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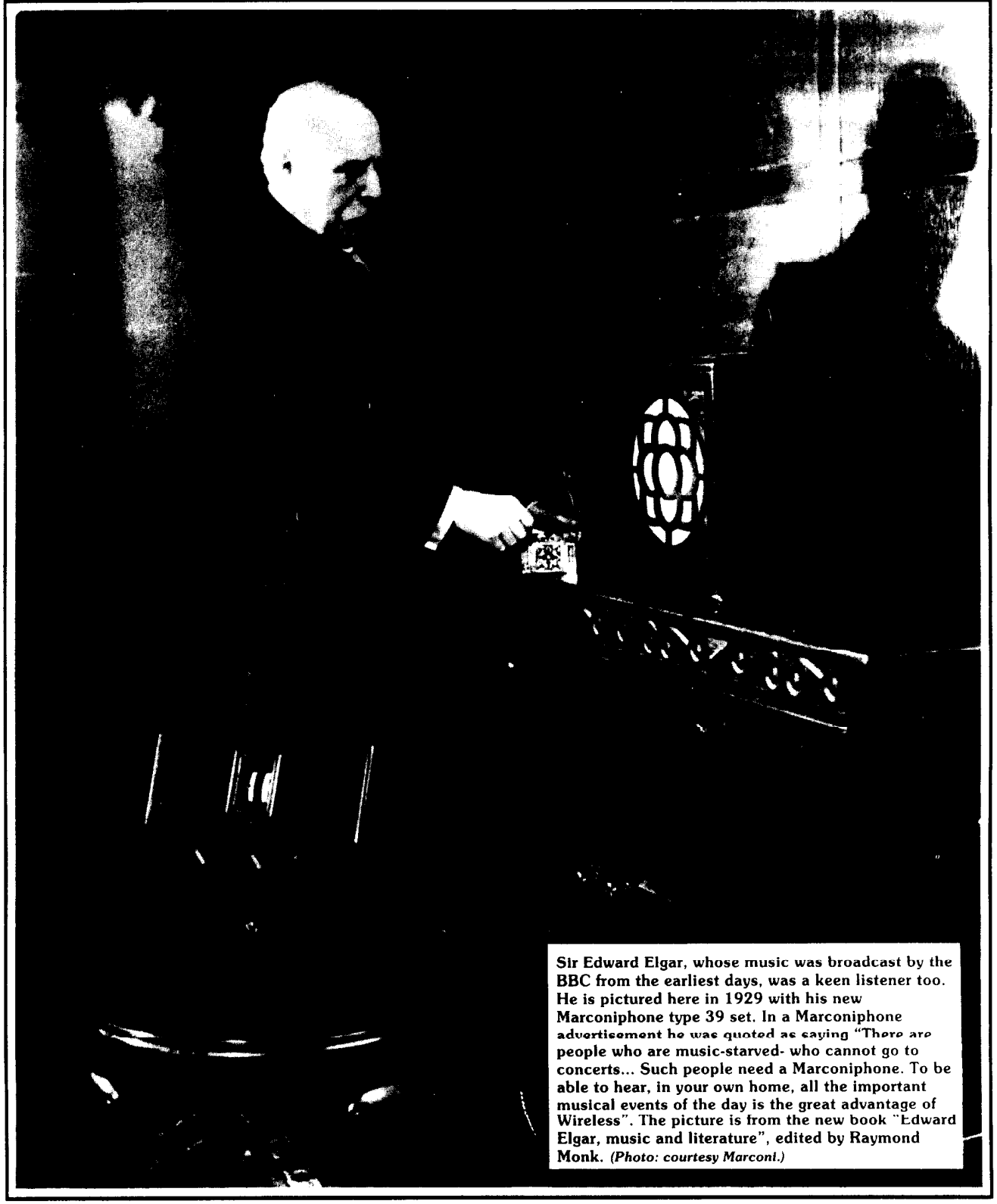
BULLETIN OF THE BRITISH

VINTAGE WIRELESS

SOCIETY



Sir Edward Elgar, whose music was broadcast by the BBC from the earliest days, was a keen listener too. He is pictured here in 1929 with his new Marconiphone type 39 set. In a Marconiphone advertisement he was quoted as saying "There are people who are music-starved- who cannot go to concerts... Such people need a Marconiphone. To be able to hear, in your own home, all the important musical events of the day is the great advantage of Wireless". The picture is from the new book "Edward Elgar, music and literature", edited by Raymond Monk. *(Photo: courtesy Marconi.)*

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VINTAGE WIRELESS SOCIETY

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

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Cover drawing: Norman Jackson

Information Exchange: A Register of Members' Interests

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

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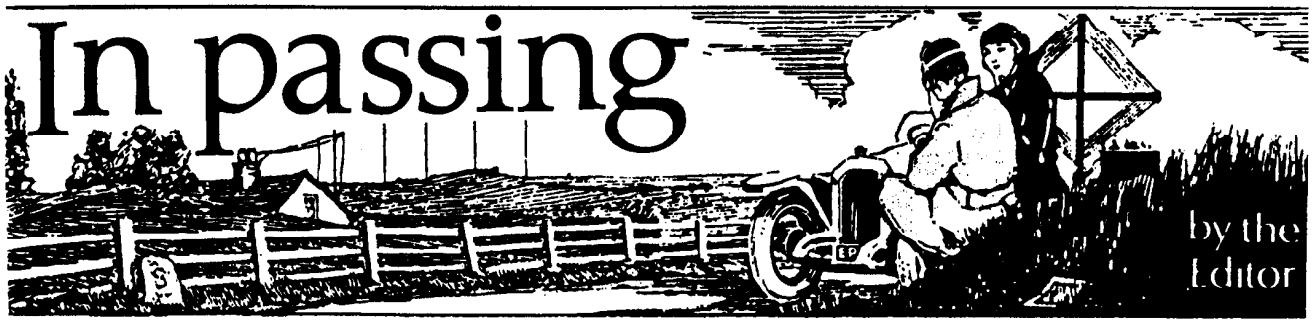
Contents: Bulletin of the British Vintage Wireless Society Volume 18 no. 2 3.93.

VINTAGE WIRELESS MUSEUM

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



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

Meetings

The next major Society Swapmeet is on Sunday 6th June at Harpenden. Members are requested to make application for tickets as soon as possible since these must be obtained in advance for this members only event. Applications should be made to the organiser, Robert Hawes at 63 Manor Road, Tottenham, London N17 OJH, enclosing a stamped and addressed envelope with a remittance of £3 for admission (limit 2 tickets) and £10 for a stall.

The annual wireless garden party, organised by Gerald Wells and his team at the Vintage Wireless Museum, will take place on the previous day, 5th June, and early application for tickets for this event would also be appreciated. Attractions there will include competitions, "low-fi" vintage music from vintage equipment, 405-line television demonstrations and an opportunity to see some of the hundreds of pieces of museum equipment on display. Admission charge, which includes a buffet lunch, is £9 and applications should be made, accompanied by a stamped, addressed envelope, to Gerald at 23 Rosendale Road, West Dulwich, London SE21 8DS.

Our newest meeting is being inaugurated in Swindon. Wiltshire on 4th July, and is being organised by Mike Barker and Frank Hoskins at the Memorial Hall, Wooton Bassett. It is primarily intended for local members but all members are of course entitled to attend. Stalls will cost £8 including entry and visitors' tickets £2 each. Applications should be sent to Mike at 28 Cheney Manor Road, Swindon SN2 2NS without delay.

Especially for members in the south – although all members are welcome – is the Swapmeet at Southborough, near Tunbridge Wells, on 11th July, arranged as usual by John Howes. You can obtain details by ringing him on 0892 540022.

Warning

Complaints have been received about an organisation calling itself a collectors' club for vintage radio enthusiasts, which has been advertising in various publications, giving an address in the north of England. It invites readers to send £5 for a year's subscription for a club magazine, free advertisement facility and data supply service. Some applicants have reported that they have been disappointed with the response they have received.

The general police advice to people responding to any kind of advertisement is to not send money until they have established the bona fides of the advertiser.

Documentary

Having the title "The Long Summer" this 6-part series commences on Sunday 16th May, at 8.0pm. and takes a nostalgic look at the inter-war years, (writes Ray Herbert). Part 2 on 23rd May called "Gathering Speed" deals with emerging technologies which include radio and television. Gerald Wells, curator of the Dulwich Vintage Wireless Museum, can be seen coaxing a low-fi version of the tune Valencia out of a Gecophone crystal set by the light of an oil lamp. He later appears at the counter of his radio shop display explaining the role of dry batteries and accumulators.

