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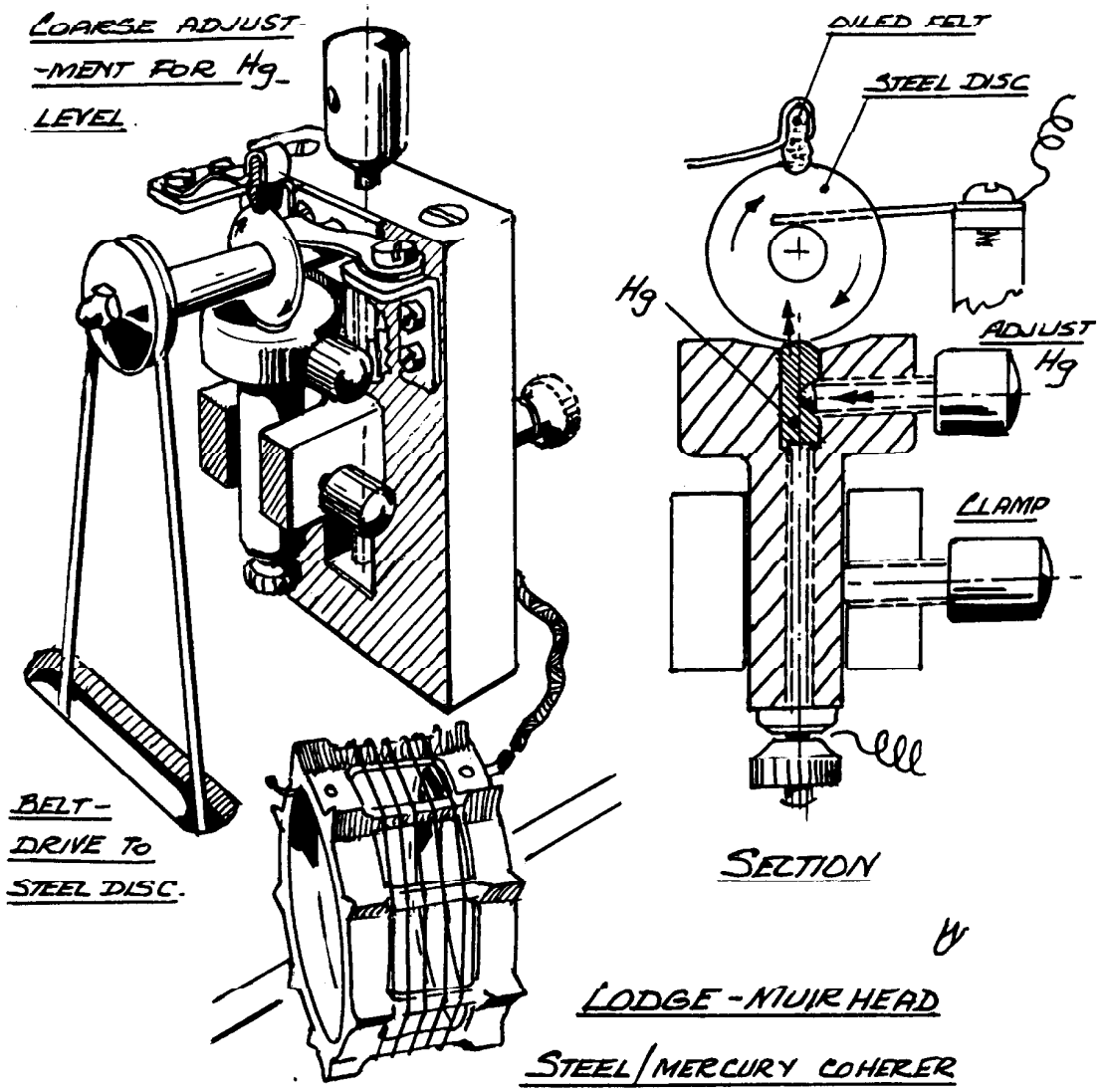
BULLETIN OF THE BRITISH

VINTAGE WIRELESS

SOCIETY



This drawing, by *Norman Jackson*, shows a rare Lodge-Muirhead-Robinson Coherer of about 1902, a device for detecting radio waves which *Pat Leggatt* writes about in this issue. In this device, a steel wheel dips into a cup of mercury but is insulated from it by a thin film of oil; an incoming radio-frequency pulse will break the oil film, reducing the resistance of the wheel-to-mercury circuit, thus operating an indicator. When the pulse has passed, the wheel picks up oil again and returns the Coherer to a "ready" state.

BULLETIN OF THE BRITISH
VINTAGE WIRELESS SOCIETY
VOLUME 15. No. 1

Editorial and advertisement enquiries should be made to the Editor, **Robert Hawes**, 63 Manor Road, Tottenham, London N17 0JH. Tel: (081) 808 2838. Editorial Assistant: **Pat Leggatt.**

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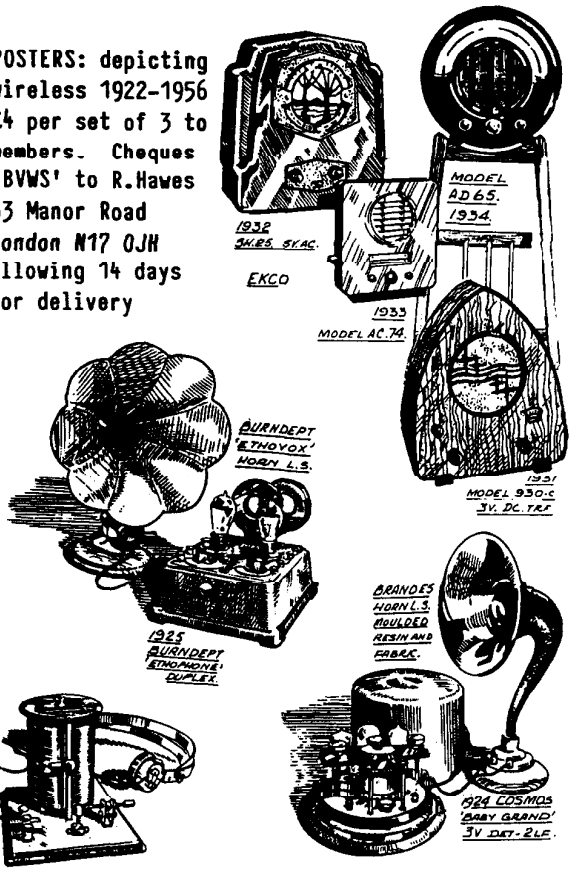
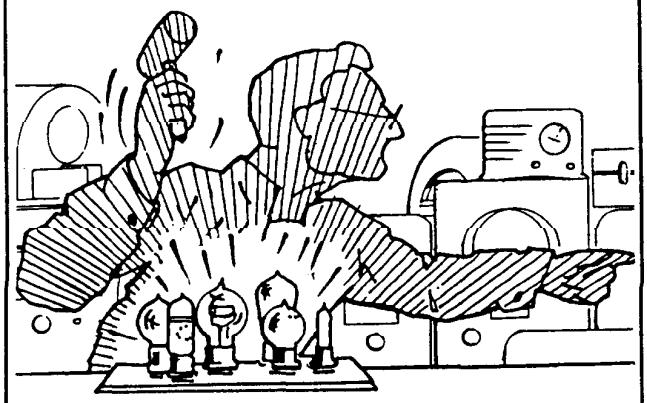
Cover drawing: Norman Jackson

BRITISH VINTAGE WIRELESS SOCIETY





BVWS AUCTION:

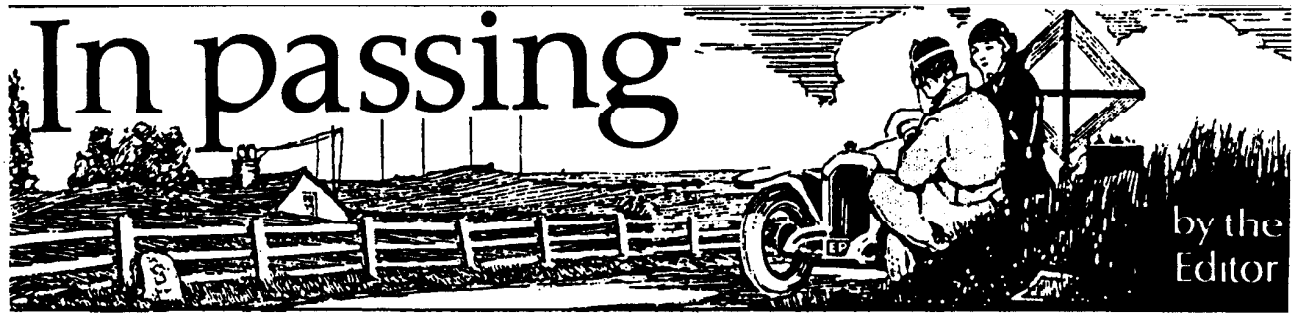
Proceeds to the Society from the auctions have exceeded £500 since sales started. From this financial booster, *all* members benefit; that's nearly a £1 a head towards Bulletin quality or a facsimile catalogue, for example.

You surely have on a shelf or in a cupboard or drawer some unwanted 'bygone'. Please donate it to the Society. Every little helps and a lot helps a lot more; 'many a little makes a lottle' for *your* Society. Suitable non wireless items such as a Van Gogh or some Elgin marbles will be just as acceptable to the auctioneers as a 'Melody Maker'.

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: (01) 670 3667. The Curator is Gerald Wells, whom visitors should telephone before visiting the museum.

In passing



by the Editor

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.

Harpenden meeting

Applications forms are being sent out early for our meeting at Harpenden on October 7th. Tickets will not be sent out until about a month before the event but since accommodation, especially stallspace, is limited please apply early to avoid disappointment. The organisation of such a large meeting has become a gigantic task, so your co-operation on the day and beforehand is vital. Volunteers to organise this and proposed new meetings in other parts of the country are needed: qualifications are an ability to deal with crowds, with an increasing number of problems and with "difficult" people plus an acceptance of the disadvantage that you won't be able to get round the stalls until late in the day. Entrance and stall fees, pegged for many years, have finally had to be increased this time, to cover rising expenses and we trust members will accept this, bearing in mind that any profits are always ploughed back into the Society's funds.

