 0905-63171 ext 5080 (day).

Information wanted to aid restoration of Siemens set type CV1746 PMG reg No. 0107 Specifically: What was the original valve type and details required of original valve mounting sufficient to construct replica. All correspondence answered. Paul S. Groom, 2/22 Allambee Ave., Camberwell 3124, Australia. Tel 03-836-7805.

Any pre-1930 receiver in restorable condition to start collection. I have some UX-type American valves. R.A.Stevenson. Geldeston Hall, Beccles, Suffolk. Tel: Beccles 713220

Searching for old microphones and pieces of same, preferably in poor or non-working condition rather than museum pieces, but anything considered. Small cash offers, or could swop tatty but readable Hawkhead & Dowsett, or possibly I have other items you want. Desmond Thackeray, 7, Beech Close, Byfleet, Surrey, KT14 7PS. Tel: Byfleet 41023.

Wanted: Early Marconi/G.E.C./Pye mains sets (pre-1934). British 4pin/7pin valve range. Early service data. An original 'columbia' set in any condition. Will exchange any quantity of items in disposal ad (below) for single items wanted. G.A.Horrox, 65, Greenwood Rd., Crowthorne, Berks. Tel: 03446-3758.

Have a Kenmac (The Listener by E.R.Fone) crystal set which needs parts. Will purchase a 'Basket Case'* set or pay for good close-up photos to aid reconstruction.. Dave Brodie, 315, Cotton Street, Menlo Park, Cal. USA 94025.

Valves wanted: Mullard 'Weco', D3 and ORA.....Cossor WR2 and point-one .....Radion 'Pyramid' and DE.06.....Osram KL1 and KH1. Equipment wanted: Marconiphone type 21, 31, 41, or 81 receiver and B202 wavemeter; Townsend wavemeter. Also case for B.T.H. type 'C' crystal set. A.P.Carter, Trellis Cottage, Shalford, Nr Guildford, Surrey, Tel: 0483-504213.

Valves wanted: Marconi D.E.R., ... Cossor 215P, 220P, 230XP, 220PT, 220HPT, 210DET. ....B.T.H., B4, B6.....MOV, HL2K, VS24K, PT2K. Service data req'd for Marconi model 55 5-triode battery portable and valves for same: HL210(2), DEH 210, DEL210, DEP215. Also req'd 'Ormond' 4" slow motion dial (silver) c 1927 any condition so long as complete. Also 'Indigraph' 4" dial. Also: Clarkes Atlas mains unit model AC188, good order. Norman Richardson, 2, Edna Rd., Maidstone, Kent, ME 14 2QJ.

Double crystal holder for B.T.H. crystal A receiver. Front flare of Burndept horn horn type 750. Also req'd world war II german aircraft radios. Will exchange duplicated crystal sets. Also wanted, *german flying bomb radio equipment.* Bob Warner, 45, Eastry Close, Ashford, Kent, TN23 2RS. Tel: Ashford 36185.

Wanted: Igranic plug-in coil(s) for medium wave (de Forest pat 141344). Also req'd: Circuit for Gecophone model RG 2860 (Ser No. 1374) c.1926. The present valve line-up is 2 L610, DEH610, HL610, DEP 610, P625A .... are these original? Would appreciate data and advice. A.E.Hopwood, The Close, Holdfast, Upton-on-Severn, Tel: 06846-2134.

Wanted: headphone panel for right hand side of Marconiphone V2 receiver. E.J.Fear, 15, Lyefield Road West, Charlton Kings, Cheltenham, Glos. Tel: Cheltenham 24186.

* 'Basket Case' appears to mean a 'throw-away' condition. It is doubtful that a Kenmac could ever be like this ... and in any case we would have another word for it!

DISPOSAL. Approximately 150 post war radios (1946-55) for disposal. Come and take your pick. Maximum price £5. Gerald Wells, 23, Rosendale Rd., London, SE21. Tel: 01-670-3667.

Valves - mains and battery types new and used for trade. Norman Richardson, 2, Edna Rd., Maidstone, Kent, ME14 2QJ.

Osram valves, MR4, DET2. Hallicrafters S-27 receiver in exchange for requirements in my searching ad above. Marconi CR-200 receiver - must go! Pilot 6-wave-band set type U-106 in poor condition ... free if collected. A.P.Carter, Trellis Cottage, Shalford, Nr. Guildford, Surrey. Tel: 0483-504213.

AVO Model 8 Mk 2 Multirange meter. Wireless World 1940-1950. Practical Wireless 1950's. Lots of Octal base second-hand valves. Pair 38 Mk 2 (walkie talkie) complete with mikes etc. A number of post-war sets working and not working. Late forties Decca projection TV - original, complete, no woodworm or rot - cabinet needs polishing. G.A.Horrox, 65, Greenwood Rd., Crowthorne, Berks. Tel: 03446-3758.

Atwater Kent No.10 Breadboard. Goltone Crystal set and life-size bust of Marconi (1920's vintage.) Will trade only .... for Marconiphone or Gecophone sets. A.R.Nolf, 7, Cambrian Way, Ewloe, N. Wales, CH53RE. Tel: Hawarden 534-329.

Miscellaneous mains sets 1935-50 ... complete but unserviced. Huge Bush SUG55 console circa 1949 (about 45 watts output) working. John Hudson, 44, Knightthorpe Court, Burns Rd., Loughborough, Leics. Tel: 0905-63171 ext 5080 (day).

Avo 25 kV multimeter type ETM, as new, boxed. Avo resistance range extension unit for model 7 multimeter. Good condition. Philip Taylor, 14 Willow Wk., Canewdon, Rochford, Essex, Tel: 03706 598.

His Master's Voice 1951... original valves. immaculate working condition with service manual. Will sell, exchange or straight swop for right items. M.J.Smith, 15, Newgate Close, Hanworth, Middlesex. Tel: 01-898-9100.

American radios (1920 -1940's). Send self addressed envelope and two I.R.C's for list. Happy to assist members in locating U.S. equipment. Larry G. Dighera, P.O.Box 12100, Santa Ana, CA 92712, U.S.A. (Tel: 714, 842-6348).