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I got £10.0.0
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than we reckoned and that
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help and soon I had to buy for
myself a new bike.

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three months and received
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was really splendid. Back
to my job at last.

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this Free Insurance—so you
should, too.

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During Total Disablment ABSOLUTELY
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6d MARCH
ROUND the WORLD of WIRELESS

Testing Your Components

The recent series of articles on making your own components has caused considerable interest to be paid to this section of radio construction, and many readers are now trying their hand at making some of the items which have been described. It should be remembered, of course, that in many cases it will not be possible to make a component to give the same degree of performance as a commercial article, but with care and suitable design it is possible to make a most reliable component, and cases have been reported on many occasions when better results than a commercial product have been obtained. However, the main point after having made a component is to test it, and although this may be done by including it in its normal place in the circuit, doubts are removed, and in many cases time is saved, if the part may be properly tested. In this article we deal with the problem of testing components, using standard apparatus, which may also be made up at home, and which will find many other applications in modern radio work.

Transmitter for Siarn

Standard Telephones and Cables have received an order for a 100-kw station to be erected at Bangor for national broadcasting purposes. The order, amounting to approximately $30,000, includes all studio equipment and a vertical mast of the type recently used by the B.B.C. at St. John’s and other places.

Italian Enterprise

The Italian authorities are taking great care to popularise radio in various places. At Zara, the small Italian town on the Adriatic, a man of money is to be spent each month to reduce electrical interference, whilst at Trippoli speakers have been placed in streets and bazaars to enable the population to hear the Italian broadcasts. A competition has also been opened to all members of the Fascist party for the design of new studios to be built at the Milan station, F.I.A.R.

Philips Factory

During the recent visit of the Mayor of Blackburn to the Philips North of England factory, plans for doubling the size and the transfer of important manufacturing processes from other factories were announced by Mr. J. Visman, Managing Director of Philips’ Blackburn Works Ltd.

B.B.C. Book a “Discovery”

As Charles Shadwell conducted the B.B.C. Variety Orchestra some time ago during a broadcast by a number of Carroll Levis’s “discovery,” he was

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March 29th, at 8 p.m., will be as follows: Overture, “The Eurythmian,” by Weber; Symphony No. 6 (Pathetique), by Tchaikovsky; Violin Concerto from Serenade No. 7 in D (Haffner), by Mozart; “The Walk to the Paradise Garden” (from “Avignon and Juliet”), by Delius; and “Siegfried’s Journey to the Rhine” (“Twilight of the Gods”), and “Entry of the Gods into Valhalla” (“Rheingold”), by Wagner.

The solo violin part in the Mozart Concerto will be played by Paul Beard, leader of the B.B.C. Symphony Orchestra. This will be the first visit of the orchestra to Preston.

Variety Comes Back

Continuing the series entitled “Variety Comes Back,” the Theatre Royal, Blitheton, will be visited in the Midland programme on March 9th, and David Greenton will tell the story of the theatre, from which listeners will hear turns by some artists well known both on the halls and on radio. It was used in the middle of the nineteenth century and in 1902 was reconstructed. Its director then was the late Henry Batheby, who produced and toured juvenile opera companies in “Les Cloches de Corneville” and other works. Florence Baines made her debut at this theatre. Another regular performer there was Dan Rodby, who appeared in Frank Bateman’s Company in the famous “Sentenced for Life.” Other noted artists who have appeared there are Bransby Williams, Sidney Howard, and more recently, Tommy Trinder.

A John Hilton After-dinner Speech

Professor John Hilton is to be one of the speakers at the Sheffield Trades’ and Technical Societies’ annual dinner on March 6th. A visit to this function by the B.B.C.’s Northern microphone and recording van will enable the words of this very popular broadcaster (a Northerner, Bolton-born, and an authority on technical education and industry) to be heard by a wider audience than that made up of his fellow diners. His speech will be recorded and broadcast in the Northern programme on March 7th.
ROUND the WORLD of WIRELESS (Continued)

Broadcasts for South African Natives

It is reported that an interesting experiment in broadcasting is now being made in Uganda. Every evening a programme is sent out from Kampala by land-line to four loudspeakers situated in villages between one and seventeen miles from the studio. Over 15,000 persons listen to the programme every evening. Their reactions are noted by trained African observers. It is hoped ultimately to establish a real broadcasting service with loudspeakers in every village.