Information exchange

Exchange of information has been an important function of the Society since it's inception: members have been providing each other with historical and technical data, advice, spare parts and help in all kinds of other ways. Now, our new Information Officer Dave Adams hopes to put all this on a more organised basis but he will need the co-operation of all if the idea is to succeed. Included with this Bulletin is an invitation to participate. We should like to compile a list of the interests of members, the apparatus and special qualifications and data collections they possess, so that all this information can be made available to members generally. If you wish, the details you supply for the Register can remain confidential: we would only make them known to other members with your permission. You are invited to return the forms and in addition, to list the "Post Office" numbers relating to your equipment, so that we may attempt to complete a full list that we began many years ago. We are grateful to Dave for taking on this daunting task. He is well qualified: he has been in the wireless trade, has served as a wireless operator mechanic in the RAF, has been a teacher and has done a lot of historical research work. His memories go back to the crystal-set days, he restores equipment and has for some time been looking after Gerald Wells' technical library at the Dulwich Wireless Museum, maintaining contacts with orgainsations with similar interests and serving the interest of Society members for some time in the supply of information.

Wavechange switch

No doubt everyone is aware that BBC medium wave broadcasting is about to change, but in case anyone is not sure just what will happen and when, here is a brief summary, sent to us by Pat Leggatt:

On Monday August 27th this year, Radio 2 will disappear from its medium wave slots and be available only on VHF-FM. Its place will be taken by a new BBC service, Radio 5, carrying all BBC Network Radio's sports and educational programmes, plus some elements of the World Service. Radio 5 will be transmitted on the same wavelengths that have carried Radio 2, i.e. 433m, 330m, plus a low power filler on 303m for West Wales (Cardigan Bay). Radio 5 will not be available on VHF-FM.

This is the only immediate change, but in the next two or three years Radio 1 and 3 will also be taken off medium wave, to make room for national commercial radio.

Radio 4 remains on long wave, 1515m, although at times it will split away to carry special events. Radio 4 on VHF-FM will be uninterrupted.

If you still want to hear Radio 2 on your vintage medium wave sets, build one of Don Turner's modulated oscillators (Bulletins 14/3 and 14/4) and feed it with the audio output from an FM receiver. Or, if you have a signal generator, feed the FM receiver output to the 'External Modulation' input. But be careful not to 'broadcast' too widely!

Tribute to David Hughes

Society member Ralph Barrett, who is well known for his lectures on aspects of wireless history, has succeeded — after seven years — in persuading English Heritage to agree to erect a plaque at 94 Great Portland Street, behind Broadcasting House, London, to commemorate David Hughes (1831-1900), Professor of music and scientific experimenter. He invented the carbon microphone (and the word "microphone" too, hoping it would do for sound what the microscope did for vision) and discovered radio waves in 1879 when he set up a crude transmitter in his house and walked in the street outside with a receiver. If the scientific establishment of his day had not dismissed this first radio broadcast in history as mere electro-magnetic induction, broadcasting as we know it might have begun much earlier than Marconi. Congratualtions to Ralph for his efforts.

/ *continued on next page*

Contents: Bulletin of the British Vintage Wireless Society Volume 15 no. 2.

In Passing: news, comment, continued

Nostalgic trio

Members with a nostalgic ear for vintage BBC programmes should listen out for a recently formed group of performers called "The Melody Rations" who are making a name on the fringe theatre circuit with a re-creation of the 1940's "Workers' Playtime" broadcasts that used to tour British war-production factories. Two boys and a girl, (Maryjane Stevens, Laura Macaulay and William Martin, directed by Ann-Louse Crocker) they have carefully researched their material and present it delightfully, recalling the times when rationing meant clever "Kitchen-Front" cookery followed by anti-indigestion advice from the Radio Doctor and morale-boosting songs to sing in the air-raid shelter.

BBC Bristol

To celebrate the 20th birthday of the station, BBC Radio Bristol are staging an exhibition of photographs and sets and a vintage "enthusiasts' corner" at the Watershed gallery on 8th and 9th September and the BVWS will have a presence there.

Directory

We are preparing a Directory of Suppliers and Services relating to vintage wireless requirements and would be grateful if members will supply any information they have. We have a number of members who are dealers in various items of interest, for instance, who may wish to be included, as might members who can offer services for rewinding of transformers, electro-plating. loud-speaker re-coning, re-magnetising of earphones and drive-unit parts, reproduction of knobs, set-backs and cast parts, making of transfers, polishing and cellulose spraying, reprinting hand-books and data, undertaking special finishes such as "crackle" and "wrinkle", paint matching and many other things. If you make, sell or service anything to do with the subject or can tell us who does, you would be greatly obliging members in general.

Great Wireless
Bores of today number 4
"Old Foghorn"

Foghorn is a loud man, who has a nasal, monotone, hollow bellow like a baa-lamb in a bathroom: an affliction which may have progressively damaged his ear-drums, for he seems seldom to have heard anything but his own voice. He is a fount of useless information and unamusing trivia and has an uncanny ability to spoil any potentially funny story (it's the way he tells 'em). He asks questions, then talks loudly through any replies that you are foolish enough to offer. He assumes that what he *doesn't* know about wireless isn't worth knowing; but is unaware that what he *does* know isn't worth knowing either. His collection is as boring as himself: an unresearched, unrelated accumulation without intrinsic technological or historical interest. He simply has *more* than anyone else. If you ask him for a circuit diagram he *can't* help; if you ask him his sources of supply he *won't* help. In fact, there isn't much point in asking him anything. You could try asking him to leave but he's unlikely to hear you.

Civic Sets

Dave Adams has written for information on "Civic sets". In November 1946, the Wireless Trader reported that a number of local boroughs were entering the radio market with their own "Civic Concord" sets through the municipal electricity undertakings — in competition with established makers selling through normal retail channels. There were three models, all in wooden cabinets, 4 and 5 valve AC and AC/DC superhets offering 3 to 5 wavebands at £16 to £19 or on hire purchase terms of about £1 a month. Plessey's denied that they were manufacturing such sets. It was reported that an election in Kingston, where the Socialist council had been pressing for sale of receivers through their electricity undertaking, had resulted in Conservatives and Independents outnumbering the Socialists by 14-11. The radio traders' association, concerned about competition, commented that the answer to municipal trading "lay in the ballot box".

Does any reader know what happened to Civic sets?

Chairman's notes:

New Treasurer: For family reasons, Desmond Thackeray is having to spend much time away from home at short notice: and for this reason he feels that he cannot continue the Society Treasurer duties.
We owe Desmond much gratitude for the dedicated work he has done over many years and he will certainly be missed. But we are fortunate in that Alan P. Carter is willing to step into the breach, so he has joined the Committee as co-opted Treasurer until such time as his appointment can be put to the A.G.M. on October 7th. All correspondence for the Treasurer should from now on be addressed to Alan at Lime Tree Cottage, Loxhill, Hascombe, Godalming, Surrey GU8 4BQ.: his telephone number is Hascombe (048632)-535.

***Annual General Meeting:** The Society's Annual General Meeting will take place during the Autumn Harpenden, on October 7th. The A.G.M. should be properly conducted without interference from members' private conversations, and to this end we shall hold it this time in the small hall Annexe at Harpenden, a better setting for members who really wish to hear and take part in the proceedings.*
As is constitutionally required, all Society Officers and Committee members will stand down at the A.G.M. and nominations are invited for any of these positions. Nominations, with the names of proposers and seconders, should be sent to me as Chairman by September 26th. Proposers should ascertain that their nominee is in fact willing to stand for election.

***West Country Meetings:** The Society is not at present involved in West Country swap meetings. Any current meetings are independent ventures of their organisers, not under BVWS auspices.*

Telford Seminar:** It was a matter of regret that the proposed BVWS Seminar at Telford in April had to be cancelled for lack of support. We had hoped that a Midlands location would be convenient for members who find the London area too much of a journey, but evidently the arrangements were attractive to only very few. We would like to try again sometime to set up an event elsewhere than the South-East, and I would be most grateful to hear ideas from any members who are good enough to write to me. Is the Midlands a good location? Is a Saturday a good day to choose, or would only a Sunday suit the majority? Does the name 'Seminar' sound off-puttingly academic and formal, (even though it would in fact be just some fairly light talks and a bit of discussion and lively argument amonst friends)? Please let me know what you would like. — **Pat Leggatt

Coherers in action

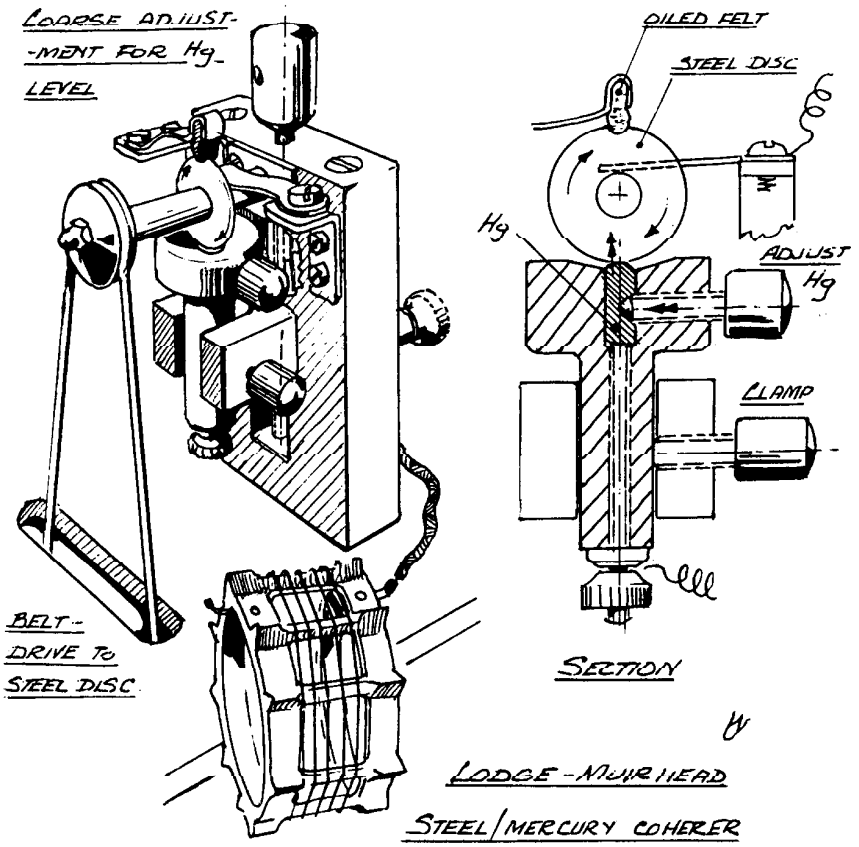
by Pat Leggatt

Recently I was fortunate enough to acquire a Lodge-Muirhead-Robinson coherer, the one in which a steel wheel dips into mercury. This was patented in 1902 and the device I have does not appear to be a commercial model, but rather a laboratory prototype: so it could well have been made soon after the patent date. E. E. Robinson was Lodge's assistant who actually constructed the original devices.

