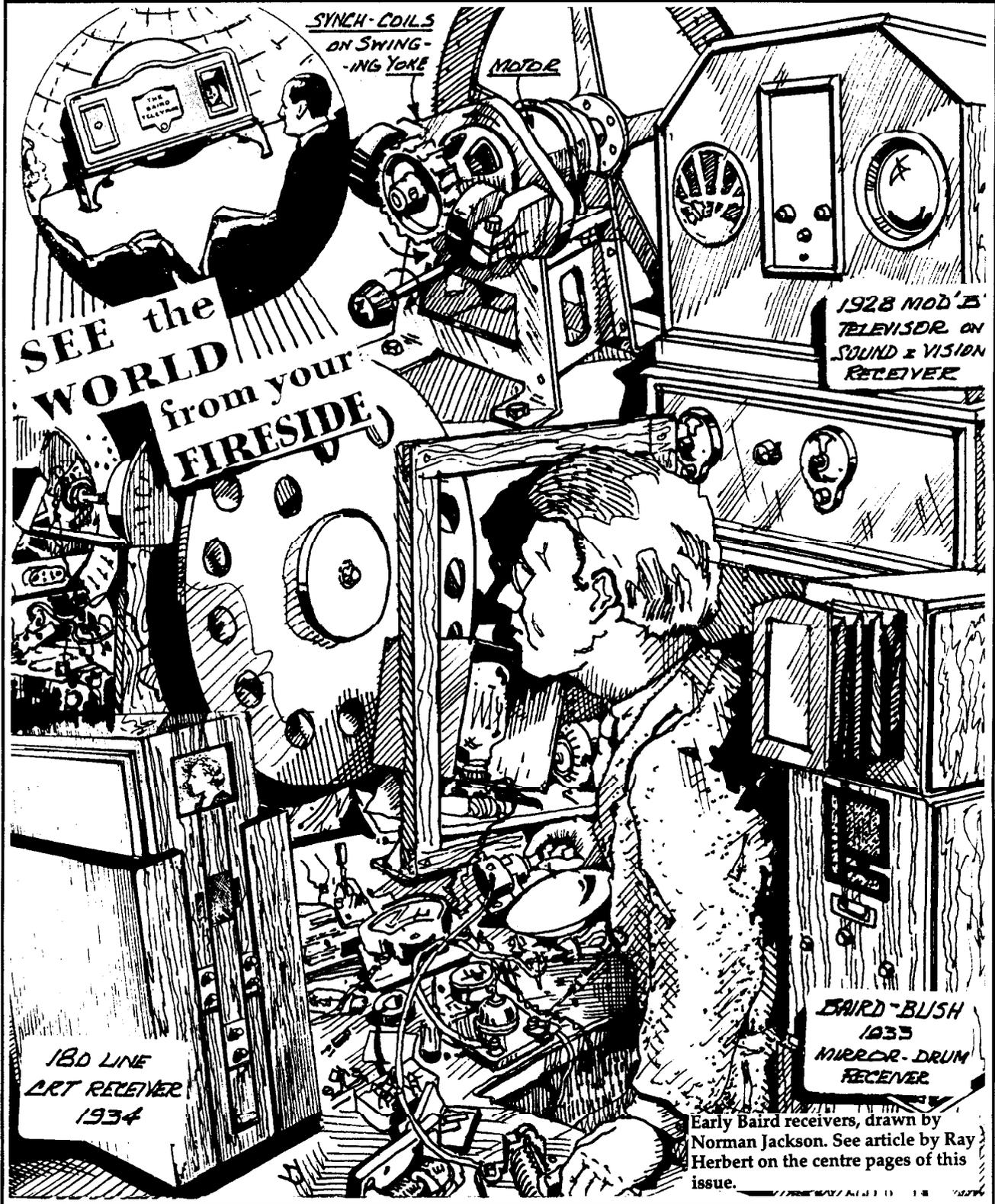


BULLETIN OF THE BRITISH

VINTAGE WIRELESS

SOCIETY



Early Baird receivers, drawn by Norman Jackson. See article by Ray Herbert on the centre pages of this issue.

**BULLETIN OF THE BRITISH
VINTAGE WIRELESS SOCIETY
VOLUME 15. No. 4**

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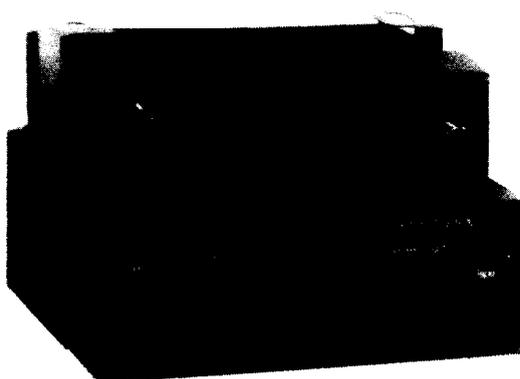
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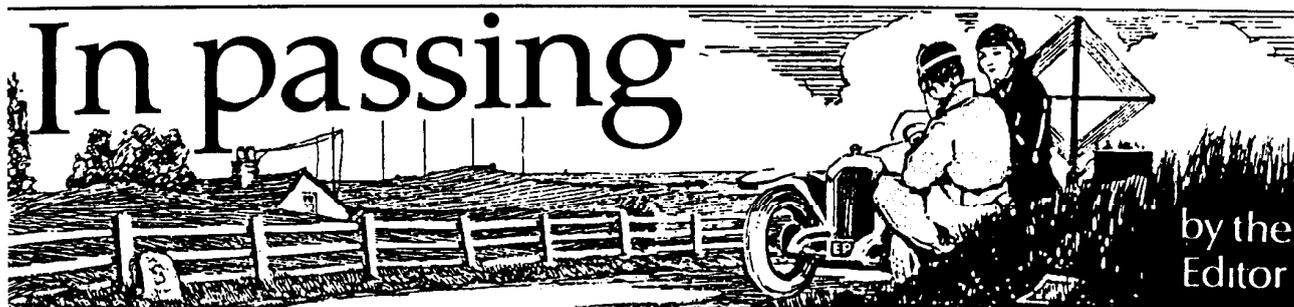
Prop. Stephen Ostler
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RADIOCRAFT

**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.

Welcome

We welcome our new chairman Geoffrey Dixon-Nuttall, a long-standing member whose flair for writing articles which are both informative and entertaining is already well known to members, as is his cheery personality and fund of knowledge.

The Editor would like to be among the many who would like to thank our outgoing chairman Pat Leggatt for his three years of good work for the Society, being personally indebted to him for his splendid articles in the Bulletin and his editorial assistance ranging from technical support to proof reading, which has saved me from many a blunder. One should mention too, the excellent International meeting and seminar he organised for us and the public-relations activities which have not only helped to fuse together the many interests among members but have also helped give the Society a distinguished and increasingly respected profile. We must be grateful too, that Pat has agreed to continue to help with the kind of donkey-work, that is vital to the ordinary running of an ever growing organisation but for which volunteers are extremely hard to come by.

Readers will, of course, have spotted that a near-anagram for "Pat Leggatt" is "Apt Taglet", which, as any wireless wag will know, is a most suitable little connection for a Live Wire with which one hopes to have permanent good contact.

New venture

As an experiment, we are organising an event at Harpenden on 31st March which differs from our usual "Swapmeet" there. It is a two-in-one event. In the large hall, we shall be running an auction of vintage wireless equipment to which anyone can contribute and in the small hall there will be a "Bring-and-Buy" sale of vintage valves, data, books and magazines. Invitation will be by ticket only, to be obtained from the Organiser in advance. If it is successful, we hope to

run similar events in the future, having auctions and different themes for the "Bring-and-Buy" section.

Members should note that there will be no stalls in the main hall, but simply a limited number in the small hall, issued on a first-come-first-served basis and with the condition that goods offered must only be on the stated theme (valves and literature) and must not include "general" vintage-wireless goods. The small hall, will as usual, also be used as a social and refreshment area where members can take their breakfast, lunch and afternoon tea (the canteen will be open all day). Entrance charge will be £2 for all, except those requesting stallspace, which will be charged at £5 per person (up to three members may be asked to

share a stall if demand is heavy. The main hall will be reserved for the auction, which will not be restricted to the "Valves and Books" theme but can include any wireless and related items. The event will open at 10am and the auction will begin at about 1pm and is expected to end by late afternoon. Anyone may bring items for the auction, either to be sold on their own account or as welcome donations to Society funds. Goods must be registered with the auctioneer's clerk and will be given a lot number, to be sold at 10 percent commission to funds. Reserve prices may be put on lots but if these are not reached the lot will be returned to the seller with a charge of 5 percent of the reserve price for handling. There will be no Buyers' premium.