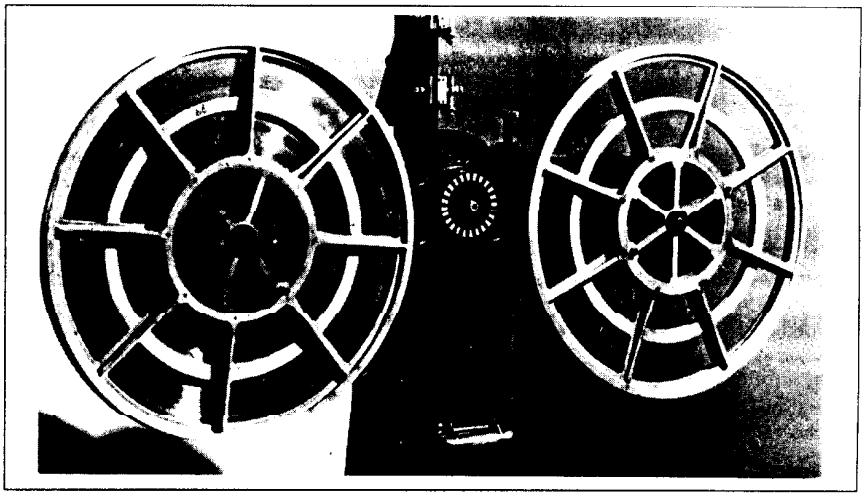
The Blattnerphone, rescued and restored by Jim Butterworth, is shown and provides a remarkably clear 1932 recording of Amelia Earhart, the famous airwoman. Radio Amateurs are correctly credited with having exploited the wireless wastelands below 200 metres in the 1920s which paved the way for the BBC Empire broadcasts.

Television has its place and a rare clip shows John Logie Baird, unusually in shirt sleeves, working on his equipment in 1927 at Motograph House. The reproduction of an early video recording of a Miss Pounsford which was made by Baird on 28th March, 1928, is particularly interesting. Recognisable images from this 10 inch, 78 rpm. gramophone record could only be obtained after needle scratch, head-cutter resonance and phase distortion had been considerably reduced using sophisticated filtering and digital techniques developed by Donald McLean. Vintage 405 line pictures are displayed on the screen of the RGD teleradiogram at the Vintage Wireless Museum.

The series is directed and produced by Brian Johnson who holds the callsign G3LOX which no doubt accounts for the well presented television and radio items.

Telecom 'unlocks' historic recordings

A mystery which puzzled Canadian radio broadcasters for over 40 years was recently solved at Telecom Australia's Research Laboratories in Clayton, Melbourne – when a 1930's "Blattnerphone" steel tape recorder was used to play back 11 reels of historic recordings made as early as 1935.



Developed in 1929 by Louis Blattner, from a design by German inventor Dr Kurt Stille, the Blattnerphone was a very early recorder using thin steel tape. The machine in question was originally brought to Australia by the PMG's Department, and later used by ABC Radio. It fell into disrepair after WW2, and was later given to the Museum of Victoria. More recently it has been restored to full working order by TRL technicians.

The 11 reels of steel tape, each weighing up to 15kg and playing for up to 35 minutes, were brought to Australia by Ernest J. Dick, Corporate Archivist for the Canadian Broadcasting Corporation. The recordings had not been heard since WW2, due to the lack of a working Blattnerphone, and no-one knew what they contained,

The tapes turned out to contain a historic broadcast by England's King George V, on the occasion of his Silver Jubilee in May 1935; radio programmes recorded during WW2, with news, interviews with services personnel and messages from parents in the UK to children sent to Canada during the war; and post-war French news broadcasts, one featuring a speech by President de Gaulle.

Ernest J. Dick, Corporate Archivist for CBC, wrote the following report in October 1922:

The Blattnerphone was an erasable magnetic sound recording technology developed by Louis Blattner in Britain in the late 1920's and early 1930's. Some thirty machines are estimated to have been sold to broadcasters in the 1930's with the CRBC/CBC purchasing three machines and installing them in our radio facilities at the Chateau Laurier.

The thirty-three minutes continuous recording capacity of the Blattnerphone represented a significant improvement for broad-casting over the four-minute recording/playback capacity of the 78 rpm discs of the period. The tape speed was 1.5 metres per second with single channel recording possible in either direction on metal tape of 3 milli-metre width. Only 2,000 metal tapes were manufactured by a Swedish company with the CRBC/CBC purchasing twelve (as far as we know) for use as required. Each reel, therefore, contained some 3 kilometres of metal tape, measuring 60.5 centimeters in diameter, and each weighing 15 kilos.

During the spring and summer I assembled ten of these reels that were in the best condition, and had them shipped to the Research Laboratories of Telecom Australia in Melbourne where they have restored a fully operational Blattnerphone (one of the CRBC,/CBC machines is included in the CBC collection at the NMST here in Ottawa but it is not operational). On the 21st and 22nd of September, we played these reels back and made reference copies onto DAT.

The CBC apparently used this Blattnerphone recording technology until late 1943 since most of the recordings we heard on the tapes appear to date from this period. Primarily, the technology appears to have been used to record CBC and BBC programs being prepared in Britain that were being transmitted to Canada via short-wave. The quality of the recorded signal is, therefore, very uneven, given the vagaries of the short-wave transmission, the inconsistent quality of the metal tape, and because of the second or third generation audio signal that was being recorded. However, the original audio signal does not appear to have diminished or distorted over time.

The metal tapes had naturally begun to oxidize and had collected much dirt and debris over the years. This debris collected on the playback heads and quickly impaired the quality of the signal we were hearing. Cleaning the tapes was, therefore, attempted as the tapes were running but this was dangerous for the operators (the BBC operating manual required operators to wear lead gloves to protect them from breaking tape) and was not very thorough. Telecom Australia has subsequently devised a cleaning mechanism that should be more satisfactory and allow for the best possible audio signal to be recorded from the CBC tapes.

We were able to determine (and record on the DAT reference copies) that the recordings consisted of complete examples of the CBC war-time programs "Canadian Calendar", "Regimental Round-Up", "Wings Abroad"and "Khaki Scrapbook"; the BBC program "Hello Children" with greetings from British parents to their children in North America; a radio address in French by Charles de Gaulle; speeches in French at the Alliance Française in London, and bits and pieces of other unidentified programs, all apparently from 1943. One of the reels had been slightly deformed and proved to be exceedingly difficult to mount on the playback machine. It contained the 1935 special BBC programmes on the occasion of the Silver Jubilee of King George V with greetings from all the Commonwealth countries of the time.

**Reprinted from Electronics Australia, December 1992.*

An early portable superhet

by Geoffery Dixon-Nuttall

History

In France they wouldn't buy T.R.F. sets in the late 20's. In this country, on the other hand, superhets were rare.

The "Wireless World" annually listed all the available portables, and in 1928 there were only five superhets, with a price of about £42. In 1929 they were reduced to two, and also there were two in 1930. For these two years a Rees-Mace superhet was featured. Its price went down from £50 (8 valves) to £41 (seven valves). Most of the other portables were of the usual 2-v-2 type. These prices indicate that these sets were a luxury. In addition, they were only sold to people who could afford to have somebody else to do the carrying. The weight is about half a hundredweight. The "Neutrosonic 7" weighed 70lbs!

A posh portable

I recently was lucky enough to acquire one of these rare birds. It is a "Rees", and is very similiar to the one being cuddled by the lady in the cloche hat on p.73 of "The Setmakers", sitting on the back seat of her Hispano-Suiza. There is a slight mystery about the manufacturers, however. The fret is undoubtedly Rees-Mace (and quite fragile it is, too), but the transfer on the cabinet says firmly "Rees Radio, Paris". It would seem that it was made in France to a design by Rees-Mace, but it is quite different to anything they sold in the U-K. Most of the components are French, exceptions being the T.C.C. condensers and the S.G. Brown reed speaker. Dating it is not easy; about 1928?

Mine has different controls from the set in the picture, but seems to be the same size.(17½" X 17½" X 8"). It weighs 23 lbs. without the batteries, which is not too bad. From left to right, the knobs are: Aerial tuning, I.F. gain (marked "Min-Max"), switch ("PO-arret.-GO"), R F tuning, and oscillator.