Referring to the illustration, the sharp-edged steel wheel can be seen on the horizontal shaft near the top, with a drive pulley on the outer end. Just below the wheel is an ebonite cup with a hole running vertically down through the ebonite supporting pillar. A little mercury is fed into the cup, running down the central hole and making electrical contact with a terminal at the bottom. The mercury partly fills the cup and the cup can be raised by means of the adjusting screw at the extreme top of the device so that the steel wheel just grazes the mercury surface. The wheel is connected to another terminal at the back via a springy brass finger bearing on the wheel shaft.

A drop of oil is fed onto the mercury in the cup so that, as the wheel revolves, a thin film of oil insulates the wheel from the mercury. An incoming radio-frequency pulse breaks down this oil film, reducing the resistance of the wheel-to-mercury circuit to a low value and operating some form of indicator. When the incoming r.f. pulse ends, the rotating wheel sweeps up more oil, renewing the insulating film and making the device ready for another signal.

To set the device to work I dismembered an old electric clock motor, extended one of the shafts and fixed a pulley to it. Mounting the motor in a box below the coherer, and coupling the motor and coherer pulleys with a rubber band, enabled me to drive the wheel at about 1 revolution per second. The rubber band drive can be seen in the drawing and at the back of the box is a tuned circuit for receiving signals from my small spark transmitter working on about 6 MHz (50 metres).



This drawing, by *Norman Jackson*, shows a rare Lodge-Muirhead-Robinson Coherer of about 1902, a device for detecting radio waves which *Pat Leggatt* writes about in this issue. In this device, a steel wheel dips into a cup of mercury but is insulated from it by a thin film of oil; an incoming radio-frequency pulse will break the oil film, reducing the resistance of the wheel-to-mercury circuit, thus operating an indicator. When the pulse has passed, the wheel picks up oil again and returns the Coherer to a "ready" state.

I had earlier done some experiments with the better known type of coherer with metal filings loosely placed between metal contact plugs in a glass tube. I have not got an original coherer of this type, but one was quite easily constructed from an old neutralising condenser comprising a 3⁄16" diameter glass tube with a 1⁄16" gap between removable electrodes. Although not the real thing, this serves in my collection to demonstrate a coherer in action. Using brass filings in the tube, the normal resistance of the loose mass is almost infinite — greater than 20MΩ anyway. Reception of a pulse from the spark transmitter causes the filings to 'cohere' and the resistance drops dramatically to about 100Ω. This low-resistance state is maintained after the transmitter pulse is finished, a mechanical disturbance such as a light tap on the tube being necessary to 'decohere' the device and restore the high-resistance condition.

When such coherers were used for wireless morse communication in the early years of this century, the low-resistance state enabled a bell to be energised and the bell trembler was arranged to apply the decohering tap and automatically make the detector ready for the next signal.

Work with the Lodge steel/mercury instrument prompted me to look again into coherers in general and to re-read Dr Vivian Phillips' excellent treatment in his book "Early Wave Detectors" (published by Peter Peregrinus, 1980) and his account of experimental work in a paper delivered in 1975 at an I.E.E. week-end meeting at Manchester on "The History of Electrical Engineering". From these and other sources one can discover the various theories of operation of coherers; and one also learns that no single theory can adequately explain all the observed phenomena.

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Technical Research continued

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Metal filings coherers

There seem to be three phenomena to be explained: first, the initial high-resistance state; second, the drop in resistance on receipt of a signal and third, the fact that this low-resistance condition is maintained after cessation of the signal.

Initial high resistance

The initial high resistance can be explained on the basis that the metal particles are so loosely packed that there is little or no contact between them; or that the particles are insulated from one another by a thin layer of metal oxide. A working coherer can be made using carbon granules, which cannot be covered with an oxide film since the oxides of carbon are gases: and Dr Phillips' experimental work shows clearly that the initial resistance of a mass of metal particles increases markedly with the thickness of an oxide layer. So it seems that both the air gap and oxide film mechanisms can play a part.

Resistance drop with signal

Turning to the resistance drop on receipt of a signal, there are two main lines of explanation, differing as to whether or not they postulate movement of the particles. Small movements could be brought about by electrostatic forces between particles, bearing in mind that although the signal potentials are very low (a few tenths of a volt) the air gap or oxide film between particles is very thin, so that the electrostatic field strength could be quite high — 0.1V across a gap of 10^{-7}cm. results in a field of 1MV/cm.

Thermal expansion due to eddy current heating could also cause small movements tending to push the particles into contact. Electromagnetic forces arising from eddy currents could perhaps play a part by causing a general stirring of the particles.

An alternative explanation, not depending on particle movement, suggests that the metal oxides have a negative coefficient of resistance change with temperature. Local heating at a point of contact would thus reduce the resistance of the oxide film, permitting more current to flow and generating more heat. The process would be cumulative, resulting in a large drop in resistance. This explanation could possibly be applicable to carbon coherers as well as metal filings types since, although the oxides of carbon are gases and no insulating oxide film would surround the particles, carbon itself has a negative resistance/temperature coefficient so that a cumulative reduction of resistance could occur.

Again it seems that more than one mechanism may be operative, and both particle movement and negative coefficient explanations may be valid.

Need for mechanical de-cohering

If particles have been forced into contact and any insulating oxide layer punctured, there seems no reason why the low-resistance condition should not persist until the contact chains are broken by some mechanical disturbance.

On the other hand, it is *not* obvious why conduction brought about by heating a layer with a negative resistance/temperature coefficient should remain after the signal current ceases and the contact area has cooled down.

It is suggested that the current density (amps per square centimetre) at the minute points of contact is sufficient to fuse the metal and weld one particle to another: and, under the microscope, Dr Phillips has confirmed that this does take place. This, with metal particles, can account for maintenance of low resistance brought about by the negative coefficient mechanism, and would give rise to a rather more stable cohered condition in general.

In the case of carbon granules, with a melting point over 3,500°C, it seems hardly possible that welding occurs. Any maintenance of low resistance must arise simply from continuing close contact.

Filings coherer experiments

Nature of metal particles

Having digested the various theories of operation, I carried out a few rather random experiments on particular aspects that interested me. First of all I wondered whether coarse or fine particles performed better. I had read that Lodge's original experiments with this type of coherer employed very coarse iron particles in the form of lathe turnings; whereas Marconi advocated the finest possible particles, produced with the aid of a worn and clogged-up file.

The brass filings I was using appeared fine enough to the naked eye, but examination under a microscope showed them to be more akin to shavings than granules, with many points and sharp edges. Accordingly I produced another batch using a very smooth file, and these when examined could indeed be termed 'granules' with rounded blunt contours and few sharp edges. I expected that the original sharp-edged particles would more easily puncture an oxide film and show better sensitivity and lower cohered resistance than the granular ones; and this did in fact prove to be the case. In both versions the initial high resistance was something over 20MΩ: the coarser sharp particles dropped to about 100Ω on receipt of a signal, while the fine granular particles required a rather larger signal to make them cohere and their resistance dropped only to about 5kΩ.

So I seem to side with Lodge rather than Marconi on this point, although of course there may be circumstances under which the finer particles would be preferable — I can imagine for example that a fine-particle coherer might be less prone to accidental triggering and thus more reliable in service.

Dr Phillips' paper details measurements of uncohered resistance with coarse and fine particles, showing that the finer the particles, the higher the resistance. His coarse and fine particles were derived by sieving from a common initial batch of filings so his experiments were, as he intended, primarily concerned with the effects of particle size. My experiment, although I set out with the idea of using particle size as the variable, turned out to be more concerned with the *shape* of particle, jagged or smooth.

Carbon granules

I next tried carbon granules as the active ingredient in the coherer. This certainly worked, with an initial resistance of some 30kΩ falling to about 3kΩ in the cohered condition. Sensitivity was noticeably less than that of the metal filings version.

An interesting point is that the Russian Popov and others declared carbon coherers to be largely self-decohering, returning to the high-resistance state without mechanical tapping. In my carbon granule version the low-resistance cohered state was far less stable than with metal filings, the resistance reading wandering randomly and in fact occasionally reverting to the original high-resistance condition spontaneously after dithering about for 20 seconds or so. But this can hardly be regarded as self-decohering and almost always the usual tap was needed; so I found little or no evidence of real self-decohering action, in my device at any rate.

continued: Technical Research

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Operating frequency

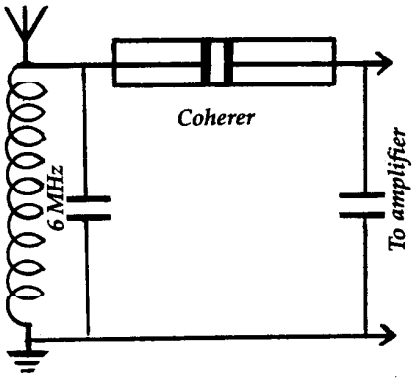
I now turned attention to whether the coherer action was noticeably frequency-conscious. Abandoning my spark transmitter for a sinewave source and r.f. amplifier, I subjected the brass filings coherer to quite strong r.f. fields, both electromagnetic and electrostatic: but none of this would make the device cohere and I guessed that it was the initial sharp transient from the spark transmitter which triggered the action rather than radio waves as such. To prove this I would like to have subjected the coherer to a single electrostatic step function with no accompanying oscillations; but I soon gave this up since any circuit must possess some inductance and capacitance, and any electrical discharge will be accompanied by oscillations. In any case, a true step function is composed of an infinite series of sinusoidal Fourier components, so my idea was thoroughly ill-founded!