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© BVWS

Baird Exhibition

The Julia Logie Baird travelling exhibition "Jam, Socks and Television" which began in Scotland, will be at Hastings Art Gallery and Museum throughout February (closing March 2nd.) It provides the largest display of early television material ever presented, and a considerable amount of public interest has been generated. More than 110,000 people have visited the exhibition during its run so far. It will travel to Southampton University in May and June.

Reminder

Members are reminded that all subscriptions now fall due on 1st January, irrespective of original dates of joining and that if not renewed, this is the last Bulletin that will be sent to 1990 members. Membership is necessary to attend all Society events. Subscriptions have been pegged for some time but have had to be increased by £3 this time. Remittances for UK (£15), Europe (£17) and Worldwide (£20) should be sent to the Treasurer, Alan P. Carter, Lime Tree Cottage, Loxhill, Hascombe, Godalming, Surrey GU8 4BO. Telephone enquiries: 048632 535.

continued on next page

In Passing news and comment, continued

News from Ireland

Dublin has "Cultural Capital" status in 1991 and BVWS member Paddy Clark, promotions officer for Radio Telefis Eireann, Dublin, hopes to organise a special vintage wireless event to mark the occasion. Some time ago, Pat set up a small museum at the RTE but due to accommodation difficulties it has been stored away. Some of it may be brought out for exhibition again soon. We wish his venture success.

Congratulations

Congratulation to Editor Chas. Miller and his team on the sixth year of publication of the magazine "Radiophile", which was marked with a splendid "vintage" colour cover. Anyone interested in repair and restoration of sets, particularly of the Thirties period, may subscribe by writing to Chas. at "Larkhill", Newport Road, Woodseaves, Stafford ST20 ONP.

Vintage programmes

Readers who are interested in vintage wireless programmes as well as receivers may be interested to hear that there is an "Old Time Radio-Show Collectors' Association", run by Barry and Marilyn Hill, of 4 Prospect Terrace, Farsley, Leeds LS28 5ES, to whom you can send an SAE for an information sheet. In it's 5th year, "ORCA" issues newsletters and has a library of some 800 tapes of vintage shows.

Letters

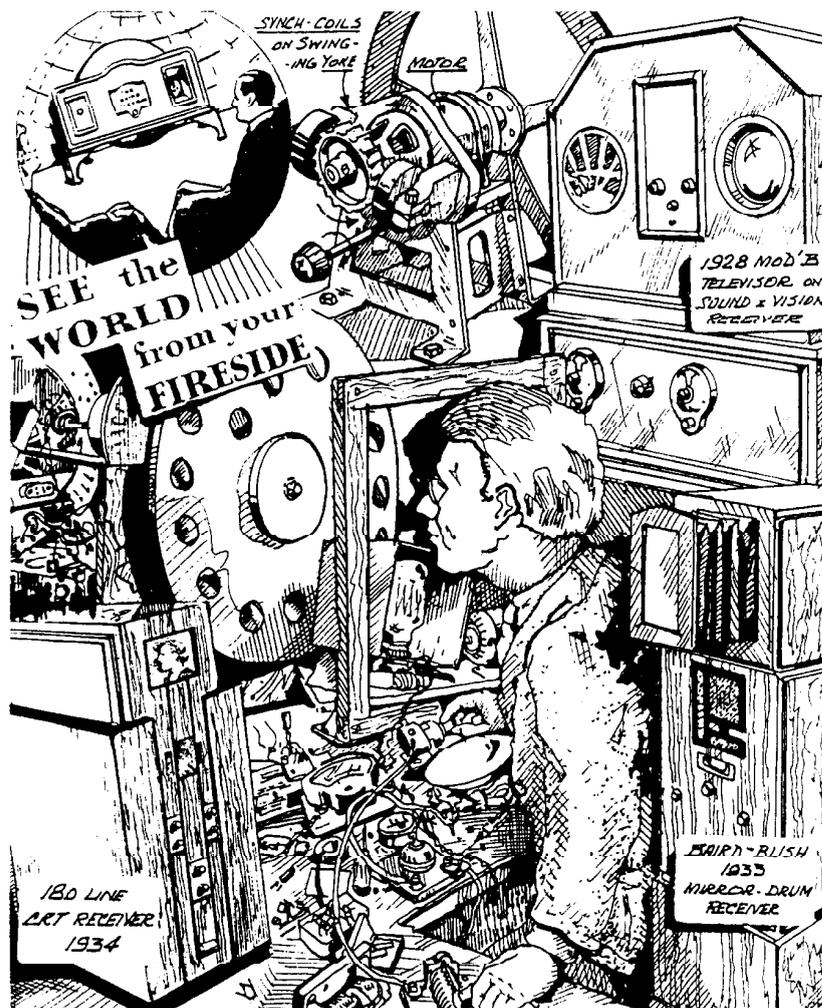
Feedback is always welcome. Letters should be sent to the Editor at 63, Manor Road, London N17 0JH.

Jenkins' book

The famous 1925 book "Vision by Radio" has been reprinted as a paperback and will soon be available from Camden Book Services, 13 High Street, Rode, Near Bath, Somerset BA3 6NZ.

Bright Sparks

George Jessop C6JP has written an entertaining and informative book about the work of early amateurs called "The Bright Sparks of Wireless". It is available in hardback £10.85 including post, from RSGB Sales, Lamda House, Cranbourne Road, Potters Bar, EN6 3JE.



Cover Story: Norman Jackson's drawing on the front cover is a montage of early Baird receivers including the prototype "tin box" (top), the 1928 model B (top right), the Baird-Bush mirror-drum set of 1933 below it, and the 180-line CRT model of 1934 (bottom left). Three of these receivers will be on show at Hastings Museum throughout February. See Ray Herbert's article in the centre pages of this issue.

From retiring Chairman Pat Leggatt: A welcome to our new Chairman:

Some of you will have heard that at the October A.G.M. I announced my withdrawal as Chairman and that Geoffrey Dixon-Nuttall was elected in my place. I think it is a healthy thing for any Society to have a change of face and style every so often; and on this account I had not planned to remain as Chairman for more than four years. In the event I am stepping aside after three years because I have recently become a District Councillor and there could be a risk of this diluting the attention I could give to our Society affairs. I am remaining on the Committee and will of course continue to serve BVWS interests as best I can. May I thank all members, and the Committee in particular for the friendly co-operation which made my spell as Chairman so enjoyable.

We are fortunate in having Geoffrey as our new Chairman. He is well known to many of us, both personally and through his expert writings on vintage wireless subjects; and there is no doubt that his enthusiasm, energy and agreeable personality will serve the Society well. He has an impeccable background in what is now the respected lone survivor of the British radio industry, having joined Roberts Radio in 1948 and served as Production Director from 1960 until his retirement. On behalf of us all, may I bid him welcome and offer our good wishes.

You will no doubt have noticed that the letters of Geoffrey's full name when re-arranged spell out "Far, until next old Fogey": this I think must be a good omen for a long and successful reign!

The home-constructed transmitter of 70 years ago

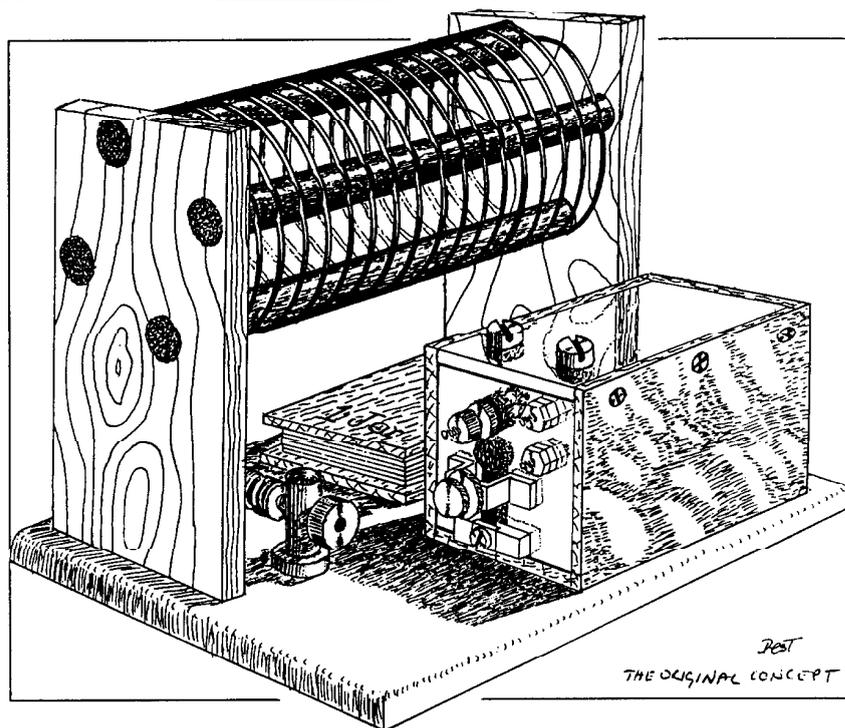
by Desmond Thackeray

Seventy years ago the wireless experimenter was looking forward to resuming licensed operation or, in the case of many younger enthusiasts, making a start on the hobby after experiencing wireless operations in World War 1.