Photograph: "Setmakers"

The dials have to go in at an angle to suit the cutout in the cabinet. The panel also carries a 'Phone Jack, which has been shoe-horned in at the last moment, and misses the vanes of the tuning capacitor by a gnat's whisker, even after bits have been filed off it!

This set seems to be in almost mint condition. What the original valve types were I have no idea, but it came with a motley collection most of which had impossibly low emission. Either it had had more use than it appeared, or somebody was clearing out his duds! Two of them are Gecovalve HL 210's, which appeared in 1928, so probably these are original. Osram used this name in Europe, apparently. Inside there is no trace of the usual acid attack, and there are no signs of vandalism by "repairers". It even still has its canvas and leather travelling cover!

The cabinet is oak-faced ply. It seems to have been waxed as there are no traces of French polish or lacquer. The chassis is mahogany; polished, too! Some unknown insect had eaten the handle, and there was a nasty home-made turntable which didn't work It is all held together by bolts and nuts which seem to be metric, but have a different pitch to the modern M3. It is very beautifully wired in green "Glazite" with right angle bends.

Electrical

The circuit uses eight valves, as follows:
(1) R.F. stage.(Screen Grid); (2) Mixer; (3) Oscillator; (4) & (5) I.F. amplifiers; (6) Leaky grid detector; (7) L.F. amplifier (R.C. coupled); (8) Output (transformer coupled). All except the first are triodes.

The only fault was an O/C audio coupling transformer, which is French and rather cheap looking. The I.F. is about 65kHz., which is par for the course. There is no neutralising, and things are held down by using a low H.T. (27 volts). The plug-in I.F. transformers have plastic cans, which doesn't help. The tuned anode oscillator has no grid leak or condenser, but the waveform is good.

Continued on next page >

Technical Research

> continued from previous page

Performance

Well, it works, but driving it takes a little practice. You really need a calibration chart, which I have prepared. There are three tuning controls, frame aerial. R.F. stage, and oscillator. Set all three to the reading on the chart. and then explore with the oscillator. It is possible to find several points which bring in the same station, but things are arranged so that with all three dials at the same reading you are not far from the point where the oscillator is equal to the signal plus 65 kHz. It is possible to tune to the "oscillator low" point, but the oscillator stops before the end of the band, so you are obviously not meant to do this. The tuning condensers are all of the straight line frequency type.

The sensitivity is very good; it is as good as a modern transistor, and the signal to noise is better, due to the enormous frame aerial. The problem is overloading from strong stations. Radio 4 on Long wave is only possible by detuning and turning the set round for minimum pickup. The M.W. coverage is good, about 210-550 metres, which for those days is unusual. The reed speaker sounds as one would expect.

The drawback is the design of the gain control, which varies the bias of the I.F. stages from slightly plus to slightly minus, by sliding up and down the L.T. Minimum volume is the positive end, which drives the amplifiers into grid current and damps the coils, but not enough.(It also detunes the I.F. transformers slightly.) This primitive arrangement seems to have been standard at that time (see the W.W "Super Seven" of 1927). At max. it goes unstable, which is also not unexpected. At a setting when it doesn't, the bandwidth seems to be about 4kHz at 6db down.

It is no wonder that this sort of set disappeared as soon as decent R.F. amplifiers came along. The Pye "Twintriple" for example does almost the same thing with only four valves, and it has only one tuning control. I think the lady in the picture had a friend who not only carried the set, but tuned it in for her as well. If he also owned the Hispano-Suiza – happy man!

Receiver Techniques of the 1920's

Part 7

by Pat Leggatt

Here is number 7 of a series of short articles by Pat Leggatt reviewing the circuitry and other features of wireless sets of the 1920s. Each article will outline a particular aspect of sets of this period. Back numbers of Bulletins in which earlier parts appeared can be obtained from The Editor.

Simplified Controls

The early broadcast receiver was regarded as a technical marvel which only the expert(?) man of the house could be expected to understand and operate. But as time went by the wireless came to be seen as a ready source of entertainment which should be suitable for any member of the family to use.

To have a large number of controls was not in accord with this philosophy. On/Off switches were straightforward enough, but even simple sets needed at least two variable controls - for tuning and reaction - and the more elaborate receivers with HF stages could incorporate two or three tuning controls, all of which had to be correctly aligned before any station could be heard. In America it became the practice to achieve the necessary sensitivity by adding HF stages and to do without reaction; and the very common line-up of two tuned HF stages, tuned detector and two LF stages became known as the '3-dialler'.

In England, 5-triode portable sets were popular, typically with frame aerial, two HF stages, detector and two LF; but tuning was confined to the frame aerial with reaction round the first HF stage, followed by an untuned (aperiodic) HF transformer or choke-capacitance coupling to the second HF stage and on to the detector. Thus there was just one tuning control.

For sets with tuned detector and one or more tuned HF stages, the obvious approach was to gang the two or three tuning capacitors on a common shaft. This could be done reasonably satisfactorily for detector and the second of two HF stages; but the first HF stage input tuning would be affected by the aerial impedance and would not track sufficiently well with subsequent tuned circuits. To get over this, the stator of the aerial tuning capacitor was sometimes arranged to be rockable by a trimmer knob.

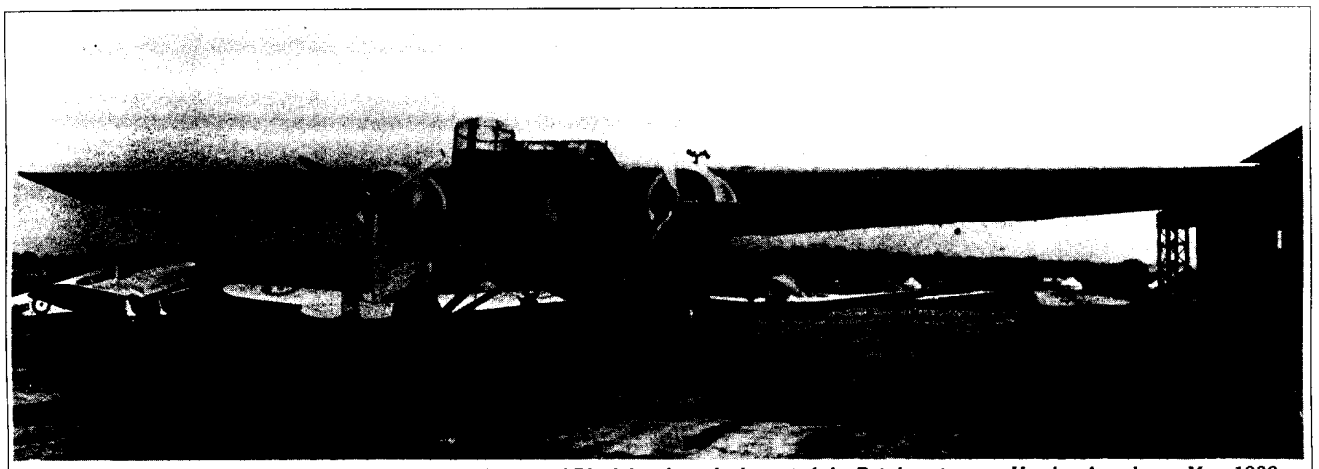
In the American 3-dialler class, a compromise was reached in the Grebe Synchrophase receiver. All three tuning controls could be adjusted independently; and once aligned they could be mechanically coupled together by tightening clutch screws which enabled a chain loop to turn all three simultaneously by the action of only one of the three tuning knobs. The tuned circuits remained fairly well in track over most of the band, expect at the high frequency end where the capacitor vanes were hardly meshed and aerial capacitance and circuit strays were proportionately more disturbing.

A little later, in 1926, a third HF stage appeared on some American sets with the aerial fed to an untuned input circuit. In the Atwater Kent Model 35 (8), for example, this led to a 6-valve set but still with only three tuned circuits. Since all tuned circuits were isolated from the aerial impedance. the three tuning capacitors could be permanently ganged, not on a single shaft in this case but coupled by phosphor-bronze drive belts.

After the first few years of the 1920's a further control appeared on most English sets in the form of a medium/long wavechange switch. Although adding a control, this was a great simplification since wavechanging on earlier sets had to be accomplished by plugging in a different set of two or three coils. American sets did not need switching or coil replacements, since only the medium wave band was used for U.S. broadcasting after the first year or so.

References:

8. Alan Douglas: "Radio Manufacturers of the 1920's" Vol.1. The Vestal Press, New York 1988.



The Marcel Bloch bomber which carried the Baird equipment. Hendon Aerodrome May, 1939.