Nevertheless it would be interesting to investigate more fully the nature of the signal required to produce the cohering action, and perhaps someone will take this up. I did in fact try the effect of zero frequency (D.C. to you and me) applied directly to the coherer terminals, but again with no very satisfactory result. Application of comparatively high potentials up to 12V or so produced no cohering effect; but at 15V D.C. the coherer resistance broke down to the low-resistance state. This 15V threshold was quite repeatable and indeed tallies closely with a figure quoted by Dr Phillips — for nickel filings in his case. You could almost use a coherer as a reference in an electronic voltage stabiliser, but perhaps we'll stick to zener diodes as you don't have to keep tapping them!

An anti-coherer

An anti-coherer is one in which the resistance *rises* on receipt of a signal. Dr Phillips quotes reports that under certain conditions filings of aluminium, and some other metals, exhibit this effect; and ascribes the behaviour to the fact that aluminium oxide probably has a positive resistance/temperature coefficient.

Eager to learn, I prepared some aluminium filings but was disappointed to find the action exactly the same as with brass filings, except that the cohered resistance was even lower at about 20Ω. I then realised that my freshly-filed aluminium would probably not have an adequate oxide



layer, (essential to the anti-cohering action), so I heated the filings in air for some ten minutes. Unhappily this made no difference, normal cohering action still being found, so one day I must find someone with an oxygen cylinder and build up a really good oxide layer.

In this regard it is worth stating that results with any metal filings coherer are likely to depend critically on the thickness of the oxide layer: Dr Phillips' experiments with controlled layer thicknesses prove this point conclusively.

The Lodge mercury-oil coherer

Back now on the Lodge coherer, the construction and operation of the device has already been described. In this form of coherer a thin film of oil acts as the insulating layer between the two electrodes — the steel wheel and the mercury. Application of a signal of only a few tenths of a volt sets up electrostatic force between the wheel and the mercury sufficient to mechanically squeeze out the oil film and allow low resistance contact. Despite the small signal, the electrostatic force can be considerable: a calculation by Lord Rayleigh indicates that a potential of 1 volt across an oil film 10^{-7}cm. thick results in mechanical pressure across the film of 650 lbs/square inch.

In the light of this figure, it can be imagined that the insulating oil film readily breaks down with application of only a small e.m.f.; and this holds for applied D.C. as much as a radio signal. I found that the insulating film ruptured with a D.C. potential of about 0.5V, and it is said that with careful adjustment the rupturing potential can be as low as 0.1V.

This of course makes for a sensitive detector, but raises problems when considering how to indicate that cohering has taken place. The cohered resistance is only an ohm or two and at first thought this seems fine for operating an indicating bell or buzzer. But if the applied D.C. must be less than 0.5V to avoid premature rupture of the film, then the indicating device must be capable of operating with a potential no greater than this.

When the Lodge coherer was in operational use, the indicating devices would have been earphones or a syphon recorder, both of which could operate satisfactorily with low-voltage excitation. Alternatively a sensitive relay with a suitable low-impedance coil could have been used to enable a higher-voltage instrument such as an electric bell to be energised.

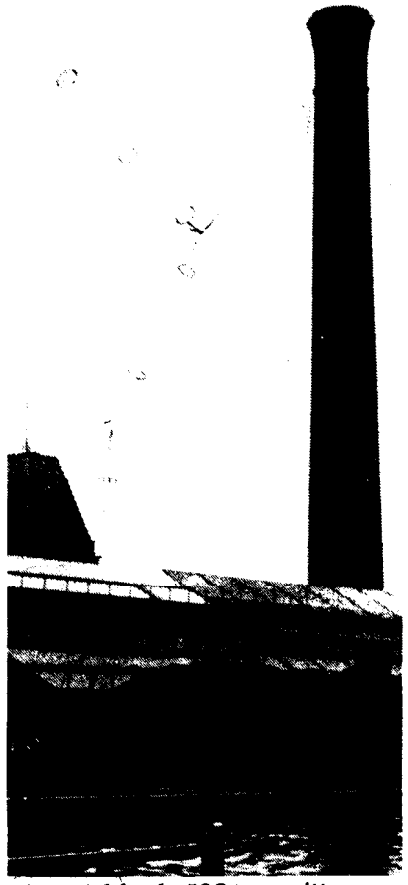
For demonstration purposes I wished to operate a 4.5V buzzer, and I am ashamed to say that I have taken the easy way out and made up a transistor D.C. amplifier to drive it from the coherer. At least this anachronistic item is concealed within the box on which the coherer is mounted!

My initial trials showed that the coherer worked well, especially when the D.C. potential across it was adjusted to be just below the breakdown threshold. But the range of my spark transmitter/coherer communication system was rather limited, about 12 inches in fact with the coherer in the transmitter induction field. To improve things I decided some syntony was needed (tuning for any readers born after 1910) and added a tuned circuit as shown in the diagram.

As an incidental point my spark transmitter, a small World War I model, is said to operate on 80 Metres (3.75MHz). The exact frequency is dependant on the capacitance of the aerial in use; and I intended to use only a foot or two of wire, so expected the frequency to be higher than specified. It is a credit to the synchronising circuits of my oscilloscope that I managed to obtain a locked display of the damped wave trains following the spark discharges, which of course commenced at uncertain intervals determined by the rather low-quality buzzer in the transmitter.

In this way I discovered the actual radio frequency to be about 6MHz and dimensioned the coherer tuned circuit accordingly. With transmitting and receiving aerials each a few feet long, the working range is now sufficient to transverse the shed housing my collection. Don't ask me if the neighbours enjoy my spark transmissions: I don't press the key all that often!

Sir Harry Lauder



The aerial for the 5SC transmitter was slung from chimneys at Pinkston Power station which generated power for Glasgow's trams.

Early days of broadcasting in Scotland

by Douglas Gough

In February 1923 'Wireless World' announced, that the erection of the broadcasting station at the Port Dundas Corporation's Electricity Station at Glasgow had begun.[1]

Glasgow Station 5SC was opened at 7 pm on March 6th 1923, its programmes issuing from a studio in 202 Bath Street near the City Centre. Scotland's first wireless broadcasting station was inaugurated by the then Lord Provost of Glasgow Sir Thomas Paxton.[2]

To the strains of the Scottish air "Hey-Johnie Cope", the sound of the pipes were transmitted the length and breadth of the country. The Wireless Orchestra played a selection of Scottish Music, followed by various items including a suite from the ballet 'Russe', Miss Eva Turner sang something from the Opera 'Aida' that she had been performing at the Theatre Royal the previous Monday evening. Miss May Lymburn sang arias from 'Samson and Delilah' in a 'sweet and natural voice' (as described by listeners) but although the piano did not come over too well, this did not detract from the immense excitement of the first programme. During the interval the station closed down for half an hour, to allow listeners in Glasgow to tune into the B.B.C. London Station. Afterwards 5SC broadcast more music and the Evening's News.

That evening in a suitably draped upper room, the Opening Ceremony of the station was attended by dignitaries including Lord Gainford (B.B.C. Chairman), Sir Thomas Paxton (Lord Provost of Glasgow), Directors of the B.B.C., representatives of the Western Electric Company, the Director of the Station Herbert A. Carruthers and of course John Reith (General Manager of the British Broadcasting Company).

Lord Gainford said he had received encouraging messages from many important people on the occasion of the opening of the station including the Lord Provosts of Aberdeen, Dundee, Edinburgh and Perth. A telegram from the Prime Minister, Mr. Bonar Law read "I am glad to see that a Broadcasting Station has been opened in Glasgow, and I wish it every success!" Lord Gainford said he was anxious to please the listening public, John Reith, a Scotsman and citizen of Glasgow, and Sir William Noble and all the Station's staff would ensure the very best in entertainment, news, sports and good music. Wireless was still in its infancy but all concerned would do their best to make the Station a success. It was promised that the children would not be left out and the first programme was 'Childrens Corner'[3] to be broadcast every tea-time, and featuring 'suitable' stories, 'instructive' talks and fairy tales.

Each night a good orchestra would play, with select artists. Dancers were promised an adequate selection of Ragtimes, Two Steps, Waltzes and Fox-Trots.

Declaring the Station open, Sir Thomas Paxton said the opening of the station marked an important development in the science of wireless telephony. Sir Donald McAlister, Principal of Glasgow University harked back to 1853 when a young Glasgow Professor William Thomson, wrote a paper for Glasgow Phylosophical Society on 'Transient Electric Currents'. It was a piece of mathematical analysis predicting a practical method of generating electric oscillations. William Thomson became the famous Lord Kelvin and many years later was a consulting engineer for Marconi's Wireless Telegraph and Signal Company.

The people of the City had fine opportunity to hear the opening broadcasting even if they were not fortunate enough to possess a wireless set. The City Corporation provided a large hall where members of the public were invited to 'Listen In' to the programme. A receiver with loudspeaker was installed by a local music publishing firm,[4] with an aerial strung across the hall above the heads of the audience. In the course of the programme the Lord Provost came over from the concert room at the Bath Street Studio to become a listener-in himself at the Berkeley Hall. Other venues in Glasgow that evening gave eager members of the public opportunity to hear the wireless. In nearby Waterloo Street about sixty people heard the programme via a two-valve Gecophone Set with horn loudspeaker.

Historical

continued from previous page

The transmission was advertised on a wavelength of 415 metres.[5] However one listener, living at Cupar estimated the real wavelength that evening was around 396 metres! Yet even before the interval of the first programme a message was received from the City of Perth congratulating the station on a successful opening.