Not all of them would be spending big money on novelties like valves; but the available money could be eked out by careful purchases of surplus military equipment supplemented by home construction wherever possible. Examples of such home construction are uncommon, such was the tendency to strip and re-use parts, modify this and that in an upgrading process, or just to throw away items made useless by changes in licence regulations. One such was the spark transmitter, which was progressively outlawed from the mid-20's onwards, surviving examples of which are almost all professional equipment, and much of that the military transmitters of World War 1. What does remain however of amateur activity in hardware is documentation, articles in magazines about how to construct "instruments" as the early wireless gear was vaguely entitled, and descriptions in catalogues of the components they could have purchased.

Updating from 1913:

Reprinted in the HRSA Newsletter for July 1989 is an article which originally appeared in the "Model Engineer & Electrician" of 1913 in which H. Hildersley describes "My Wireless Station". Though a photograph contains components which rather resemble what he might perhaps have bought from Gamage's wireless department, Mr Hildersley's text describes the erection of his aerial, the winding of a transmitting coil, and the tuning operations, aided by buzzer and wavemeter. Circuits are given for receivers and transmitter; and only a little vagueness in matters of theory indicates the author's limitations. The contents of this article would still have been appropriate in 1920, when the wireless amateur could still have constructed his own transmitting coil,



erected his aerial, and tuned the completed system in a similar fashion. However, he would probably have bought a war-surplus spark coil at least, and maybe other components, even if he was building no more than the most primitive transmitter with single "oscillation coil".

World War 1:

Such a transmitter had its limitations, most notably in spreading its radiated power over a substantial band of wavelengths. Nevertheless the one-coil design was used to some purpose in aircraft transmitters during World War 1, where its implementation was in the form of a spiral of copper strip rather than the solenoid that Mr. Hildersley had in mind. While it would obviously be interesting to restore one of these primitive aircraft transmitters to original electrical condition and study its behaviour using a resonant artificial load, the peak power produced could well be unwelcome to any solid state equipment nearby, and that includes pocket calculators, wrist-watches, telephones and even lighting dimmer switches. In principle of course the neighbours might also object. But in the modern ambience of interference from welding sets, hair dryers, television receivers, etc. etc. who would even notice a bit more? Nevertheless, to keep things legal, I wound a coil somewhat resembling the 25 feet of wire on a 4" diameter former that Mr Hildersley suggested, and made some measurements using signal generator and valve voltmeter instead.

Double-Wave Radiation

As shown in the circuit diagram, I simulated the spark circuit with a 2650 pF capacitor and two 3R3 resistors paralleled to give 1·R65 ohms across the first four turns of the coil. The remaining 25½ turns of the coil fed a variable capacitor set to about 310 pF and a 19 ohm resistor in simulation of a 100 foot aerial of the time. With a little care in tuning I could get the two circuits into tune with each other, indicated by the symmetrical shape of the frequency response I have sketched, at a frequency of 1.6 MHz. This is actually below 200 meters in wavelength, and so met one of the conditions of the amateur licence. But as one can see, the transmitted energy would be spread over a wide band from below 1.5 to above 1.7 MHz, and the double-humped nature of the characteristic tells us that the two sections of the coil are seriously overcoupled.

Tuning for a single wave:

How could they be other than overcoupled in fact, when the two parts of a tapped coil like this have an inherent coupling factor of around 0.2, three or four times what is really required? Well, a professional wireless engineer would probably have moved the coil tap from 4 turns to one turn to reduce the coupling, and restored the inductance necessary for tuning the spark circuit by inserting a loading coil of a few microhenries (mics) inductance.

• Continued on next page

Technical research

• Continued from previous page

Loading coils had been in use at least since Marconi's first Poldhu transmitter in 1901, as well as in countless receivers for long-wave reception. On the other hand it would have been simpler for the amateur experimenter just to slightly detune spark and aerial circuits from each other, which has the effect of making the double humping quite lopsided. Quoting now from E. E. Bucher's book "How to Conduct a Radio Club":

"in compliance with the United States restrictions . . . the energy in the lesser wave must not exceed ten per cent of that in the greater"

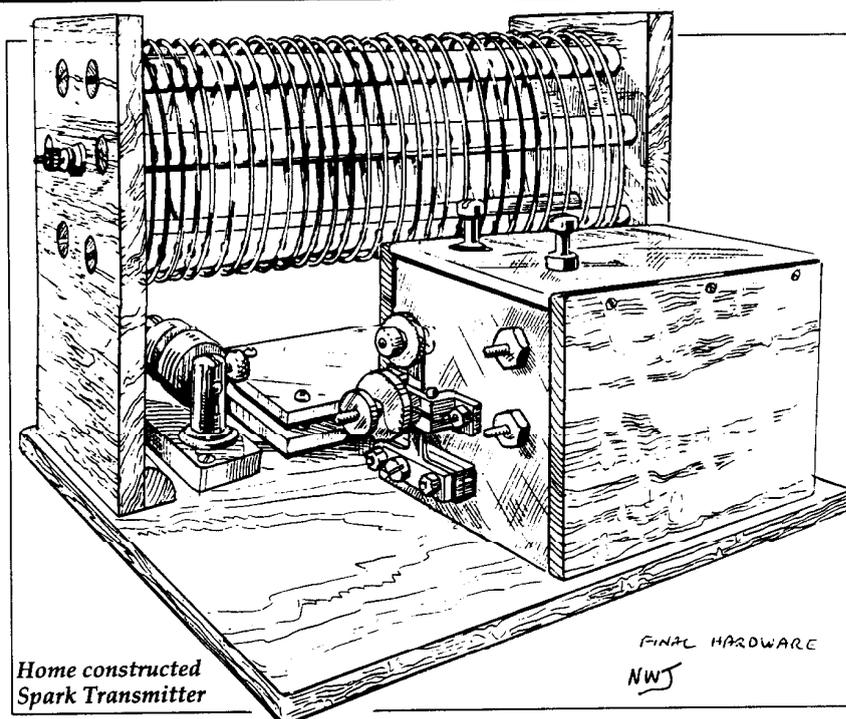
More work for Mr. Hildersley's wavemeter! Though a highly selective crystal set and a pair of good 'phones would have been enough to check the presence or absence of the double wave.

Back to 1900:

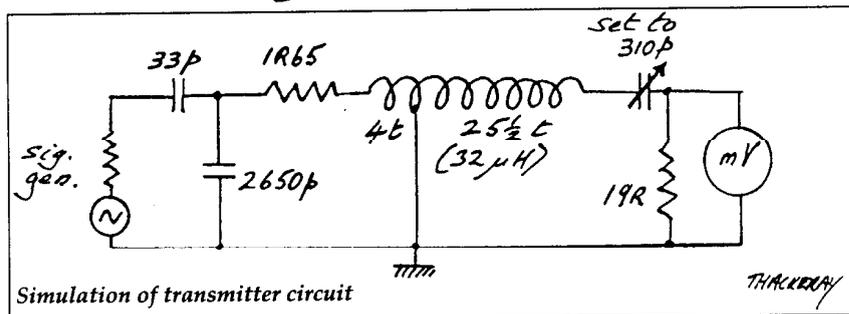
This may well be how the two-winding aerial transformers (jiggers) of the Marconi 1900 marine transmitters were (off) tuned, since Marconi also started with seriously overcoupled windings. His "Tune A" frequency was higher, probably somewhere near the half-wave resonance of a vertical 100' aerial, i.e. several MHz. By courtesy of the Science Museum, I measured the inductance of the aerial winding of a 1900 Marconi ship's jigger and obtained a value just over 100 microhenries. It remains to calculate the resonant frequency with a 100' vertical aerial. Such high frequencies were largely unexplored territory before World War 1. Since Mr. Hildersley had plenty of wire aloft, a more likely possibility would have been to use his aerial at its quarter-wave resonance, tapped into the coil at just a turn or so above ground, as in the WW1 military spark transmitters already mentioned (and briefly described in *Wireless World*¹). With more limited domestic aerials, any shortfall in wavelength could be recovered with an auxiliary aerial loading coil.