Airborne Television: A spy in the sky

by Ray Herbert

"Television would have a pacific effect upon warring nations. It would show the hidden enemy. Aeroplanes would no longer wireless their scanty reports but the electric eye within them would reproduce unerringly the entire field of action and the very shell bursts. Stationary objects, moving troops, each tiny detail of hostile activity would be stripped of every shred of concealment."

This accurate prediction was made by John Logie Baird at Motograph House, London, when he presented a lens disc scanner to John Hart of Falkirk, as reported in the Falkirk Herald on 18th September, 1926.

Background

Interest in the possibility of using television for military purposes goes back a long time, to November, 1924 in fact, when an article in the *Daily Express* "Aeroplane With Eyes" gave rise to correspondence between various Government establishments. During this period the Admiralty Research Laboratories at Teddington were carrying out television experiments but in spite of the superior facilities available it would appear that they could not equal the results then being obtained by J.L. Baird. This situation led to meetings between Television Ltd., (later Baird Television Ltd.,) and the Service establishments to explore some form of co-operation. Although discussions were held during 1926 and proposals submitted by Television Ltd., no decisions were made and the interest lapsed.

In 1936 a short Government report appeared in connection with the use of television in air operations. It highlighted the problem of examining in detail fleeting television pictures and drew attention to the advantages of recording the images when received on the ground. Infra-red techniques were discussed by which means it would be possible to bomb invisible targets with the aircraft operating above cloud cover. Bearing in mind that means of recording television pictures on film were already available and J.L. Baird had demonstrated his Noctovisor infra-red equipment in 1927, it is surprising that the Services did not pursue the matter.

The Baird Company made an approach to the French Air Ministry in 1936 and this resulted in a contract being received for the supply of a high definition airborne TV system with provision for recording the pictures on the ground. Marconi-EMI obtained a similar contract and based their proposals on the Emitron camera but Baird's chose the Intermediate Film system which, as will be shown, offered some unique advantages. For reasons best known to themselves the French Air Ministry would not allow any contact between the two participating organisations. Neither side knew how far the other had progressed. Very few details of the Marconi-EMI equipment have come to light but fortunately photographs of the Baird system survived and the author, who was a member of the Baird research team throughout the series of flights, is able to provide this account based upon his own experiences.

The Baird contract, known for security reasons only as job number 4141, amounted to about £10,000. A team of 11 engineers under the leadership of B.B. Austin worked in the Crystal Palace School of Arts, which had survived the fire, and in the incongruous surroundings of busts and statues this piece of television history took shape.

After initial test flights from Hendon aerodrome early in 1939 to establish transmission coverage, pictures of the countryside around west London were radiated regularly during July of that year, sometimes twice daily.

The System.

The main purpose of the project was to explore the potential of television equipment for aerial reconnaissance and artillery spotting.

The early electronic television cameras were relatively crude, could not operate in poor light and suffered from shading problems (tilt and bend). By using the Baird Intermediate Film process the superior optical capabilities of a 16mm cine camera could be utilised. This arrangement had already been employed for transmissions from a studio and involved developing and fixing the film in 16-30 seconds, then passing it still wet through a cathode ray tube scanner for conversion into television signals. The adaptation of

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Vintage Vision

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this bulky equipment for use in an aircraft posed many problems in connection with size, weight, power supplies, change of air pressure and vibration.

This system had the unique advantage that at the termination of a 30 minute transmission, 45,000 individual pictures of the ground were available on film for detailed analysis.

A Marcel Bloch 200, twin engine night bomber (No. ED83) with a flying speed of 150 mph (241 kmh) carried the equipment. It was small by today's standards, 51ft. (16 metres) long and 5ft. (1 metres) wide. Not a lot of room for a complete television system weighing 800lbs. (363kg) and five crew comprising a French Air Force pilot, a mechanic and three Baird engineers.

A summary of the specification is given below:

Definition	400 lines, sequential.
Repetition rate	20-30 pictures/sec.
Resolution	In a field of view of 900 ft. (274 metres) black and white squares, each having sides of 3 ft. (0.9 metre) could be resolved on Radio transmitter 200 watts at 51 MHz.
Antenna	1/4 wave ground plane
Operating range	25 miles (40 km)

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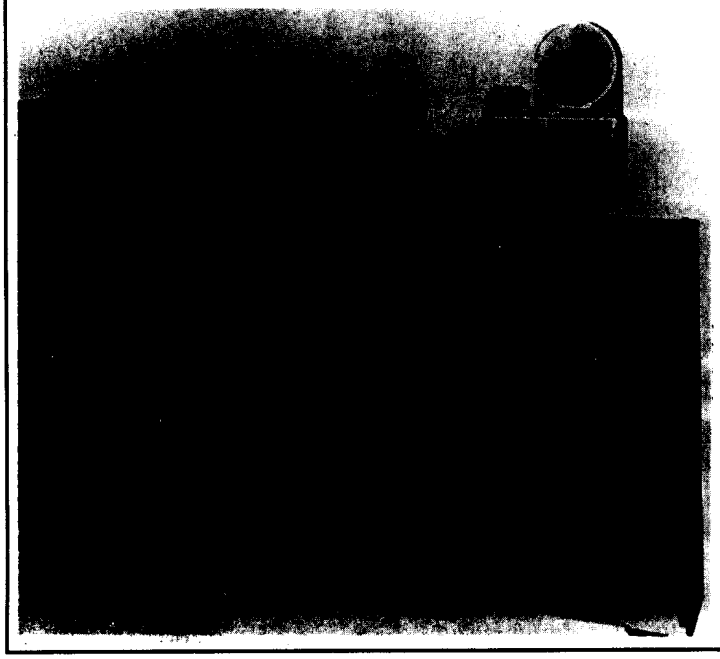
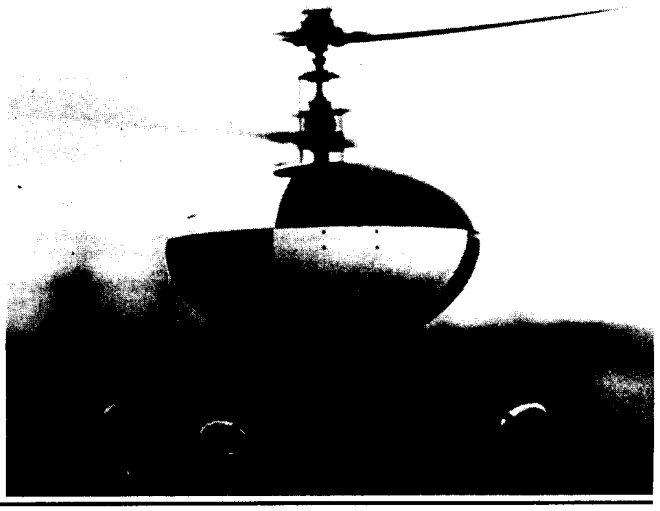
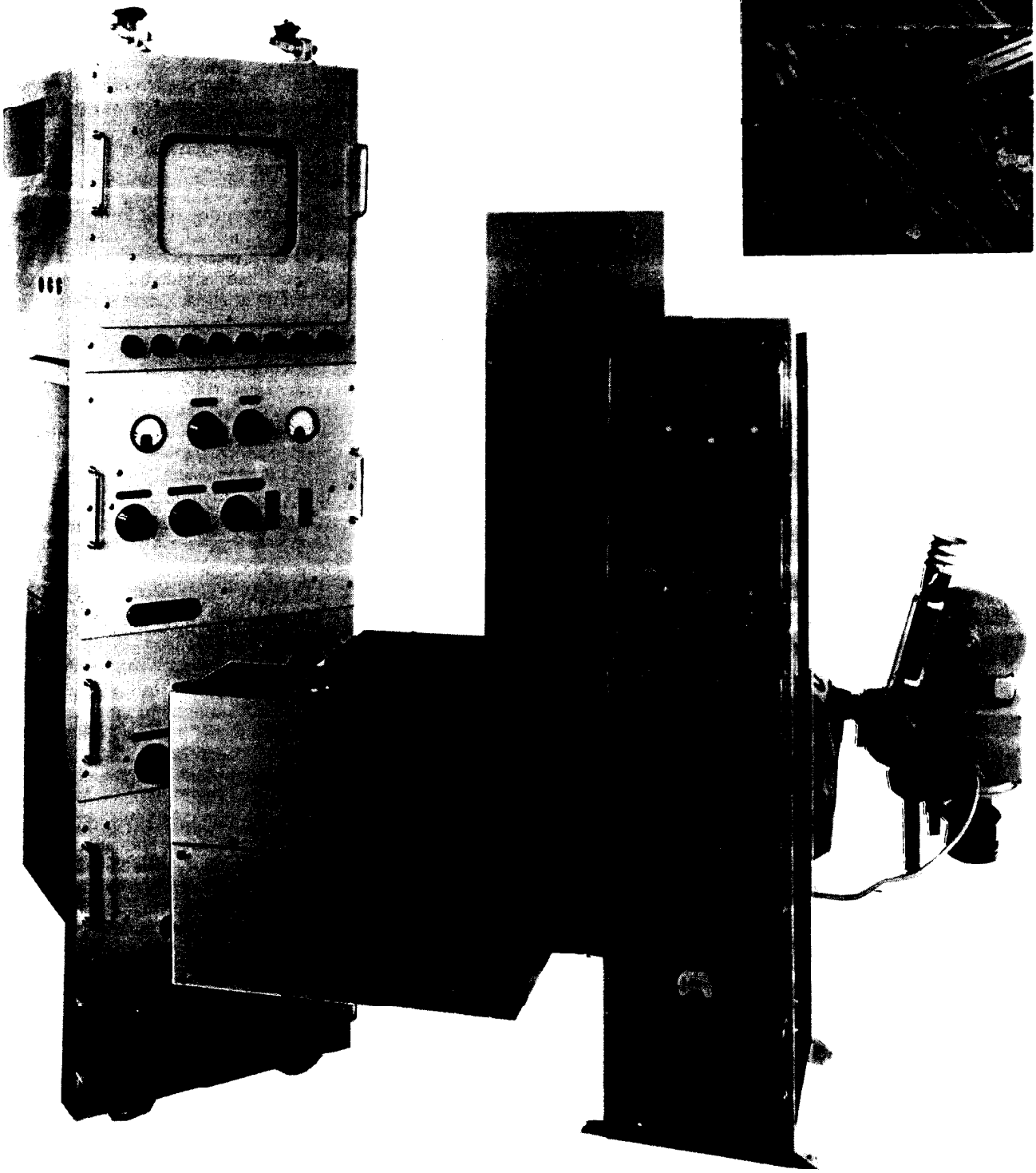
Top right: Television transmitter in forward gun turret. Below left: Television pictures received from the aircraft were recorded using this apparatus and they could be projected on to a large screen within a few minutes. Below right: The Westland Wisp in flight.