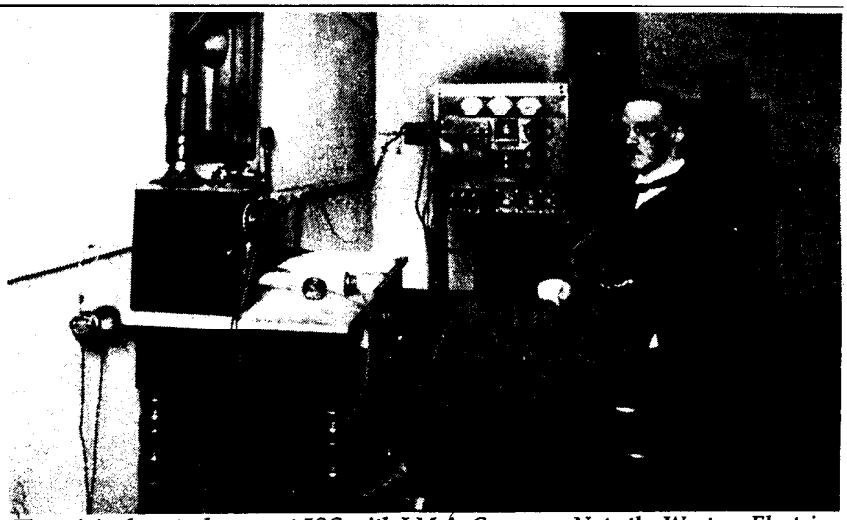
On the evening before 5SC started its regular service a test transmission was radiated, and on opening day a further test from the transmitter was made between 5 and 6 pm. Listeners were informed that a crystal set would be adequate for reception in the Glasgow area but since the station had a predicted range of 75 miles a two valve set was recommended for reception in the service area — four valves for listeners in more remote parts.

The broadcasting studio, about 30 feet square, was probably equipped with a Western Electric carbon microphone on a pedestal and a platform for artists to stand on to keep them at the correct height. The room was heavily draped and the floor covered with felt for acoustic correction. A small observation window allowed the control-room operator to monitor the proceedings. Signals from the microphone were fed through a Western Electric type A8 Amplifier, with a small receiving set and horn loudspeaker for monitoring.

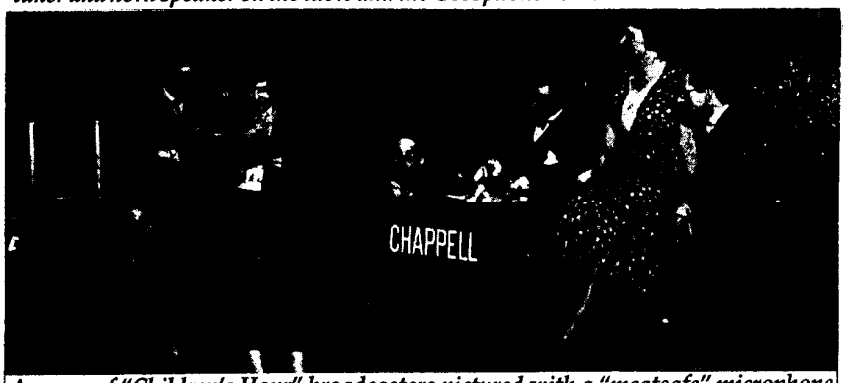
The transmitter was located some distance away on high ground at Glasgow's Electric Power Station at Port Dundas, linked to the 5SC Bath Street Studio by underground cable and telephone. The power for the transmitter was at first instance derived from the mains direct current of 500 volts,[6] routed via a switchboard to a 10 horsepower D.C. motor directly coupled to a 6 kilowatt single phase 300 C.P.S. alternator at 500 volts, then connected to a 6 kilowatt transformer.

In the tower of the power station the actual transmitting equipment was encased in metal and glass cabinets, the equipment being similar to the 2LO transmitter serving the London area.[7] The transmitting aerial was 200 feet long, consisting of four wires in the form of a giant "sausage", separated by hoops stretched from the Wireless Room on the second floor, to the top of one of the power stations' tall chimney stacks.

REFERENCES: *1 – Wireless World, Feb. 3rd 1923, page 611. 2 – The Glasgow Herald newspaper, March 7th 1923, page 11. 3 – 'Radio Times', Oct. 12th 1923, page 93: 'Uncle Caractacus comments about the B.B.C. Glasgow, Stupid Cat, named 'Susie' – coloured pink with blue spots!' 4 – Ewing and McIntosh, Music publishers. 5 – By January 1924 5SC's wavelength was changed to 420 metres. (Jan. Radio Times 1924). 6 – The Port Dundas power station supplied current for Glasgow's electric tram network. 7 – 'Wireless World', Dec. 23rd 1922, pages 389 to 392 – detailed description of the 2LO transmitter and photographs.*



The original control-room at 5SC with J.M.A. Cameron. Note the Western Electric tuner and horn speaker on the table and the Gecophone "Smokers' cabinet" set above



A group of "Children's Hour" broadcasters pictured with a "meatsafe" microphone

Broadcasters round the Round-Sykes marble microphone

The 5SC transmitter

Comment

The Power and the Glory

by Geoffrey Dixon-Nuttall

Readers will be aware of manufacturers' claims about "power" output and the deceptive descriptions intended to glorify their products but they may not be aware that it happened with vintage equipment too.

One of the regions in which what is now called "Public Relations" (there are other names for it) comes to light is the vexed question of power output. It was, it seems, usual practice for set makers to claim power outputs which were in fact, never reached.

One example will show the sort of thing. The 1939 Philips range includes the models 855 and 735, for both of which a power output of 4 watts is claimed. Now both of these sets, (which are very good radios) use the EBL1 valve, and this is rated by the Wireless World at 3.6W. The distortion is not stated, but I suspect it is 10%. Even a perfect output transformer can be expected to lose 10% of power at least, so we are now down to 3W undistorted. In fact the specimens I measured gave 2W.

The origins of this probably go back to when sets were sold without speakers. The power output at the speaker terminals was then usually equal to that claimed.

The only set I have measured that gives the claimed output is my Atwater Kent. This has no output transformer, but uses a choke. The power output is claimed as 70mW, and that is what you get — from the speaker terminals. Unfortunately you still have to use a transformer to match a moving coil speaker, but that is no concern of theirs! Measuring output power is not easy, I would agree. The method I use is to look at the output to the speaker on a 'scope and increase the input (at 1 kHz) until distortion can be seen. If negative feedback is used this happens quite suddenly. Carefully measure the peak volts.

Now watts equals V^2/R, or for peak volts $V^2/8R$, where R is the impedance. We have measured V, how about R?

The impedance of the speaker is somewhat of a problem. It can be taken as roughly 1½ times the D.C. resistance, but it is probably better to assume that the manufacturer used the correct transformer ratio to match the valve. In this case the secondary impedance equals the optimum load divided by the turns ratio squared.

I have usually found that the average table radio gives about one watt. In some cases the transformer has been replaced by one of the wrong ratio, or such a cheap transformer has been used that the output is much less than this. If you use a small enough transformer the output of, for example, an EL33 goes down to about half a watt!

In any case it is absurd to suppose that the tiny set with a five-inch speaker and using a 6V6 will give anything like the 5 watts of which this valve is capable.

The sort of catalogues issued before the war would be jumped on heavily nowadays by the Trades Descriptions Act. Manufacturers usually gave the output according to the rating of the output valve, assuming that that was what you got. Sometimes it was given in milliwatts, which must have impressed the public no end! (In fact, if one wants to be a purist, things are much worse, because the speaker will only convert about 5% of the power into sound anyway.)

An even more misleading habit was to give the power in terms of the output valve *dissipation*. This sounds very impressive; see, for example, the "50 watt" model by R.G.D. In fact this probably gave about 8 watts.

All this is rather academic from the user's point of view. The audible difference between one and two watts is probably undetectable in the average room — most listeners use a mean level of 50 milliwatts anyway. But I am only surprised that nobody seems to have remarked on the discrepancy between promise and performance.

Hints and tips

Salvaging rusted moving-coil loudspeakers

A major problem with radios stored in damp conditions is always the loudspeaker. I have found the following method helpful.

Be brave! You will almost certainly have to take out the cone. For the common mass-produced cone with a cardboard ring which clamps to the baffle – assuming there is one – use a small, sharp screwdriver and dig under the cardboard ring which is of course stuck to the cone edge. Push gently round the metal frame, release the voice coil leads and you may be lucky and be able to ease out the cone and centering device. There will be bolts or rivets to remove to free the centering device. Don't worry if rust has attacked the cone edge. If this parts company from the cardboard it can be replaced with a ring of copydex when re-assembling. If the voice coil is trapped by rust try to remove it from the gap by gentle pushing and pulling. As a last resort you can try WD40 but this hinders rust removal and repair to damaged enamel on the coil.

Once the cone is out the gap has to be cleaned, strips of fine glass paper folded so that both inner and outer edges are cleaned. Brush and shake out what debris you can. Do not on any account attempt to dismantle the magnet. Instead, take a roll of paper masking tape, cut small strips and work round the gap. The dirt and rust will stick to the adhesive. Seal the gap with a piece of masking tape so that you can clean and spray the frame.

The rest is obvious: lightly re-varnish the coil if needed. Protect the pole pieces with copious WD40. Allow to dry and re-assemble. Use Copydex to form a latex bridge across large gaps and holes.

I can't guarantee quality but I have had some very gratifying results.

from Don Turner

Readers are invited to contribute to this column. Have you solved a problem in repair or restoration? Do you know a clever dodge (as opposed to a bodge)? Ideas, great or small, should be sent to the Editor.

How *not* to take photos of your radios!

by 'Half-watt'

I should really come clean with a subtitle: *"How I Took Disappointing and even Useless Photos"*, because this is a subject I can certainly claim to know something about. In the last 50 years I must have made all the mistakes possible, in every combination, many times over. Just in case *you* haven't yet experienced all of them, I'll explain a couple that are almost certain to give trouble. And remember, my mistakes have helped to keep Messrs. Kodak in business manufacturing more film for me to spoil.