Exhibition hardware:

Returning however to the single coil of Mr. Hildersley, as subsequently "realised" by yours truly, it was not fated to join many other experimental coils of mine in boxes in the loft, but has now been augmented by some vintage wireless components. Together with a spark coil, condenser and spark gap, the coil has been mounted on a board, much as I imagine the experimenter of 1920 might have done for convenience, rather than leaving the bits distributed around on a table or shelf. So I have now, for very little



Home constructed Spark Transmitter



Simulation of transmitter circuit

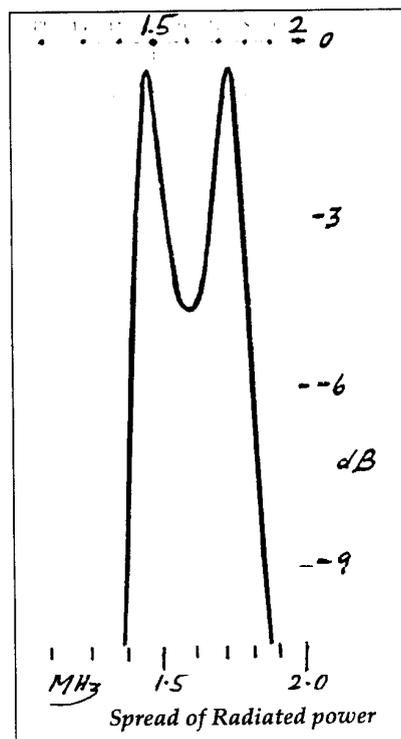
Coil details:
diam 4'
length 7 1/2'
winding 4 tpi
guage 16 swg

Estimated parameters:
 $R \approx 0.16$
 $Q_p = 23$
 $Q_s = 17$

extra effort, what might at first sight be mistaken (see sketch) for an amateur transmitter of the period. The stimulus for doing this was the opportunity to display it at a nostalgia evening organised by the local amateur radio club. The old timers present were most courteous and uncritical of my presentation, despite that the coil itself is obviously made from modern wood and wire, and has not been varnished, shellacked or paraffin waxed, a *sine qua non* if it were ever to be fired up to a high voltage.

Acknowledgements: My thanks to Louis Meulstee and Ray Kelly for photocopied material, to Alan Douglas for "Bucher" and to Harry Matthews for the homebrew glass-plate condenser.

**See, for example "Radiol, Radiol!" Figure 25, and *Wireless World*, May, June & July 1919.



Spread of Radiated power

A 'wireless for the blind' set

by Maurice Stedman, MSERT

Not long ago, I was asked by the British Wireless for the Blind Fund if I could bring back to life an old radio which had been found in an office cupboard at their headquarters. It was a two valve battery operated MW/LW set of about 1929 vintage, housed in a wooden cabinet and of "breadboard" type construction.

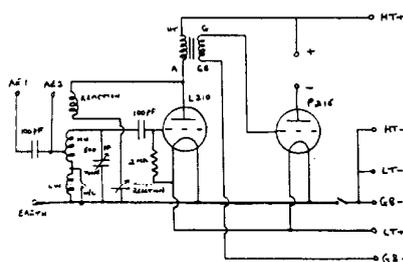
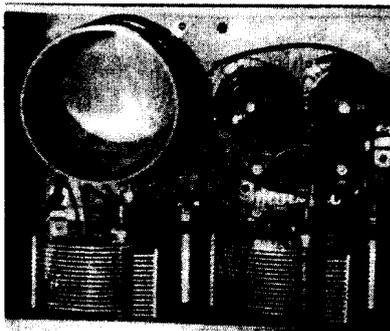
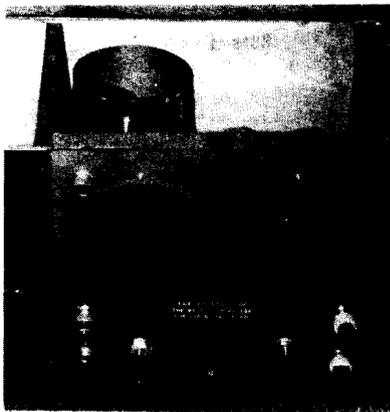
Tuning and reaction control was by two large black knobs engraved in braille, and on/off and wavechange were by push/pull switches. The only identification as to model was the mark B2133 stamped inside the case.

The circuit was so basically simple that it hardly needs drawing; there wasn't even an RF choke in the anode circuit of the detector valve. The only real faults were some dry joints in the tuning coil connections and corroded push/pull switches. Of course, the battery leads were perished and had to be replaced. The valves were missing so I fitted Hivac L210 and P215, which were to hand.

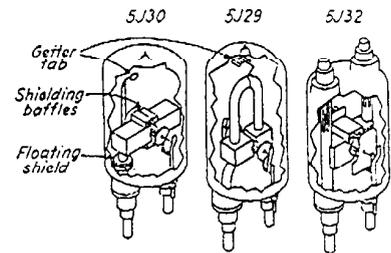
As the set was to be kept in regular use in the office it was decided to dispense with batteries and a power supply unit was purchased from the Vintage Wireless Co. Ltd. of Bristol. It would have been preferred to have provided a period loudspeaker to go with the set, but the cost was too high, so I made a small moving coil loudspeaker with transformer and also the power supply unit. The result was a tidy arrangement which is unlikely to be inadvertently disturbed by office staff or cleaners.

I wonder whether any other pre-1950 Wireless for the Blind sets have survived. Many were made specially by Clarke & Smith Manufacturing Co. Ltd. Nowadays standard modern radios and radio cassette recorders are used.

If any Society members have the facilities and can spare the time to offer voluntary help in the repair of Wireless sets for the Blind, in the area where they live, I would be pleased to hear from them. They must be equipped to give a reliable and professional service.



Circuit diagram of 1929 Wireless for the Blind receiver.



Split-anode magnetrons: compare with photograph on page 28, issue 15/3.

What is it?

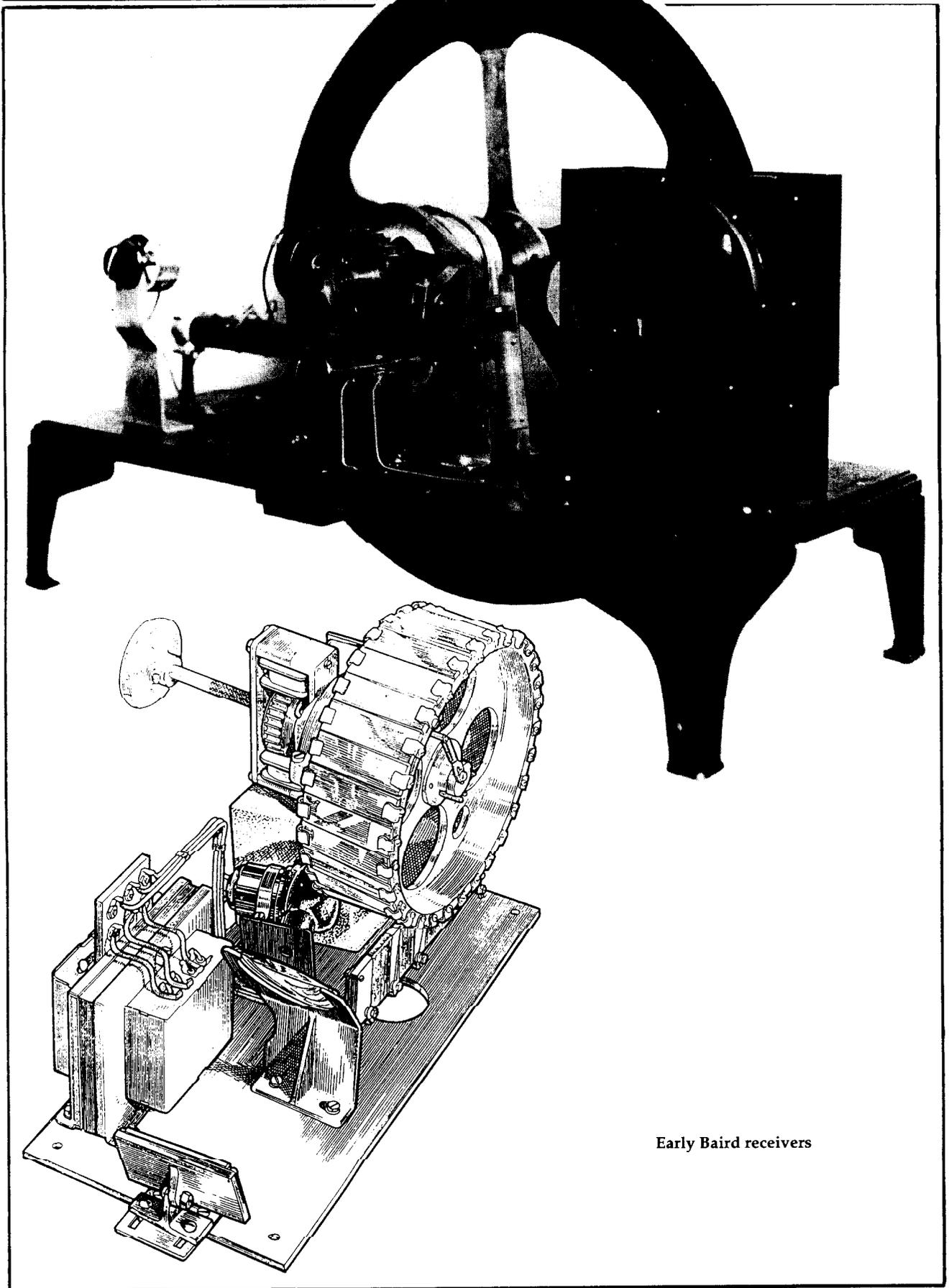
Several readers replied to our "What is it?" quiz in issue 15/3. They included Eryl Davies of the Science Museum and Rod Burman of Pascall Electronics who identify the object as an American split-anode magnetron of the kind used in WW2 anti-radar jammers, which had a hollow anode through which coolant was passed. Douglas Byrne of the Isle of Wight Wireless Museum also sent us a letter he had received from Al Jones, curator of Ye Olde Transmitting Tube Museum, Crescent City, California, who had also identified it from the Bulletin photograph. Another letter came from Bill Williams of Solihull, who suggested that the "valve type" envelope and base had been found to be ideally suited for many objects which are often mistaken for valves, including crystals, electric tuning-forks, stabilisers, switches and flash-tubes. If anyone else has a mystery object for identification, they are welcome to submit a photograph.