Vintage Vision

Below: The disposition of the equipment as seen from port side of aircraft. From left, camera drive and synchronising pulse generator, monitor tube rack (rear), film processing and scanning unit, rack containing time bases, processing controls and HT supply, 16mm camera. Top right: Two frames from the film processed in the aircraft taken from about 3000 ft.



Vintage Vision

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Aircraft Equipment.

The 16mm cine camera fitted with two fixed focus lenses on a revolving turret scanned the ground through a hole in the fuselage floor. Pan and tilt through 30° could be acomplished and the number of pictures a second was variable between 20 and 30. Synchronisation pulses were generated by a slotted disc attached to the variable speed DC motor driving the camera.

The exposed film was processed immediately in sealed developing and fixing tanks maintained at 28°C, emerging 16-20 seconds later and then passing still wet to the scanning unit. This consisted of a vertically mounted, high intensity 7" (178mm) tube in association with an optical system and photoelectric multiplier. Messages and sketches written on transparent material could be placed in a holder immediately beneath the scanning tube and transmitted in the same way as the film.

An auxiliary rack adjacent to the camera position contained temperature control equipment for the processing tanks, and HF and LF timebases. The camera operator viewed the transmitted pictures on a monitor screen situated in a rack which also housed the modulation amplifier and pulse generator.

The vision transmitter, located in the forward gunner's position, consisted of a master oscillator, frequency doubler, drive amplifier and push-pull final stage incorporating Raytheon RK47 tetrodes, grid modulated. This produced a power of 200 watts at 51 MHz fed to a quarter wave retractable antenna.

As a means of saving weight most of the equipment operated from a 200 volt 500 Hz supply obtained from a 1kVA rotary converter operating from the main alrcraft batteries. A 1200 watt wind driven generator with a variable pitch propellor provided the 1200 volt supply for the transmitter power stages.

Ground Receiving And Recording Station.

A specially constructed Renault motor van with a sprung floor contained equipment for receiving and recording the pictures transmitted from the aircraft. The 200 volt 500 Hz power requirements were obtained from a petrol driven generator set towed behind.

Two vision receivers were used (one spare) each having three RF stages, a diode detector, followed by three separate video amplifiers feeding the monitor, large viewing tube and photographic recorder respectively. The main picture appeared upon a cathode ray tube having a diameter of 20" (510mm), the largest then available and specially produced in the Baird vacuum laboratories. Due to its length, about 38" (1 metre) it had to be mounted vertically and viewed through a surface-silvered mirror inclined at 45°, a technique used quite extensively for home receivers at that time.

The video recording equipment enabled pictures of particular interest to be stored on 35mm film and projected on to a large screen within five minutes of being received. Operational requirements did not call for a continuous run of film and the arrangement adopted allowed the operator to obtain either single frames or a continuing series of one frame in three.

The system used for recording was virtually the reversal of that used on the aircraft, the same high intensity tube producing a negative image on the film emulsion. After exposure the film passed to a storage cassette which could then be transferred to the processing unit for rapid developing, fixing, washing and drying.

Results.

Intensive testing commenced during the summer of 1939 from Hendon Aerodrome and during July a total of 15 transmissions had been made from the aircraft. The usual routine was to head north to Radlett airfield to gain height and then start transmitting pictures of the ground during the south-westerly run towards Guildford at about 3000ft. (915 metres). The gasholder at Southall had the name painted on it which provided a useful definition check. At the end of July the bomber returned to its base at the Centre d'Essais, Villacoublay near Paris, and the acceptance trials continued from that location.

The results overall were most satisfactory and on no occasion did the aircraft have to land prematurely due to equipment failure. A report made by an observer on the ground stated that excellent views of the river Thames and its bridges were obtained, ripples on the surface of reservoirs, moving buses and cars, tennis court markings and names on buildings could all clearly be seen even in poor weather conditions with an overcast sky.

Due to the imminence of World War II the full potential of the project, particularly the possibility of using infra-red techniques, could not be exploited.

After the outbreak of hostilities the aircraft moved to Bricy, near Orleans, and later Toulouse. Its ultimate fate is unknown but almost certainly it fell in to the hands of the Germans.

The claim that these achievements represented the world's first live television transmissions from an aircraft in flight has not so far been challenged. They were well ahead of the USA demonstration from the air by RCA on 6th March, 1940.

Post War Progress.

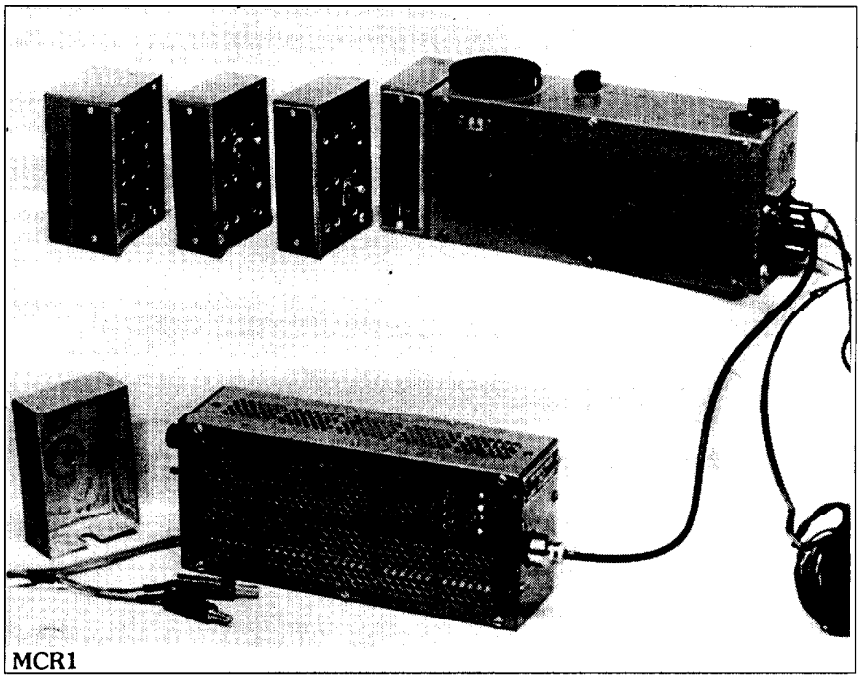
It is interesting to take a quick look at a few later ventures into airborne television. The BBC made their first television transmission from the air on 30th September, 1950. A Bristol Freighter carried standard outside broadcast equipment and viewers were able to see pictures of St. Paul's cathedral and also an Airspeed Ambassador plane flying alongside.