Problem 1, very high contrast: It is almost impossible for the photographic process to cope with an enormous range of scene brightnesses in the same image. So, to make it difficult to get a satisfactory print, put a black (or dark brown) radio in front of a white background, or a white (or cream coloured) radio in front of a black background. Figure 1 should give you some idea of the result, a dramatic silhouette perhaps, but not usually what one wants.

Problem 2, specular reflection: Most dark radios are quite shiny and/or have shiny dials or trims. So, to get a blaze of unwanted reflected light obscuring the middle of the radio, have a small bright light source at the camera and set the radio "square-on", as happened for Figure 2.

Now, having combined an unsuitable background and the wrong lighting, it is very unlikely that the negative will afford a usable print on a high contrast printing paper without a struggle in the darkroom; nor will the resultant print make an ideal subject for any high-contrast photo-mechanical printing process. The result is most likely to be "soot and whitewash" syndrome.

So, How to Take Somewhat Better Photos? Supposing of course that you are still determined to take photos of your radios, after such chastening experiences as I describe. I've no certain recipe for success; but a policy of "don't do as I did" *should* help you on your way. Experiment with one or more of the following, using a few frames of your domestic colour film. Send the film off for processing as usual. The domestic snapshots provide a useful control on whether the "laboratory" is doing a consistent job on the processing and printing.

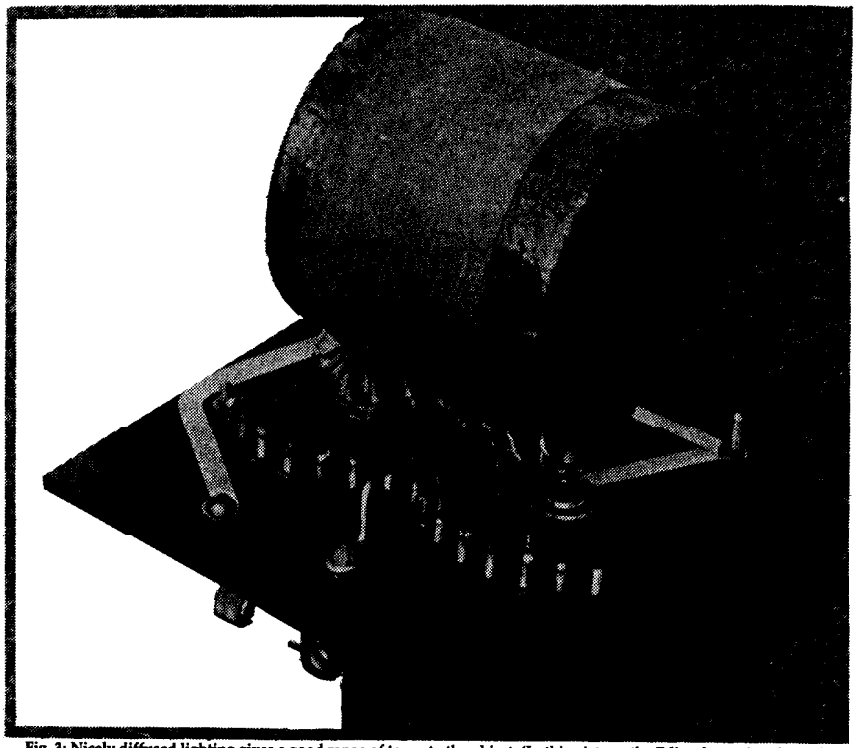


Fig. 3: Nicely diffused lighting gives a good range of tones to the object. (In this picture, the Editor has painted-out the left-hand side of the background at the production stage to show how an object can be made to stand out better.

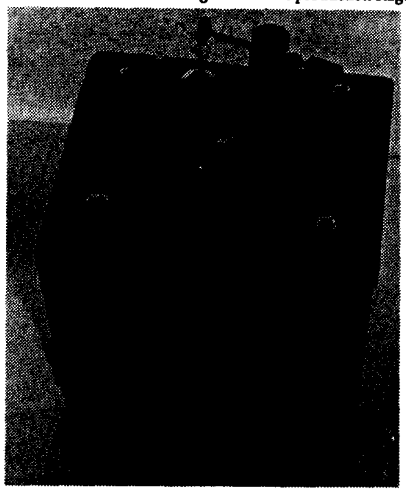
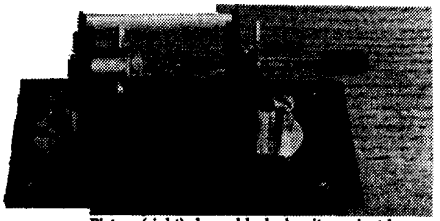


Fig. 1 (left: A dark object against a light background may result in simply a silhouette instead of a well-exposed object.



Picture (right) shows black ebonite against brown

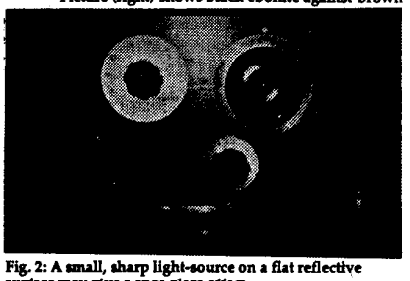


Fig. 2: A small, sharp light-source on a flat reflective surface may give a spot-glare effect.

1) Use medium-toned backgrounds, though in any colour and texture you like. In Figure 3 the background is a blue-green carpet.
2) Angle radio to control, though not necessarily eliminate, mirror-like reflections.
3) Spread the light source(s), e.g. bounce off a white card or cloth, white ceiling or side-wall and/or use overcast skylight. A faster film may be needed under weaker lighting conditions.

Got good photos at last have you, medium to low brightness contrast, and no patches of soot or whitewash? Just the item our editor needs for the Bulletin but rarely gets offered. Pick the most interesting one from what is now an album of very fine photos and send it in, with a few words about the subject.

Editor's note: *Contrary to popular belief a "contrasty" picture is not the best for reproduction, but one which has a good range of grey tones. Sharpness is vital and it is desirable that the background should be put out of focus, but an obtrusive background can always be painted-out (another reason why you don't have to place your object on a contrasting background). Black and white photographs are preferred but often colour ones can be used although the final effect may lack contrast.*

Feedback

More about the wartime "Utility" set

Jim Butterworth follows up the reponse to his article in the last Bulletin.

The article in the last Bulletin seems to have generated quite some interest - more, in fact, than my demonstrations of the Blattnerphone, the Meatsafe microphone or the Televisors a few years ago. Perhaps it is because more can identify with these simple sets — so many survived for so many years it is unlikely that any of your readers has not seen and heard one and, unlike most 'milestone' sets, there are enough surviving for everyone who wants one to have one.

I was contacted by a gentleman who has three of these sets brand new and boxed — desirable but not so unusual; I have six late forties/early fifties sets in such condition — a hoard of over 20 such sets having recently come to light.

It seems highly likely that John Goldberg's apparently identical set was mine in November 1986 when I wrote the article — I sold it at Harpenden shortly after... But was it? — for he says in his letter that the set was tatty and the paintwork poor — mine wasn't pristine, but it was very much better than tatty. Inconclusive, but the letter from Maurice Steadman was more helpful for he repaired these sets in their heyday. He has an uncoded MW/LW set which he recognises as as being quite possibly made by Ultra and which appears not to have been a conversion, but carried out "all at one go" in the factory. Maurice reminds us that in the forties most people still had a 'real' outside aerial in their back garden and these sets had excellent sensitivity and selectivity when so driven. Indeed this goes for many pre-war sets and their performance can be quite a revelation with 100 foot or so of wire hung (with appropriate insulators) from a tree at the bottom of the garden to the eaves of the house.

No-one has come forward with any information about the sets seen at the McMurdo works but a letter from Dave Adams takes our knowledge further forward as it relates the pre-production history, from cuttings saved from the "Trader". It seems that in November 1941, the Scottish Radio Retailers' Association proposed that plans should be put in hand for the production of a standard broadcast receiving set. In their letter sent to the Ministry of Supply (remember them?) they suggested that the set should be made from standard valves and components. The proposal would, however, have resulted in a rather cruder set than eventually resulted, for they went on to suggest that it should be for local reception only on medium waveband, with one tuned circuit (T.R.F.), two triode amplifiers and a bakelite cabinet.

By 1944, paper restrictions were really biting, and a much smaller format "Trader", published on alternate Saturdays, told us that the Retail Manufacturers' Association had been asked to design and produce a suitable receiver for civilian use employing the minimum number of valves and designed around components in large supply for the Services. "Manufacturers will be required to apply the expression 'Wartime Civilian Receiver' by means of a transfer to wireless sets made in accordance with certain specifications drawn up by the Radio Manufacturers' Association and approved by the Board of Trade. These words must not be removed or defaced by anyone once they have been so applied."

The Government's desire was that the civilian listening audience should be maintained and this was partly to be achieved by the release of valves and components for repair work and also by authorising the release of sufficient material for standard domestic receivers. It was stressed, however, that manufacture would only be undertaken after the priority demands of war production had been met and therefore the monthly output would be relatively small.

On July 1st 1944, we were advised that the price of the battery version at £10-19s-0d (almost £11) did not include batteries but that the Trade Press were preparing service sheets for the use of dealers. The same week showed that a radio apprentice could earn the princely sum of 5d (approx. 2p) an hour at sixteen rising to 11¼d (just over 12p) at twenty so few could afford such luxuries. A fortnight later, an examination of the new sets showed that from the service point of view they appear to be well-designed and that dismantling was an easy job. A small, but interesting, point was that rental of the battery set was prohibited.

The new sets did not meet with universal approval, however: a correspondent from Supertone Radio of Acton complained that there was no AC/DC version of the set for the six per cent of areas still served by direct current and remonstrated that "the Retail Manufacturers' Association, as custodian of the requirements of the British people, in collaboration with the Board of Trade, have acted without vision and failed miserably to provide for the needs of the very patient public".