Museum news

Among items recently acquired by Douglas Byrne of the Isle of Wight Wireless Museum was a magnificent "Clarabutt" early Twenties receiver the front panel of which has no less than seven rheostats - one for each valve. Another acquisition was the old short-wave transmitter from the Marine station at Niton on the island, now perhaps the museum's largest and heaviest objects. It took a week to strip down so that it could be taken through the door and had to be handled on rollers, pyramid-builders'-style.

Vintage vision



Early Baird receivers

The early classics

By Ray Herbert

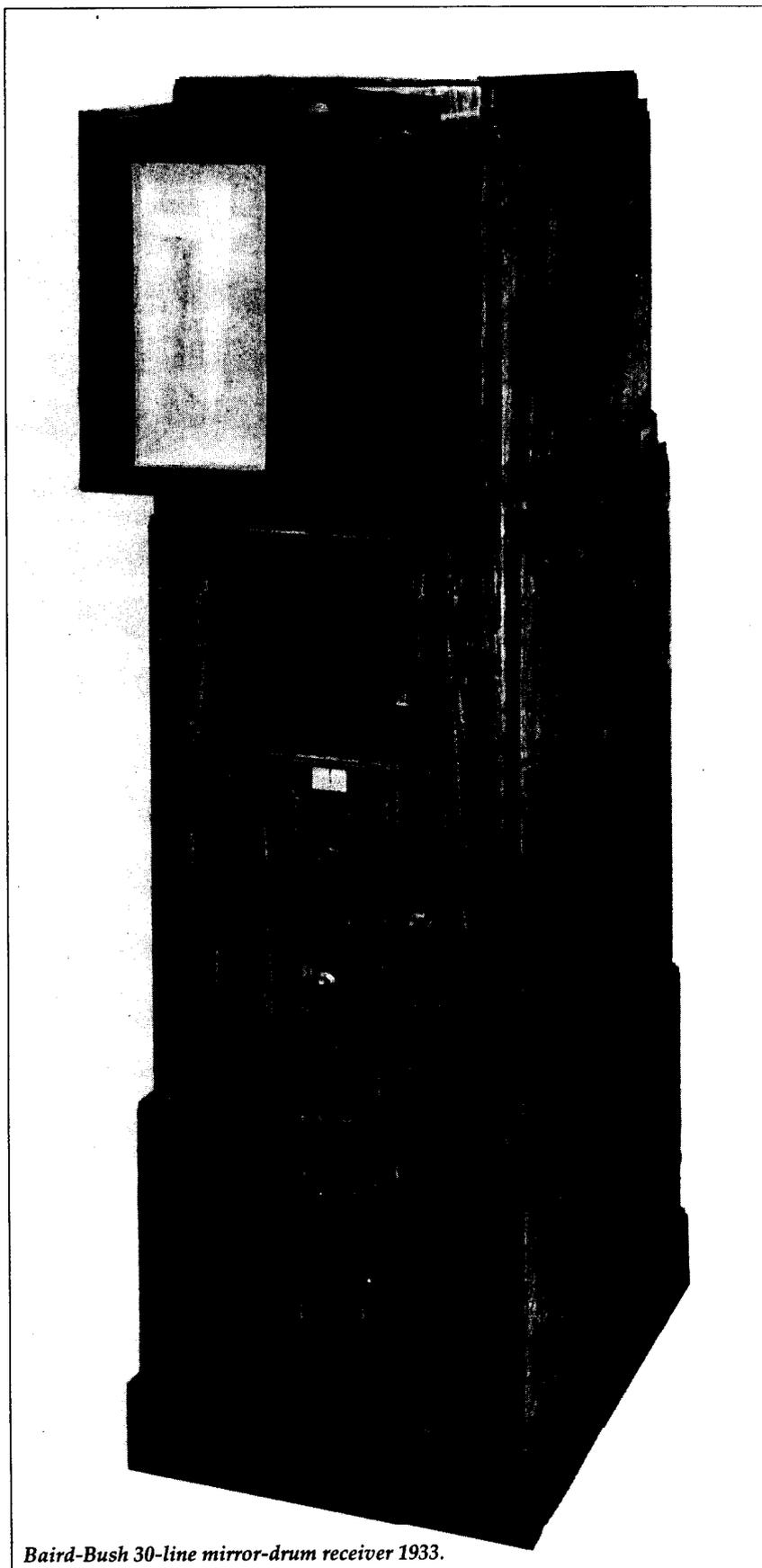
The classic television receivers of the 30 line era achieved this status not through their popularity (few were made commercially apart from the "tin box" Televisor) but because they were the sole examples of their type.

The first television sets for sale to the public made an appearance at the September, 1928, radio show at Olympia. They were Models A, B and C, manufactured at the Kingsbury Manor laboratories of the Baird Television Development Company by an engineering team led by H.J. Barton-Chapple who did so much to foster interest in home construction through his books and articles in the technical press.

Model A was a portable Televisor in a polished wooden box requiring a 6 volt DC supply for the scanning disc motor. Models B and C (known to the Baird staff as the 'Noah's Ark') figured prominently in demonstrations during the next 18 months. Two were taken to Australia by Ben Clapp in 1928 and two more went to South Africa in 1929 as part of the missionary activities of the Baird Company who arranged closed circuit TV displays in various countries. These receivers also made a significant contribution to the successful and crucially important demonstration via 2LO on the 5th March, 1929, to Members of Parliament, the Post Office and the BBC. The viewers included Lord Clarendon the Postmaster General, Lord Angus Kennedy, Sir John Reith, Sir Ambrose Fleming and P.P. Eckersley.

Less than 15 of the 'Noah's Ark' Televisors were produced and there is just one survivor currently on tour with the Baird travelling exhibition. Models B and C were basically the same both having a 24 inch scanning disc, a lens system and synchronising arrangements involving a 30 segment commutator in conjunction with a relay for adjusting the voltage supplied to the motor field thus trimming the speed. Model B required a 12 volt DC supply for the disc motor and a minimum of 350 volts for the medium wave receiver which had to be provided separately. A moving coil speaker was included but this required

• Continued on next page



Baird-Bush 30-line mirror-drum receiver 1933.

Vintage vision

• Continued from previous

to be connected to yet another medium wave receiver tuned to the sound channel. Model C came complete with built-in vision and sound receivers and could be operated from the mains or a 12 volt battery in association with a M-L rotary converter which supplied the high tension. Models B and C were priced at £40 and £150 respectively.