On 6th September, 1976, the *Daily Telegraph* displayed a headline "Spy in the Sky Robot steals the Show", a reference to the International Air Display at Farnborough. Called the Westland Wisp, this remotely piloted miniature helicopter was equipped with a Vidicon camera weighed 35lbs,(16kg.), having a flying speed of 80mph,

Although John Baird never dreamt of satellite television he was not far out with his farsighted observations in 1926 as the viewing public were able to see for themselves during the Gulf war.

John Brown and the SOE

One of the highlights of the BVWS International meeting in 1984 was a talk by Major John Brown at the London Science Museum on his wartime work with the "Special Operations Executive" designing "Clandestine" radio equipment in secret. Associated with various electronics and communications organisations throughout his life, John has also had an interest in medical electronics - including working on the first artificial heart-lung machines - and also in talking books for the blind and aids for disabled people. A member of the BVWS, he died earlier this year, and as a tribute, we reprint an edited version of a report of his 1984 talk.



MCR1

In mid-1941 John Brown was posted from Royal Corps of Signals Catterick to a "closed address" - an English country mansion in a secluded area of Hertfordshire named "Frythe". Under the cover name of "Inter-Services Research Bureau", it rapidly became the centre of technical development for communications weapons and special devices for SOE.

John's first tasks were to design radio equipment for communication by Morse between England and Occupied countries in Europe, France, Holland, Belgium etc. The first design, a receiver and transmitter in a large "OHMS" briefcase, served only to illustrate the problems of the task; the second, a small box to convert a typical domestic table radio-set into a transmitter to send "blind" messages to England, relying on the BBC programmes of messages to occupied countries for acknowledgement, had limited use as circumstances in Europe changed and the Germans clamped down on all receiving equipment.

The Frythe staff included first class instrument makers using well equipped work-shops, so development was rapid and new designs followed very quickly: the "L" set, a crystal-controlled transmitter with a receiver using small single-ended valves, all running from a car battery via a vibrator-unit, established the specifications on which later sets were based.

As winter of 1941 approached, demands from Operations grew to maximum urgency and the first "suitcase" set was designed by the conversion of the chassis of the transmitter-receiver type 18 standard infantry set. Fitting an 807 in the transmitter, with 6v mains-type valves in the receiver boosted the power and sensitivity, and with power units for optional AC mains or 6v battery operation, the units were fitted into a robust fibre suitcase typical of those commonly used in Europe so that it would attract little attention among the luggage of travellers. This first set, classified for a range 150-400 miles, "Type A" was identified as the 21/1 but more generally referred to as A Mk 1. As soon as the prototype was complete, work began on the Type B Mk 1 for longer range. John's laboratory was augmented by assistants and the modified set was completed in a few weeks and immediately put into small scale production, sets going to Norway, Yugoslavia and the Middle East.

Progress meanwhile was rapid in recruitment and training of operators, mainly patriots who had escaped to Britain and were willing to return to their native countries as agents. In secret country houses they were trained, before being parachuted back. The first two sets were considered too large, heavy and fragile for parachuting and development was accelerated of Mk II versions of both sets. The contemporary WT sets used by the British Intelligence Services , made at Bletchley Park, were also being developed from the simple wooden-box construction to the metal design known as the "Para-Set" . The A Mk II was designed around new all-glass loctal-based valves in the receiver, with an Osram TT11 in the transmitter,and was completed before the end of 1941 and rushed off to the Marconi WT company at Writtle. Volume production included consignments for Russia delivered via the perilous sea route past Norway. The design of the B MkII was completed in March 1942 and volume production was set up at a new factory staffed by Army and RAF personnel. The B Mk II sets went into service with the Yugoslavian partisans where it rapidly became the standard WT set, and it was also used in the Far East. Still, the A Mk II was considered too large and co-operation with Marconi resulted in a crash programme to condense the separate units into a single small box,

Continued on next page >

Wartime Developments

> continued from previous page

with the introduction of an extra valve to serve as audio output in the receiver and crystal oscillator in the transmitter. The TT11 was replaced by the loctal 7C5, newly arrived from the USA. The result, the A Mk III, became the standard "workhorse" for all SOE communications in Europe in the "A" range up to 500 miles.

The main base stations in England were developed for the special needs of communications to and from Europe, and over 40 transmitters fed an "Antenna Farm" of more than 100 acres. The staff grew to hundreds, including many FANY (Women's Transport Service/First Aid Nursing Yeomanry) women as wireless operators and cipher clerks. Techniques were developed for recording "out station" traffic on 78rpm discs for "finger-printing" identification of operators, and for high-speed morse traffic at 250wpm or more. The UK base stations served as prototype for bases abroad where special problems were solved by the ingenuity of the men who had little time to get "on the air" . Resistance forces in Europe needed huge supplies, not only of arms but also of food, clothing, petrol and general supplies. The organisation of supplies and dropping by parachute in rugged country or to secluded coasts, needed a great volume of signals and offices required rigorous training. The Far East campaigns brought new operational problems in jungle conditions where equipment deteriorated rapidly. The greatest problem was power supplies . The battery charging equipment was bulkier than the sets and supply of fuel over hundreds of miles by sea of air was costly and dangerous, so the demand was for man-powered generator-chargers and the "Chore Horse" petrol- electric generator was supplemented by modified pedal-bicycle generators. Several modifications of these led to John's own "Beach Chair" style pedal-generator which provided direct power for B sets and eliminated heavy batteries. The universal demand for battery charging produced other solutions: a wind-driven one with portable mast; a steam one using a model-ship engine; a converted pressure-cooker; and one using the parachuting folding motorbike . Perhaps oddest of all was a thermo-couple generator using hundreds of couples built into a brazier of the type used by night-watchmen. With adequate supplies of wood it would charge an accumulator in six to eight hours.

An important item in the supply of material and people to the field was the "S-Phone", developed by a small team in 1941 at Frythe and designed by Captain Bert Lane. Using miniature valves, it operated on 450 MHz as a two-way radiotelephone carried on the breast of the operator and powered by a beltfull of batteries. It provided-ship-shore, ship-ship, ship-air and ground-air speech links to pinpoint dropping and landing points. Special versions were developed and the later Rebecca/Eureka beacon system by TRE completed the equipment for the Squadrons of Allied aircraft flown by British, Polish, American and other nationalities dropping supplies to Yugoslavian, Italian and French partisans prior to D-Day, and in operations in most other theatres of war.

BBC special-message broadcasts were used from early in the war, increasing to maximum importance at D-Day. The confiscation of radios by the Germans and the difficulties of obtaining batteries, made precious the few sets in the hands of resistance cells who could distribute information. In April 1943, chief signals officer Brigadier Nicholls described the problem at a late-night meeting at Frythe. After an all night "drawing board session, John put forward proposals with sketches for the set later named MCR1 (miniature Communication Receiver No.1) and variously dubbed "Woolworths Communication Receiver" and by the French "The Recepteur Biscuit" from the biscuit-tin pack which contained the receiver, the universal AC/DC 90-250v power unit, batteries, headset, aerial and earth wires etc. The design was based on the new miniature valves (B7G types IR5 IT4) then available from the USA, and the new Ever-Ready layer battery. The set covered the frequency range from 150 KHz to 15 Mhz. Given immediate "Top Priority", the prototype was completed in a month, followed by several months of tooling and preparation including design of special testgear. Before Christmas 1943, the MCR1 was in production by Philco at Perivale at 500 a week, rising in the time before D-Day. Delivery in hundreds, mainly by parachute, was made by the special squadrons supplying all the countries from Norway through Europe to the Middle East. The story of the coded greetings, poems and other messages which triggered resistance action on D-Day is well known and the value of those actions was cited by General Eisenhower as "Worth two divisions already landed" . Very many Allied lives were certainly saved, though at great cost to the resistance. Later, the MCRl was used in the Far East to restore communications from Allied broadcast stations to areas vacated by the Japanese. In 1944, the development of the UK base stations showed that simpler, lower-power WT sets could be used for communications to the Continent and pocket-sized equipment was designed, using the new miniature valves now also being made in Britain. The types 51/1 transmitter and 53/1 receiver reverted to simple, basic circuits in very compact form. It is noted that, 40 years later, similar pocket "QRP" sets are popular with amateur radio hobbyists. John illustrated with slides sets made for resistance forces as well as sets made in England for the Polish underground which played an important role in V-weapon counter-measures. Many museums now feature sets which have become collectors' items which are valued by radio amateurs since they can still be used. John also referred to the BBC TV series on the SOE and his own B MkII and AR88 sets which are still in daily use and are featured in the title shots of the programme.