In September, the newly formed British Radio Equipment Manufacturers' Association found it necessary to stimulate sales and issued a statement which noted that after five years of war, three million homes needed new radio sets. They explained that, even when civilian production recommenced, many listeners would have to wait a long time for a new set and this was the reason for authorising the production of 250,000 standard sets. A decision to produce a further 250,000 was reserved but never actioned.

Worse criticism followed, for in October a Mr Green suggested that sales of the set were 'sticky' because the prices were high for what were cheap-looking sets and that the austerity and skimping that was visible in the sets was going a long way towards wrecking sales. He added: "They only get two stations" (quite true, for there were only two services — "home" and "forces") and "the worst plastic cabinet would have looked better than that" were further criticisms. The writer concluded "it does appear to me that these sets ought never to have been born; I maintain we cannot expect people to buy things which are condemned on sight". He had sold only one of these sets between July and October despite having them on show in his window.

Two weeks later, however, the dam burst and the criticism was washed away — several correspondents advised Mr Green of the inefficiency of his sales methods and said they had no difficulty shifting all they could get. There were waiting lists for sets in those dark days.

The circuits were published in early September 1944; It was emphasised that the code prefix numbers indicating the manufacturer should remain confidential to the trade and must not be communicated to the public. This emphatic warning also applied to the source of the BVA coded valves which enabled the manufacturer to be identified by the last figure. Unusually for Trader Sheets, addenda to sheet 688 were published in the text of the magazine — amongst other things, we learn of two more suppliers to add to the original 42 — these were subsequently included in the battery sheet (690).

continued on next page

continued from previous page

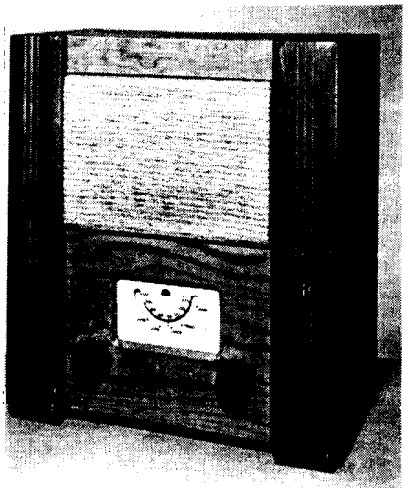
Have you a U5 (Ferguson Radio) set? If so, it might have been one of the batch stolen in January 1945 — 20 sets in the 6,000 to 7,000 range — if you had one, you were requested to report the fact to your local Police Station.

The matter was concluded at the end of 1945, when the Trader reported an exchange in the House of Commons after a member pointed out that the new Light Programme was unobtainable on utility sets (note the use of this term even in the House!). The Government reply was that "the production of Wartime Civilian Receivers is practically finished and the manufacturers are now able to modify them to receive the long wave programme. Those that wish to have this done should take their sets to their retailers. A separate adaptor unit is also available." It would seem the Government had abandoned the set to its fate.

I am indebted to Alan Shaw, who has provided documentary proof that Bush Radio supplied long wave conversion kits to their dealers with full details on fitting and alignment for both mains and battery versions. Being Bush, things were done properly with separate long wave aerial and oscillator coils provided along with a new scale. No less than 40 steps were necessary to complete the conversion and the central knob in the battery version became an off/on wavechange switch. I wonder how many battery sets were converted? — I have never seen one.

Were these utility/standard/civilian sets a success? They certainly filled a gap until the new post-war sets arrived and what they lacked in beauty they made up for in reliability. If the yardstick of successful design is longevity then the number of AC mains versions that survive (despite, or because of, their looks) must put them head and shoulders above any other model. They are survivors.

The utility set was produced in a time of austerity and ration books and queues for everything — my articles may not have advanced our knowledge too far, but I feel they add a new flavour to these simple but robust sets which then, as now, we either love or loathe.



The "Wartime Utility Receiver" which soon acquired the name "The Utility Set".

Frank Brittain has sent the following notes: I think it most unlikely that factories had any stockpiles and demand was so great that there were no available stocks of sets at the end of the war. There were certainly no imports. Regarding modifications, certainly many were made by retailers and users but modifications by manufacturers were unlikely. The use of a particular manufacturers' code number did not necessarily mean *that* manufacturer actually made the set: McMurdo probably made sets for other companies and Cossor made a battery set quota for Ever Ready. I do not believe that the Cossor battery circuit was different from others; I always understood the battery version was a Murphy design using Mazda octal valves. Most areas did not have mains electricity in 1944; the great expansion came after the 2-volt battery sets were still being made post-war as were AC/DC ones since there was still some DC around. I'm not sure but I believe that Westectors were used to save valves.

To produce the wartime sets meant BVA manufacturers producing a million on top of the three million valves the BVA were allowed to produce for maintenance purposes (these being allocated to BVA members on a percentage basis related to their sales in 1938/9.) Cabinets were made by only a few companies and there were small variations. Components were standardised as far as possible but any "in stock" were used up.

**If you would like photocopies of conversion details issued contemporaneously with the sets (from originals kindly lent by Alan Shaw), send an A5 SAE and 40p stamps to the Editor.*

From 'The Leisure Hour' magazine 1897 p673 and sent to the Editor by Eric Westman

Telegraphy Without Wires

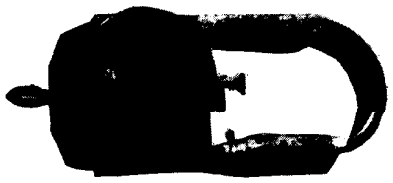
It sometimes happens that delicately suspended magnets on the earth tremble violently while an abnormal disturbance is taking place upon the sun. How is this disturbance transmitted through ninety-three million miles of space?

No one can reply to this question completely: and, to supply an answer at all, it is necessary to assume that so-called empty space is filled with an intangible medium capable of transmitting, not only the vibrations of light, but also vibrations of electricity. We are able to produce light by many artificial means; in other words, we can easily start luminous vibrations. But it is only in recent years that methods of producing and detecting electric vibrations, and of instruments that are sensitive to such waves, just as the eye is sensitive to vibrations of light, has supplied mankind with a new means of communication. For some time past paragraphs have appeared with reference to the use of such vibrations in the new telegraphy, which permits signals to be sent through space without the intervention of wires; but it was only a few weeks ago that Mr. W. H. Preece, chief electrician to the Post Office, made an authoritative statement upon the results of experiments with an apparatus improved by Mr. Marconi.

Electric waves are set up by a torrent of sparks passing between two solid brass balls four inches in diameter. They spread out like waves which emanate from a submarine torpedo when it is exploded, and they can be detected at a considerable distance from their source by means of a very sensitive receiver, which, to use a musical analogy, is tuned in unison with the electric note emitted. The receiver is thus influenced by the vibrations from the transmitter, just as the magnetic needles upon the earth are affected by an explosion upon the sun. When the waves are started or interrupted at the transmitter, the distant receiver is started or stopped, so that signals made at the sending station are repeated at the detecting station. In this way electric signals have been transmitted across the Bristol Channel for a distance of nearly nine miles, and this without the employment of connecting wires or anything of the kind. Hills and apparent obstructions fail to stop the waves, which are also independent of the weather: rain, fogs, snow, and wind availing nothing.

Letters

Marconi's 1901 transatlantic transmission



Editor's note: Here are three letters in response to Pat Leggatt's article in the last issue commenting on a suggestion that Marconi might have been "hearing things" during his first transatlantic experiment in 1901 and hadn't really received the famous three-dot signal.

Letter
from Desmond Thackeray
Marconi's 1901 transatlantic transmission
Bulletin 15:1

Having spent some time working over the slender material available on the Poldhu transmitters (there seem to have been three) during 1901, I am always hopeful of finding a few more crumbs of technical information on this strange hardware. Thus, the altercation on whether or not Marconi deceived himself into thinking that a typical grouping of "X"s, the original jargon for atmospherics, was indeed the Poldhu transmitter, has focussed my interest on the possible performance to be deduced. In a sense, it scarcely matters whether these particular experiments were successful or not. For Marconi, supported by family money, they were an essential enlargement of knowledge in a field he was determined should eventually bear fruit, as it did indeed.

But there are too many unanswerable questions for there to be any definitive statement such as "yes, he did" or "no, he didn't". Could I, however, bring out a "vital technical point" that Angus Taylor probably has in mind, and thus net the red herring of harmonic operation as a possible mode? Though this was discussed in Proc IEE by no less a person than J. A. Ratcliffe, the resonant frequency of the primary of the aerial "jigger" and the spark condenser in his circuit lay at 938 kHz, not the 3 or so MHz required for approximate half wave powering of a vertical 160' aerial. Moreover, he has given little weight to the stray inductance of the primary *wiring*, which would depress the primary frequency still more, and at the same time act (together with primary leakage reactance) as a kind of low-pass filter attenuating *all* higher frequencies. So, while harmonic operation *was* the mode of the 1900 Marconi "Tune A" transmitters installed in ships, it does not seem possible for the Poldhu transmitter with its vastly larger primary condenser.

While one would hope the matter of the easily recognisable Morse "S" would be a clinching argument, this is weakened by the known occurrence of Xs sounding like three dots (though unequally spaced), and the difficulty of pitch recognition of very short tone-bursts by the ear. How short the dots transmitted were is not known, I think. But as the spark-gap arced over for dashes (3 dots length, or what ?) they would not have been generous ones; on the other hand with such a cumbersome key, they could hardly have been very stingy. Fleming could only guess at the spark p.r.f., but thought it well below the supply frequency. So a buzz of between 10 and 20 per second with a very small number of sparks per dot is likely; but still contentious.
Also, recognition is *aided* by the substantial content of audio harmonics i.e. non-sinusoidal waveforms, and both the ear response and headphone mechanics have a treble-weighted response in this context. There is scope here for personal experiment by experienced CW enthusiasts like Angus Taylor, I think, using of course a single earpiece, with stormy sound effects "off", a massive simulated "grasshopper" key and a gated pulse-waveform generator. Without such direct evidence, which clearly we don't have at the moment, it is impossible to say how difficult was the task Marconi set himself in Newfoundland; or indeed how easy? But certainly risky.