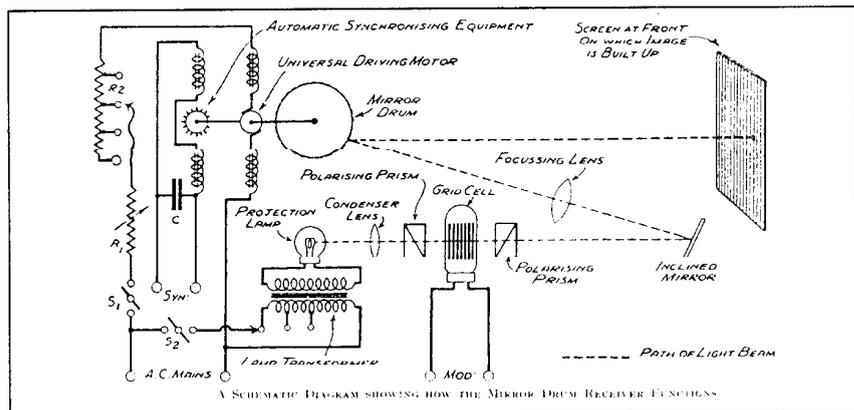
At Radiolympia in 1929 a simple Televisor was on display (see the Bulletin, Vol. 9, No. 3, page 58) and seen by Percy Packman then working for Plessey. He contacted J.L. Baird and offered to produce two prototypes based on the exhibition model but with refinements and modifications which would make it suitable for quantity production. One thousand of the 'tin box' Televisors were built by Plessey and the first offered for sale in April, 1930, at £26.25, later reduced to £18.90. At the lower price level it came within the cost of a domestic radio set but representing a considerable outlay for the reception of television programmes with an average total time of only two hours a week. This Televisor had a 20 inch diameter scanning disc driven by a 100 volt universal motor with a Zenite tapped resistor for other voltages. The extended motor shaft carried a 30 toothed wheel forming part of an improved method of synchronisation. A flat plate neon and lens system were used as in earlier versions. There were just two controls, motor speed trim and a framing adjustment to centre the picture. All the components were available separately for home constructors and considerable quantities were sold.

In August, 1932, a prototype mirror drum receiver became available to be followed by production models in 1933 for sale at £78.75. Designed by the Baird Company and manufactured by Bush Radio they represented a major advance in television reception techniques providing a steady, bright, black and white picture on a 9" x 4" screen; great improvement over the small, pink and black images provided by the 'tin box' Televisors.

The light source employed a 100 watt, 12 volt lamp and the beam was modulated by a grid cell, a variation of the Kerr cell developed by the Baird Company. On the rotating drum the mirrors were set at successively different angles so that the small spot of light was displaced by one line for each position of the reflecting surface. Focussing adjustments involved small movements of the retractable screen.



Baird engineer Thyne with the model "C" Televisor at the Kingsbury Manor laboratories in March 1930.



As the Kerr cell had the ability to act as a light valve for high intensity illumination this enabled the Baird Company to display television pictures of the Derby on a cinema screen in 1932 and J.L. Baird used the same techniques for his colour demonstrations at the Dominion Theatre in 1938.

The mirror drum receiver had a short life because the 30 line service shut down in September, 1935, rendering all the equipment obsolete overnight.

By this time the Baird Company had been transmitting high definition pictures from the Crystal Palace studios for over a year and a typical receiver of that period can be seen on the front cover.

The choice of 30 lines as a standard was no accident. It represented the maximum definition which could be used while keeping within the internationally agreed bandwidth of 9 kHz for medium wave broadcasting stations.

In the Salerooms

by Robert Hawes

While vintage equipment seems to be fast disappearing from street markets and junk-shops, it continues to appear at the auction-rooms, which reflects the fact that it is no longer "coming out of the attic" but probably from dealers and collectors, some of whom try to improve its price by poor restoration, only to find that the reverse might be the case when the object goes under the hammer.

In one recent auction a "smokers' cabinet" set was offered for sale, having a nice case with the correct transfer but newly-constructed interior which included parts that were too late to be authentic. But it came with a nice cone speaker (itself worth £150) and so made £468 (including the 10 percent commission to the auctioneers plus vat).

At Phillips, a rarish Sterling number 1 pre-broadcast crystal set with the wrong detector raised £134 and an Ediswan (cracked) in original cardboard box £88.

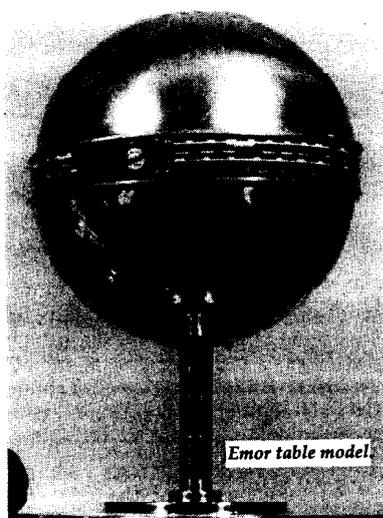
An example of the tall floor model. Emor Globe in chrome and matt gold, which had a dent, was sold for £425.

An original 444 "People's Set" in black was £387 and an Ekco AD76 that wasn't quite right went for £280.

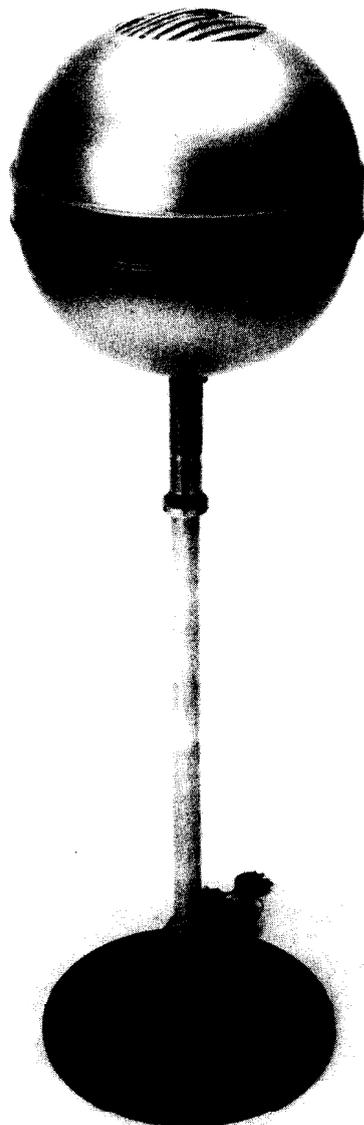
Vintage telephones fetched high prices but a brass-bodied adapted common one with bakelite handset belonging to Screaming Lord Such fetched only £40.

At Christie's, there was another Emor, this time the stumpy table version in the more sought-after all-chrome finish, which made £725. (Isn't it strange that one doesn't see rare sets like this for years, then several appear at the same time?).

There was also an unusual "Tonschreiber B" magnetic tape recorder, possibly captured in 1945, capable of recording at high speed then playing back at normal speed with a special head so that messages could be "scrambled" with little risk of being played back in the wrong hands. Possibly because it was such a specialist collectors' item it failed to reach its reserve price and was withdrawn.



Emor 1947 knob-less set, tuned by rotating the sphere.



Wireless investment

The BBC "Money Box" programme recently investigated vintage wireless as an investment, reporting the possibility that some people might have a few hundred pounds' worth in their attics. This might result in some false alarms, but some excellent advice was given by Christopher Proudfoot of Christie's. Asked if he thought vintage wireless a good investment, he offered the wise counsel: "The price may not increase in the long term by more than inflation. No-one can know what the market will be like in ten or twenty years time. One doesn't know which particular bit of the market will go up. One doesn't know how time will treat the things one is laying up. These things are, after all, mechanical objects; they are not like bottles of wine, which, provided you keep at the right temperature in a cellar aren't going to come to much harm and do actually improve with age. Very little else improves with age whatever you do with it. To be honest, I wouldn't really advise anyone to invest in radios or anything else just for the sake of it. I don't think that's a good idea and you'll probably end up paying top prices for everything and then not being able to get it back when you sell. Really, you need to buy things because you like them and get the enjoyment out of them and that way you are going to start hunting things down and you'll find a few bargains. And that, of course, is where the investment potential comes in".

Gerald Wells, curator of the Dulwich Vintage Wireless Museum gave some equally sensible advice in the programme and added "Try your local clearance auctioneers and stick to things before 1940: they get boring after that. There's a lot to be said for walnut-veneered wooden-box sets: they're not worth much now but they have such wonderful sound and they're so easy to service and repair, so you'll get an antique that is pleasant to look at, you can polish, listen to and get a deal of pleasure out of and they're bound to increase in price".

The programme aptly concluded "You have to become something of an enthusiast to know what to buy and once you become an enthusiast you'll only spend any profit you make on more radios".

R.H.

Analysis

Keeping it quiet

by Geoffrey Dixon-Nuttall

There are fashions in the design of radio sets (take the outbreak of press-button tuning in 1938, for example). In the mid-thirties there was a positive spate of ideas for noise suppression.

There were two distinct problems. First was the increase in electrical appliances (some of very poor design) which radiated interference. This was accentuated by the gradual reduction of the outside aerial to a piece of wire round the picture rail. As the original masts rotted, they didn't get replaced. The average decent superhet worked quite nicely on locals with an indoor aerial, or even with that dreaded device, the "mains aerial" — which was guaranteed to pick up any Hoovers or fridges in the district!

The other problem was due to lack of familiarity with the operation of a superhet with A.V.C. If one was tuning from one station to another on a T.R.F. receiver, turning down the reaction reduced the gain and hence the noise, but a superhet has more gain, and the action of the A.V.C. is to increase the sensitivity to maximum in between stations. The resulting racket tended to make the customers prefer the T.R.F.