Book Reviews

Book Review:
by Andrew Emmerson, Editor of "405 Alive" Magazine.
Television picture-book

'Historical televisions and video recorders. By Michael Bennett-Levy. Published 1993 by MB Publications, £12.95. A4-format colour paperback, 60pp. ISBN 0 952 1057777 05.

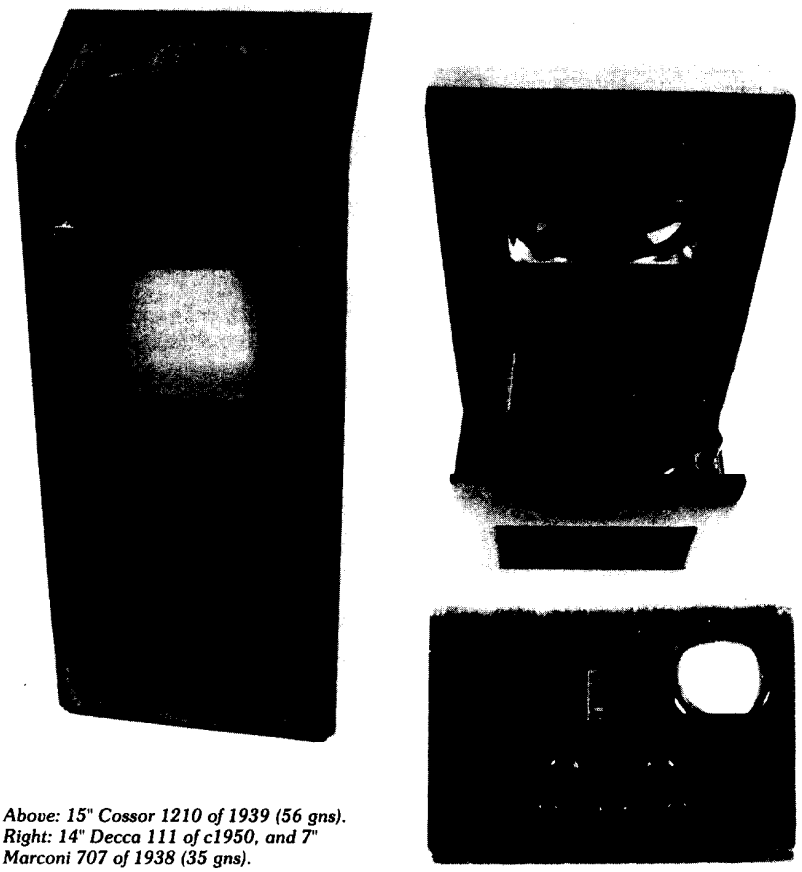
This is without doubt a remarkable book and remarkable for many reasons. It fills a crying need for the identification of early TV receivers, in a satisfactory way and paves the way for further publications of its kind.

The book is the first full-length treatment of early TVs, a field which is growing rapidly in respectability, collectability and value. It is also self-published, which is an indication of the author's dedication to his subject matter. The colour photography, typography and overall 'look and feel' of the book set it above most similar picture books, and the book offers good value for money in what is still a minority subject area.

Anyone wishing to identify British-made TVs of the 30s and 40s will be well satisfied with this book, whilst 'landmark' sets of the 50s, 60s and 70s are also included. Remarkably, examples of most early domestic video recorders and video disk players are included, as well as a representative broadcast camera. To round off the contents, there are also valuable listings of pre-war TV receivers made abroad, in fact all known models. Nobody buying this book will be disappointed.

Gripes? Well, yes a few but not sufficient to detract seriously from the validity of the book. It is fundamentally a picture album with extended captions: a detailed technical history of TV receiver technology of this period has yet to be written. The author readily invites readers to augment or amend anything he has written and has promised a correction sheet to anyone who writes in. Sadly the text is marred by some spelling howlers and some of the captions read in style more like an auctioneer's catalogue than a collector's guide. But these are very minor niggles.

We look forward to future editions and in the meantime we can all enjoy reading this pioneering effort (and help the author recoup his investment in its publication).



Above: 15" Cossor 1210 of 1939 (56 gns). Right: 14" Decca 111 of c1950, and 7" Marconi 707 of 1938 (35 gns).

Book Review
by Gerald Wells
International broadcasting

History of International Broadcasting by James Wood. IEE Technology series, published by Peter Peregrinus in association with the London Science Museum. ISBN 0 86341 281 5.

Students of electronics have waited for a long time for a work like this, which is more than a textbook, telling the history of broadcasting. It is obviously intended for electrical engineers but is written with sufficient warmth and simplicity to appeal to the less tehnically minded too.

In the first part, he deals with the invention of the triode and its use in transmitters, with good descriptions of the design of the valve from its very beginnings to the present day.

His knowledge of transmitter and aerial design is extraordinary. The start of domestic broadcasting is well covered. as is the discovery of short waves. The use of radio as a propaganda tool is also very well documented, covering its political as well as its commerical use as in the case of radio Luxembourg. Part Two takes us through the war years, exposing all the dirty tricks of the Nazis, the USSR, Japan and the Allies. Size, power, aerial arrays and locations are reported in detail as are the technical specifications of transmitters but I found the more human side of the story (like the accounts of Lord Haw-Haw and Tokyo Rose) interesting too. Progress made in transmitter design during and after the war will be of particular interest to engineers and it takes us into the age of satellite communication.

Part Three, is obviously intended for engineers and is rather heavy going, covering pulse-duration modulation, speech processors, single side-band broadcasting and rotatable curtain antennas. If you want to know the size, shape, make, frequency, power output and antenna array of each major broadcaster as well as every religious group broadcasting, then this book is for you. There are six pages indexes.

The author spent all his working life in transmitter design, acquiring a wealth of information which has provided essential reading for student and a useful reference book for engineers which is good value at £30 and I am glad to have it in my library.

Book Reviews and Feedback

Book Review
by Robert Hawes
Elgar re-written

Edward Elgar: *"Music and Literature"*, Edited by Raymond Monk. 1993. 368 pages plus photographs. ISBN O 85967 937 3. Scolar Press, Gower House, Croft Rd, Aldershot GU11

Here is a well-researched and absorbing collection of essays which throw new light on many aspects of the composer's work and how it was received in his lifetime. Challenging received opinion, it is essential reading for admirers of Elgar's music.

Those who are also interested in the development of music broadcasting and its effect on taste and consumption will find of special interest the chapter "Music in the Air' by Ronald Taylor, a book and record consultant and former editor of the Elgar Society Journal.

He begins by recalling Elgar's sad complaint in his later years: "nobody wants my music any more" and then with some diligent and intelligent research, sets out to show that if performances of the composer's music were anything to go by, there was little reason for such pessimism.

Elgar's lament, he says, was the cry of a man who often needed reassurance. There had been a falling off of critical interest in his music towards the end of his life, but it still struck a deep chord in the hearts of the people. This new piece of research certainly demonstrates the importance of continually re-assessing cosy and apparently authoritative hand-me-down ideas.

In Elgar's case, the pundits' view was that Elgar's "old-fashioned" music was out of tune in the Stravinskian, fox-trotting Moderity of the early Twenties. Taylor questions whether the bright young men of the critical Establishment were representing anything other than their own prejudices and seeks real evidence from the broadcasting that was probably expressing the tastes of the masses rather than that of the minority who were at that time able to afford seats at concerts and expensive gramophone records.

Although Elgar's music was played in the Marconi broadcasting experiments of 1992, his own first broadcast was one relayed by the BBC (Company) from the opening of the British Empire Exhibition in April 1924. He had written a special "Empire March", which the King rejected in favour of "Land of Hope and Glory". Elgar found the crowded open-air event with its brass band and choir "raucous and vulgar".