I am greatly indebted to GEC-Marconi Ltd. and the Science Museum for the help of their staff in providing information and comment.

Letter
from Ian Higginbottom
Marconi 2

Pat Leggat's article in the March Bulletin reminds me that the Radio Times of 2 November 1923 contains an item, apparently by a staff reporter, describing how he was sent to the London office of Sir Patrick McGrath, then the High Commissioner of Newfoundland, to "get a story out of him about Mr. Marconi's first transatlantic signals". Thus it must have been known to some that Sir Patrick, who was a prominent journalist in Newfoundland in 1901, had personal knowledge of the event. The item reports him as saying that one night towards the end of that year Marconi came to him and announced "I am going to give you some very important news. I have satisfied myself that signals can be received across the Atlantic, and I want you to come and listen to them". Sir Patrick then continued: "On the 12th December, I went down to the temporary station and shall never forget my excitement as I adjusted the headphones and listened for the 's'. It came through all right, although probably in consequence of the weakness of the signals and the constant variations in the height of the receiving aerial, no actual message could be deciphered".

Some details in Sir Patrick's account (only partly quoted here) may suggest journalistic license or the blurring of memory after 22 years but it nevertheless surprises me that I have never seen the Radio Times report mentioned in any of the discussion concerning the receipt or non-receipt of the signals. Can anyone throw any further light on this?

Letter
from Angus D. Taylor G8PG
Marconi 3

Many thanks for "Vintage Wireless" covering the Marconi discussion.

One method which might go part of the way to proving or disproving the Marconi claim has occurred to me. There are many amateurs with access to big antennas in the Canadian Maritime Provinces and the New England states. Some are members of either the Antique Wireless Association or the Society of Wireless Pioneers. If one or more of them could use a simple crystal receiver and a big antenna to try and receive the BBC long-wave Droitwich transmitter during the month of December we would be going some way towards simulating the Marconi tests. Unfortunately I do not have the time to organise such tests, but maybe some vintage enthusiasts could do so.

/ more letters on page 26

continued: Letters

Letter
from Dennis Yates
Search for a mystery set

As a young lad some forty years ago, interested in Radio, I acquired from a jumble sale for one old penny, a Philips (trans)portable radio set. It was quite magnificent with a polished walnut cabinet and fretworked loudspeaker aperture, a ball-race mounted turntable in the base to facilitate tuning, a piano-hinged drop flat at the top which opened to reveal the wave-change lever and tuning arrangements. Inside there was a hand-wound frame aerial and hand-soldered copper boxes housing tuning circuits. I was entranced by the source of components which it provided and set to work to dismantle it!!!. The loss was, and is, complete, to my lasting shame.

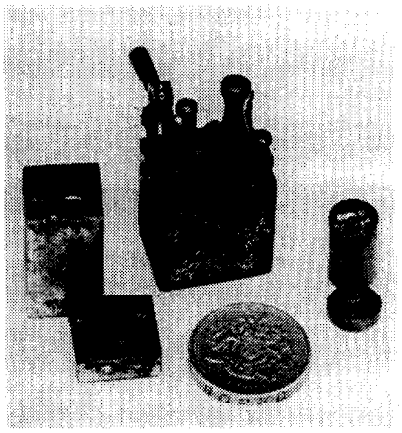
To try to make amends, I have searched the world, quite literally, for a replacement which I might preserve for posterity. Delhi and Kashmir to Khatmandu; from Colombo to the streets of Singapore; from Sydney to San Paulo; from Montreal to Madras; Montevideo and La Paz; Buenos Aries and Santiago; Hong Kong and Shanghai; Rio de Janeiro and Bangkok; Calcutta and New York. There was, for a few brief years, some hope when I visited Mandalay and after a two hour journey by jeep, reached the old hill station of Maymyo where the clerks of the old British Irrawady Steamship Flotilla Company used to go to recover in the summer from the heat and the dust of Mandalay. In the midst of the little town surrounded by stage coaches (there is no petrol for local transport) I made my usual pilgrimage to the local radio repair shop to search for, amongst other things, the Philips. The dealer, a little Indian in a sorry state whose test equipment taken away by the incoming socialists in 1948 was onto the problem in a flash. Yes, he knew of such a set in the possession of one of his clients. How long could I stay? Nobody of course can stay in Burma for longer than the seven days given on all visas, and by the time you reach Maymyo from Mandalay it is day five. A promise to return with test equipment from England in return for the cherished Philips was made, and I went back last year armed with an Avo digital test set, a UHF Mast-head amplifier (they have television in Mandalay, forty miles away!) and a pocketful of goodies. Two years almost to the day I walked up Maymyo high street to seal the bargain. The little Indian was still in the wicker chair outside his store, where I'd left him, the same cabinet of dusty red and grey valve boxes in the darkened shop behind him, and the flies buzzing around in the scorching mid-day sun. His eyes lit with pleasure at the sight of the Avo. He was absolutely thrilled at the amplifier. And the pocketful of capacitors, resistors and diodes produced a smile of ecstacy. But then a shadow passed over his face. "I didn't know you were coming back this week" he said, "the Philips radio is still with my very good customer out in the villages. How long can you stay?..."

We all hope that good things will come to Burma after their recent elections when democracy seemed to be restored after forty years of isolation and poverty. And perhaps the Philips Radio will survive, like the stage coaches, in far off Maymyo. But my search has to go on elsewhere.

And so my question is, does anyone recognise the model I describe? Can anyone throw any light on its history, perhaps even a model number and date of manufacture. Or dare I ask, Do *you* have one, and is it for sale? I hope so, its been a long wait, and I've truly tried to make amends for the damage I did so many years ago.

In the salerooms

Objects offered in the salerooms reflect the decreasing supply of wireless items coming to light: quality lessens while prices increase. Originality and condition are important; poor restoration is ruinous, particularly since more and more articles which might hitherto have been "junked" are now being cobbled together and tarted up for sale. Christie's last sale contained some nice things, the most important being a set of unique miniature crystal-sets, measuring from ½" to 1½" high, made in the early 'twenites, one of which had a just readable BBC stamp. They raised almost £300 (including the auctioneer's fee and VAT usually charged at salerooms). I hope to give more information on them in the next Bulletin. In the same sale there were no less than four round Ekcos which fetched expected prices of around £400 each although brown and not exactly mint. An AD65, the pre-war one, in brown and with a repaired crack, made only just over £200 while a shiny black-and-chrome, post-war A22 reached £535. A Pye M78F 1948 portable, rare because most of the production was put on a bonfire at the factory due to the marketing blunder of featuring a "sunray" motif that recalled the Japanese flag, fetched £180. Ordinary wooden-boxed pre-war sets were not much desired but a nicely restored



Three tiny crystal-sets pictured with a £1 coin to show the size.

Pilot U650 with magic eye was a surprise at £178. The only two sloping-panel c.1923 sets were a 1-valve Sterling complete but with wormholes which made £268 and a large but not attractive Wyvern which made £335. The gramophone (acoustic and electric) section of the sale included some fine original items and some that seemed to have been assembled from parts that never belonged together; this will surely increasingly apply to wireless items, so be on the lookout! The next "wireless" sale at Christies is on December 13. Items of interest including an Emor globe, a Sterling one-valver, crystal sets and telephones will be included in the next sale at Philips on November 21.

continued

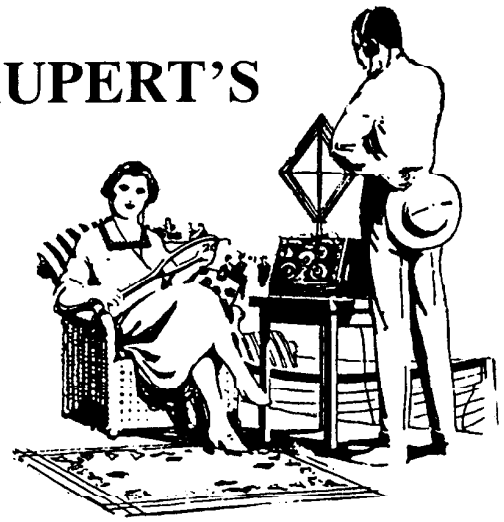
Letter
from Guy Biraud, France
La Classe! et la Couleur!

Congratulations on the latest issue of the BVWS Bulletin. What class! And such colour!

Of all the 'Radio Club' magazines it is undoubtedly the best presented.

Editor's note: This letter is one of many comments (almost all congratulatory) about the last Bulletin, particularly on the colour supplement and the new shiny cover (which most thought improved its durability, but one thought made our magazine "too much of a glossy"). Any kind of feedback is always appreciated.

RUPERT'S



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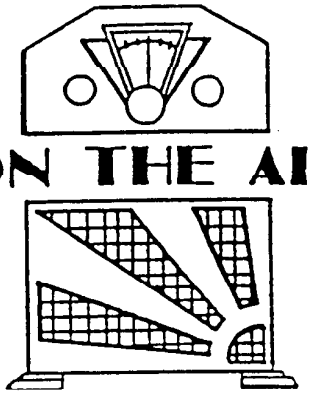

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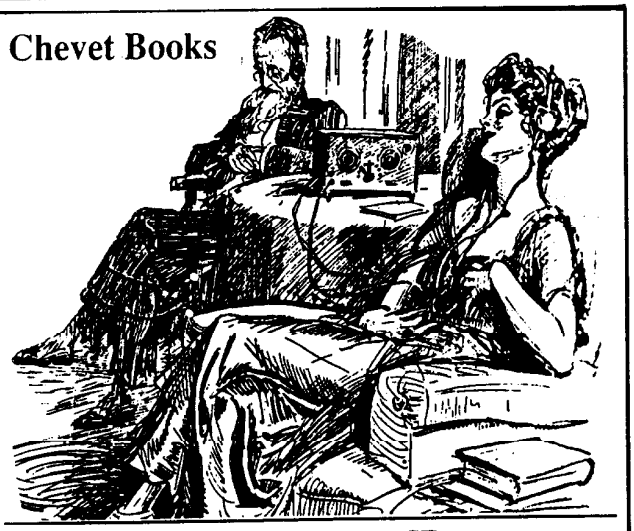

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