The first problem (noise on the signal) was really only soluble at source, i.e. suppress the Hoover. There was however some muddled thinking about. Some of the E.M.I. receivers used a switched preset resistor to reduce the I.F. gain (e.g. model 276). This reduced the noise, and everything else too! Nevertheless it was advertised as being able to cut out interference from fridges. A R.F. gain control (which is what this is) is pointless when used with a set with A.V.C., as the latter tries to counteract it!

The second problem was much more tractable, and endless ingenuity was used by designers to overcome it. An optional bias on the diode detector was a good start (Portadyne A37). The snag with this is that weak signals are clipped, causing distortion. If the bias was self-cancelling this would be overcome. Two examples are given. In the Mullard the bias is obtained from the I.F. valve cathode voltage, which of course will be reduced on strong signals by the action of the A.V.C. Murphy used a brilliantly simple arrangement in their A34 (among others) in which the suppressor grid of the I.F. stage was used as a clamping diode to bias the signal detector. Large signals will cause this diode to cut off,

after which the suppressor grid carries the A.V.C. voltage.

A cunning variation of this was used by R.G.D. in which the clamping diode was actually the grid and cathode of the "Magic Eye".

This sort of thing can be addictive! Gradually the circuits got more complex. Pye, for example, produced a cunning arrangement in which the signal diode is switched on by a voltage which is derived by amplifying the detector D.C. output. This diode is initially reverse biased, but once a signal overcomes this bias, a sort of "snap-over" action occurs, so that weak signals are not received at all, but any over a certain strength are detected without distortion.

As one might expect, Philips had their own way of doing things. The 575A has a most elaborate circuit in which the R.F. stage, acting as a cathode follower, produces a signal at low impedance, which is applied to the cathode of the detector diode. To provide a load for the cathode follower quite a high resistor is used, and the cathode (and grid) end up at about twenty volts above chassis. To make quite sure that the reverse bias is removed on signal, the signal diode *anode* is fed from the R.F. stage supply, which of course will rise when A.V.C. is applied! This works very well, but can produce interesting faults. A very slightly leaky capacitor in the high voltage/high impedance A.V.C. circuit can cause havoc.

Mention of high cathode volts will cause a bell to ring in some readers' minds. Yes, we have got round to Ekco.

One of the problems with the Ekco sets is finding out how they actually work. The circuit is not explained in the Service sheet; the Trader sheets have a shot, but not very convincingly! So, unless anybody else would like to have a go, this fool will now rush in!

The first set in which this circuit appeared was the AC76, and its AC/DC cousin AD76. These of course were the famous "round" Ekcos, and the circuit was complicated by being a reflex as well.

The easiest way to tackle this sort of thing is to look at the DC circuit separately, so the diagram leaves out everything else. The whole A.V.C. system is "lifted up" by the control R7. For those who have not met these sets, this is calibrated "Weak", "Medium", and "All stations". The A.V.C. line is therefore *positive* to chassis, and this drives the frequency changer (V1) into grid current. Note that R7 *does not* alter the bias on V2 since as it lifts up the grid and cathode together. As the grid of V1 is virtually at earth volts, the grid of V2 is about one third of the way down R7, due to the potentiometer R4/R14. The whole of the voltage across R7 appears as reverse volts on the signal diode. The same applies to the A.V.C. diode.

So what with the reverse bias on the detector and V1 going into grid current, thereby damping the aerial circuit, the set will not pick up very much. However, once it *does* find a signal, the whole thing comes unlocked. Once the A.V.C. diode starts to conduct both grids go negative, and the voltage across R7 drops. This is a cumulative action, so that increasing gain will produce increasing signal, and there is a sharp change in conditions between "signal" and "no signal". Of course V2 is also the audio stage, but this does not really affect the issue, except that as it has A.V.C. applied to it the A.V.C. characteristic will be improved.

The models AC85 and 86 used a similar arrangement. As they are not reflexes one would expect the operation to be simpler, but no.

Both cathodes are returned by large resistors. R7 is, as before, the sensitivity control, but, as the grid of V2 is returned to the top if it, it does not affect the bias at all; it just lifts the whole stage up, to about fifty volts. As the grid of V1 goes up its cathode, of course, follows. This reduces the sensitivity due to input damping, as before, but also because the poor thing has low screen and anode volts, as has V2. This time there is very little delay on the A.V.C. diode, so that the circuit "flips over" very positively. I suppose this arrangement, like the Philips, could be called "amplified" A.V.C. However, a cathode follower will always give a gain of less than unity.

One or two even more complicated circuits were used. Pye, for example, had an extraordinary circuit in their "Empire" model, in which the detector is a pentode used as a sort of gated diode! The grid is biased off a Westector with variable delay. This seems to be an example of complication for its own sake.

A slightly less wild idea appeared in several receivers, for example the "Zetavox" and the Philips 636A, as well as several American sets. This was to use a valve to amplify the A.V.C. volts and unbias the audio stage. This involves having this stage with its anode fed from earth and its cathode at a large negative voltage. As this has to be added to the H.T. it means that the power supply has to supply at least 350 volts after smoothing. With the primitive electrolytic capacitors used some fairly devastating explosions must have occurred!

Operating a set with one of these circuits is an odd experience, as the tuning range is blank except for strong stations, which stick out like currants in a cake. These circuits certainly did what they set out to do; but within about two years the public had got used to tuning a receiver properly, and these elaborate circuits all disappeared. Of course inter-station muting came back on V.H.F. receivers — but that is a different story.

Books

Book Review

by Gerald L. Wells.
Curator, Vintage Wireless Museum

The crucial decade

Wireless: the crucial decade 1924-1934' by Gordon Bussey, published by Peter Peregrinus Ltd. on behalf of IEE. Price £29.00.

Gordon Bussey has been writing about early electronics since the mid-seventies and his publications include company histories, brochures and a book on early crystal sets. He has also been involved with several exhibitions and is a historical adviser to Philips Electronics.

In 'The Crucial Decade', he has drawn on his resources of early technical publications and ephemera to produce a very accurate picture of radio development from 1924 to 1934, succeeding in producing a work that describes the workings of receivers and transmitters without being too technical.

In the first chapter he describes the works of pioneers such as Clerk Maxwell and Hertz and the struggle to get a system of broadcasting working. His chapter on technical background is concise and to the point without too many formulae. He describes AM and FM in a language that anyone can understand.

Chapter three he goes into great and interesting detail on the broadcasting stations of the world, describing the British Regional Scheme and the Lucerne Plan which eventually brought order out of chaos in Europe. He highlights the disastrous state of affairs in the USA where there was little or no control over the number or size of transmitters and the effect it had on radio development there.

Another chapter describes the development of the valve, taking us from the basic 'R Valve' through the invention by Captain Round of the screened-grid and its development to the power pentode, the use of the slip-coated cathode and finally the multi-electrode mains valve of the thirties.

There is a very good description of design trends in Europe and the United States where there was no Marconi royalty ('valve holder tax') and manufacturers were not limited in the number of valves they could use. It also relates how the wireless set gradually evolved.

Hullo Everybody!
Capt. Eckersley calling!
 The Chief Engineer of the B.B.C., CAPT. ECKERSLEY, is writing a special series of articles on wireless for **THE SUNDAY NEWS** (Formerly known as *London Sunday News*)
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 MARCONI TYPE K.L.I. VALVE TYPE K.L.I.



Ben Clapp in 1927 at the window of his wireless room. The cage aerial radiated the transatlantic television pictures from his 2kw transmitter in February 1928.

Obituary:

Ben Clapp: Wireless, television pioneer

Ben Clapp, one of the few who could claim to be a pioneer of both wireless and television, died on 12th November, a month before his 96th birthday. He obtained his first transmitting licence in 1912, the era of spark apparatus and after serving in the RFC during the war, resumed activities with the call sign 2KZ. As a partner in a wireless shop in the Strand he had access to the best equipment and could receive the USA short-wave programmes most effectively. The Wanamaker Corporation in New York, anxious to gain publicity for their special Radio Festival Concert to be broadcast through WGY, Schenectady on 107 metres, asked him to set up a receiving station at their Pall Mall offices. On April 2nd, 1924, the successful reception in London of this concert received considerable acclaim in the press.

The Wanamaker organisation had heard about television and asked Ben Clapp to investigate by visiting the inventor at Motograph House. John Baird soon realised that he was talking to someone with considerable practical experience in the design of transmitters and receivers, just the person he wanted to put his ideas into practice. Taken on as Baird's first technical assistant and becoming Chief Engineer of the Company in 1927 he went to the USA that year to supervise preparations for the historic reception of transatlantic television pictures which were transmitted from his home in Coulsdon. These were shown to the press on 8th February, 1928. Another overseas trip followed later the same year to demonstrate television in Australia, taking Tony Bridgewater as his assistant.