Elgar continued to broadcast (celebrating among other things the last night of Savoy Hill in May 1932) until August 1933 just before his final illness. Between 1922, when he was 65, until his death in 1934, there were no less than 167 live performances of his "Pomp and Circumstance" marches and a huge number of most of his other works including many not often heard nowadays.

A quantity of other interesting and important information has been brought to light by the author's researches which took many years and which thoroughly prove his point.

There is one point on which readers may be able to help the researcher whose study is not complete because certain archives of early broadcasting are missing. He is seeking the "Programmes as broadcast" books from Birmingham station up to 137 and the "Manager's Book" on the first days of the station. He is also hunting for details of very early broadcasting from Cardiff, Newcastle, Aberdeen and Bournemouth, plus northern editions of the Radio Times for 1926.

Books by John Stokes

John Stokes tells us that his most recent book "More Golden Age of Radio" is currently available from Vestal Press Ltd PO Box 97, Vestal, NY 13851. John's two earlier books "70 Years of Radio Tubes and Valves" and "The Golden Age of Radio in the Home" are now being reprinted and will be available shortly.

Letter
from Maurice Stedman, T.M.I.E.T.E.
More on droppers

I have been following with interest the correspondence on mains droppers for valve heater chains and would like to add a few further comments.

Roy Morton and Jeffrey Borin have correctly calculated the value of dropper resistor for use in their respective examples, ignoring 0.6V dropped per silicon diode. I would now suggest a convenient way of measuring that all is well in the circuit.

In Mr. Borin's example, the working resistance of the heaters is:

$$R = \frac{V}{I}\,\Omega = \frac{120}{0.15}\,\Omega = 800\,\Omega$$

and the power dissipated in the heaters is:
Irms X Vrms watts = 0.15 x 120W = 18W

In the half power half wave rectified situation measure the peak value of each half wave pulse on an oscilloscope. This should be 240V peak.

Then the power in the heaters can be calculated as

$$P = \tfrac{1}{2} \times \frac{Vrms^2}{R}\,W$$

$$= \tfrac{1}{2} \times \frac{(240 \times 0.707)^2}{800}\,W = 18W$$

which is correct.

Of course, for safety reasons, the receiver must be powered through a mains isolating transformer when using the oscilloscope.

Consider what would happen to the heaters if the rectifying diode broke down. A protective diode of the same type should be reverse connected across the heater plus dropper chain and the circuit lightly fused.

It must not be forgotten that this discussion has been for AC mains operation only, and there is still no substitute for the dropper for AC/DC operation if ever required.

Feedback

Letter:
from Alan S. Douglas
The "Anodye"

I remember the Anodyne story when it first appeared – Kurz Schluss and all – and I do recognize the rotating-grid tube. It was devised by Allen Du Mont, but as far as I know, it never amounted to anything.

I saw a photo of Du Mont in a magazine somewhere, holding the tube, maybe in a later issue of his company house organ, the Du Mont Oscillographer. It would take a bit of searching to find that. Meanwhile, I quickly found a couple of references enclosed. I don't think that the Radio Club papers were published in 1930, since Radio Broadcast magazine was in the process of going belly-up just then. And this paper probably didn't rate publishing anyway. But the Club may have printed it privately. Complete sets of the Club publications are essentially non-existent; they don't even have a set themselves. I can check further, but since the tube was a dead end, it hardly seems worth it. Du Mont went on to bigger and better things: by the 1940s he was the king of oscilloscopes, before he let Tektronix wipe him out with better and cheaper products, and before he blew lots of money trying to run a fourth TV network in competition with the big boys.

Of course some big Coolidge X-ray tubes (made by GE) had rotating anodes much earlier, but that was for cooling, to keep from melting holes in the tungsten anodes.

Here are two references:

From The Wireless Engineer, Oct. 1930:
A Revolving-Grid Valve. – A. B. Du Mont. (*Rad. Engineering*. July, 1930, Vol. 10, p.24.)

A paragraph on a paper by Du Mont (De Forest Co.) recently read before the Radio Club of America. The grid may be revolved by electronic bombardment or by external electromagnetic influence. Suggested uses include the conversion of a.c. into d.c.; of d.c. into a.c.; the providing of any frequency and almost any wave-form; to replace the oscillating valve as a transmitter; "as a radiovisor of the simplest kind entirely sealed in a single glass bulb."

From "Experimental Wireless, Nov. 1930:
The Revolving-Grid Valve. – A. B. Du Mont. (*Sic. News-Letter*, 30th Aug., 1930, Vol. 18, p.135.)

Illustrations and brief description of the valve referred to in Oct. Abstracts, p.571. The cylindrical suspended grid has a series of vertical slots, on the outside of each of which is a small slanting blade: the electrons impinging on these blades drive the grid round. Voltages used are "of the same order as those used in radio equipment."

Letter:
from Bruce Adams
The AnoDyne

I was surprised that the AnoDyne was not mentioned in the list of contents for the Wireless Review, but I am sure that the enthusiasts of the day would have been most satisfied if it had been in production.

A development, if indirectly heated, would have been gratefully accepted by the TripleFi company, as they were very forward thinking (as my research published in the current issue of The Radiophile on the "Star H" reveals. Amazingly, their concept was used in Hi-Fi amplifiers 20 years late.

Letter:
from Bill Williams
Safety

The electrical safety of vintage wireless sets seems to be a hot topic both among BVWS members and other similar interest groups. I am told that I am quoted sometimes to support arguments on the above topic.

For the record: I am not an expert on electrical safety or an expert on the Electricity At Work Act 1989. I *do* have over 40 years practical engineering experience.

I am *for* electrical safety. Who can be against it? That said, I do think that we should distinguish between domestic electrical appliances on sale to the general public and antiques in the hands of private collectors.

I am allowed to own a vintage car which cannot pass the MOT test and to drive it on a public road. I can own a muzzle-loading gun; buy powder for it and fire it on a range.

The law permits both of these activities which involve a risk of injury or death and there are organisations to cater for enthusiasts.

I do not anticipate an Act of Parliament to control the ownership of vintage electrical appliances. It is up to us to behave responsibly.

No member of the public has uncontrolled access to a private radio collection so I don't see a problem.

Selling a potentially dangerous appliance to an unsuspecting member of the public as suitable for operation from the mains is rightly against the law. But we must differentiate.

Letter:
from Pat Leggatt
Restoration

I thought there was a lot of good sense in Mr B. Land's letter about repairs to vintage receivers. May I add a few comments.

My own view, coinciding with his, is that the first priority is to restore the set to working order. If one happens to have an original or at least contemporary replacement component to hand, then of course this is what should be used for the repair: but if not then use something newer or different, as repairers would have done during the working life of the set.

With this as a starting point, I would now say that if there is some really unique feature of the set then it is worth while going to some trouble to acquire an original component so that the uniqueness can be preserved. The majority of receivers of the 1930's embody fairly standard superhet circuitry with little that is unique about their innards, although there are of course some interesting exceptions. The unique character of many 1930's sets lies in the external appearance, and it is this in my opinion that should be carefully preserved. I differ therefore from Mr Land in that I think it is well worth keeping to braided cable for the mains lead so that the set still looks to be from its correct period.

Turning to receivers of the 1920's - with which Mr Land's letter is not mainly concerned - there is to my mind more individuality in this period, both in circuitry (sometimes downright eccentric), nature of components and physical layout. They may not be Michaelangelos but many were not produced in large quantities and are therefore often rarer and more unique. There is thus a much stronger argument for keeping these sets as original as possible; and, when original components cannot be found, for concealing more modern replacements in original cans, etc. When this sort of thing is necessary to get the set working, I think it important to make a note of anachronistic changes so that there is no risk of mis-representation.

As a final point I am an unashamed restorer of early sets towards original condition as far as possible. For example I rub down ebonite panels to their original polished black and refill diseased engraving, thinking it most unfair to the original designers and manufacturers to leave their lovely panels a dirty green-brown and the engraving almost unreadable. So perhaps Mr Land and I are both cowboys.

Marconi was entertained to an 8-course dinner at London's Savage Club on 21st February 1903 and an artist was commissioned to draw this souvenir menu-card. Drs. Riccardo Kron and Eunice Eckstein have acquire a copy and have produced a fine limited-edition facsimile which is printed here through their courtesy. Copies can be purchased by writing to them at Via Machiavelli, 12/A36061 Bassano de G(V1) Italy.