Remaining with the Company until retiring in 1963 Ben Clapp became much sought after by those producing television documentaries and books. Always responding with enthusiasm to those seeking authentic information on the early days of television he never lost the opportunity of expressing his dismay that Baird received so little recognition and no public honours. R.H.

The chapter on the British scene leads us through the story of the minefield of paranoid British manufacturers, the political intrigue, the Marconi royalties, the General Strike and the crippling depression which led to the reliable, compact and efficient 'all-mains' receiver of the thirties, the great grandfather of today's sets.

The final chapter describes the kit sets that could be bought for a fraction of the price of commercially-produced ones and could be assembled at home. This brought great joy to the men who made them, who immediately assumed they were "experts".

There is a very good index and at the end of each chapter every source of reference is listed. The illustrations and photographs are interesting and the printing is of high standard.

This book is a useful reference source for all students of the history of domestic radio and of radio communication. Unfortunately, at £29 for under 130 pages only the most dedicated will want to buy his own copy. For those wishing to order it from a library, the ISBN is 0 86341 188 6.

Feed back

Letter

From Enrico Tedeschi

Collecting in Italy

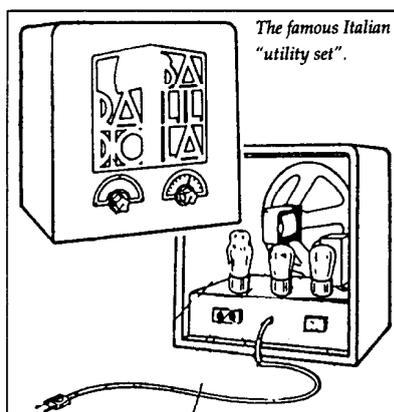
As a resident in Rome but a BVWS member visiting Britain often, where my parents-in-law live, I envy your advantages: meetings, seminars, magazines concerning vintage wireless which enable members to exchange ideas and help each other. I thought members might like to hear what the collector's life is like in Italy: the short answer is "tough!"

For a start, until recently there were no clubs or even meetings. We as a nation do not much like clubs and associations and prefer to go our own way, fearing perhaps to be trapped into duties and obligations which may lessen our freedom. Everybody lives in his own small world, and collectors are not linked together and often compete with one another. Italy is a relatively new nation and little more than 100 years ago consisted of many different and competing countries before finally becoming united. Competition seems still very much a part of the Italian way of life.

There is very little old radio equipment left. Owing to the scars of the war we have tried to delete our past and discard all that may remind us of the old days. Development of the radio industry in this country was limited. The regime failed to realise early on that broadcasting could have been the vehicle for dissemination of ideas; or perhaps for this very reason tried to slow development, but when it was finally realised that radio could be a powerful propaganda medium, it was too late because foreign industry had already secured a large part of Italian and World markets. Surviving sets are therefore few and far between and you can consider yourself lucky to find an Italian set of the 'thirties, let alone of the 'twenties. Nevertheless, interest and enthusiasm are strong. There are a few wealthy collectors with extensive collections, and many small collectors contenting themselves with sets of the 'fifties and 'sixties for which they go hunting in the "mercati delle pulci", the Sunday second hand markets. The now famous set "Radio Balilla" (the Italian utility set) with its fasci and art deco styling is now commanding a very high price.

Recently radio magazines have been including revival articles and an Italian Society has been formed.

Editor's note. The "Associazione Italiana Radio d'Epoca" has been formed at Via Cavour 5, Arezzo, Italy. Membership there costs Lit.50,000.00 and overseas 55,000.00.



The Famous Italian "utility set".

Letter

from Pat Leggatt

Abélé circuit

The circuit shown by Desmond Thackeray in the Vol. 15 No. 3 Bulletin is described in Popular Wireless of May 15th and 22nd 1926 as the Abélé circuit, "held in high esteem amongst French amateurs". Monsieur Abélé, an officer in the French Signal Corps, derived the arrangement from a WW I receiver.

It is not an Ultra-audion, since that circuit did not employappings on the coil. It is, as Desmond indicates, a Hartley circuit and I have redrawn his sketch to show that the Hartley configuration is really a conventional arrangement of grid winding and coupled reaction winding. The only unfamiliar feature is that both grid and reaction windings in series are tuned by the variable condenser, rather than the grid winding alone.

In this Abélé circuit the HF stage anode is taken to a tap on the grid coil rather than directly to the grid condenser, thereby securing some signal gain by auto-transformer action and reduction of damping on the grid circuit by the fairly low impedance of the triode HF stage anode. In electrical terms, it really makes no difference whether an auto-transformer tapping or a separate close-coupled primary winding is used: they are virtually identical.

With the detector valve fully energised, the Abélé circuit would have oscillated very readily. Presumably this would have been controlled by adjustment of the filament rheostat.

Turning to the variable resistive loading on the audio transformer

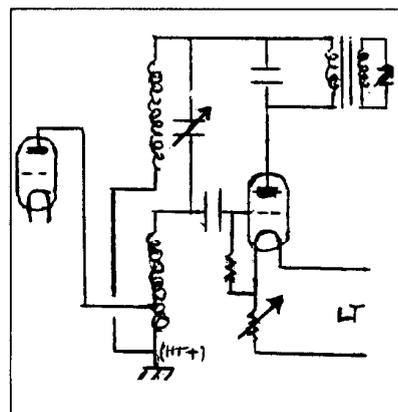
secondary, the footnote rightly says that this feature appeared in the Marconiphone V3, V4 and NB2 products: it is also seen in the A2 amplifier (the later version of the NB2). In the Type 31 and 41 receivers the same technique is used in the form of a continuously variable resistor across the secondary.

In earlier days, high-value variable resistors were not available and audio gain control was achieved by switching out a stage or two, reduction of filament current (with attendant distortion), or shunting intervalve transformers by switching fixed resistors. In the A2 amplifier the relevant switch is labelled "Tone" and indeed it does have a noticeable effect on frequency response, but it is clear that control of gain is the primary purpose. The following extract from the A2 operating instructions shows that the manufacturers regarded "Strength", "Volume" and "Tone" as interchangeable terms.

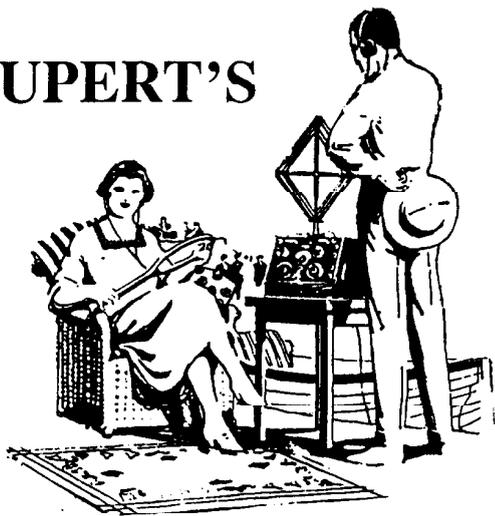
"The strength switch on the deck of the instrument is for increasing the volume of sound from the loudspeaker. When receiving Broadcast from a Station situated within ten miles it should not be necessary to move this tone switch from the stud marked "1". For receiving Broadcast from Stations which are over 10 miles distant, the stud marked "2" should give sufficient volume. These points are important, as if an attempt is made to "overload" the Amplifier the quality of reception may suffer owing to what is known as "valve saturation".

This, however, only applies in cases where the receiver used is a Marconiphone V.2, or an equally sensitive instrument."

The instructions do not even mention the stud "3" position, presumably to be resorted to only if some dreadful non-Marconiphone receiver was in use!



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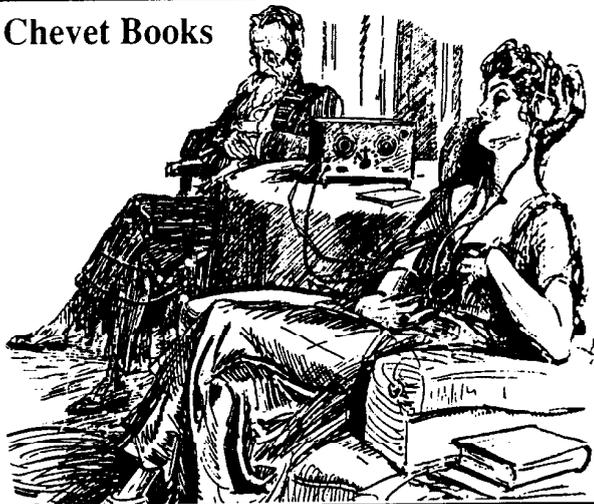
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