Ban on Radio News

According to a recent decree of the local Government, Jamaican newspapers are now forbidden to publish news received over the air by wireless.

Interesting and Topical News and Notes

Robert Layton explaining to radio star Diana Miller his ingenious invention, the "Voice Master," designed to "self train" the singing voice.

Musical training which assures familiarity with musical scores.

Mail Service to Spain

The Postmaster-General announces that the mail service (letters and parcels) to Government Spain is suspended until further notice. Letter and parcel mails for Nationalist Spain are being dispatched as usual.

Visits of Famous Composers

On March 10th Leslie Heward will conduct the B.B.C. Midland Orchestra in the fourth of the programmes of music written by famous composers when visiting England. This one consists of Haydn's symphony No. 93 in D, Mendelssohn's No. 3 in A minor, and the Concerto Grosso in D by Geminiani, the Italian composer who died in Dublin.

Australian Short-wave Transmission Schedules (March, 1939)

V2KMS (Sydney) 31.26 m. : Sundays (Sydney Time), 4 p.m. to 6 p.m. (06.00-08.00 G.M.T.), 5 p.m. to midnight.

B.B.C. Organ Recital

A RECITAL of French organ music will be given by Andre Fleury, organist of St. Augustine, Paris, before an audience in the Concert Hall, Broadcasting House, on March 10th.

Solve This!

PROBLEM No. 337

Jackson had an A.C. mains three, with a standard detector stage to which pick-up terminals were connected in the usual manner. He decided that noise should be eliminated by improving the stage, and knowing that this was applied automatically when a pick-up was joined to the circuit, he decided to use that stage for the noise. However, the detector circuit to the echo failed to pass the test to try the final version of the pick-up it would be used in the pick-up circuit. He did this without obtaining any results. Why was this? Three books will be awarded for the first three correct solutions opened. Entries must be sent to The Editor, PRACTICAL AND AMATEUR WIRELESS, Geo. Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be sealed Problem No. 337 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, March 9th, 1939.

Solution to Problem No. 336

The armature in Lewis's pick-up had become malfunction due to the rubber support having failed. Consequently, although tested for continuance and found in order, signals could not be obtained as the signal failed to move the armature and thus produced the signal voltage variations. The following three readers successfully solved Problem No. 336 and two more have accordingly been forwarded to them: Geoffrey Hill, The Nest, Hollywood Road, Walthamstow, H. Forks; A. Gilbert, 79, Nelson Road, Walthamstow, H. Forks; Mr. E. Saunders, 12, High Street, Walthamstow.

Concert from Weymouth

WEYMOUTH Choral Society will broadcast a concert from the Alexandra Gardens, Weymouth, on March 10th, in the Western programme. The Society was founded in 1881 as the successor to the Weymouth Philharmonic Society, and was reorganised in 1931. Margaret Trigg will be the pianoforte soloist in this programme. She is a native of South Ayrshire, and has won awards at a number of festivals.
The "Request" Straight 6

Having Completed the H.F. and Detector Section of this Receiver, this Article Describes the L.F. and Output Chassis, which is so Designed that it can be Used as a Separate Unit if so Desired

By L.O. SPARKS

It will have been noticed that the output valve holder on the chassis of the H.F. and det. section is wired so that its anode socket provided an anchoring point for the maximum H.T. supply lead, and the means of getting the H.T. to the first stage of the amplifier.

In the theoretical circuit shown in Fig. 1 the section the output connections are slightly different. The anode socket being connected to the negative side of the L.T., or, in other words, the earth line. That is quite in order when the H.F. unit is going to be used with headphones, or with any other form of L.F. amplification, as the coupling in the Det. anode circuit is arranged on the usual R.C.C. lines, which allows the output to be taken from the free side of the coupling condenser and earth. The method shown on the chassis is identical, theoretically, but the connections are modified for practical reasons and for the amplifier now about to be described.

The theoretical circuit is shown in Fig. 1. It is the well-tried Class A Push-pull arrangement, free from elaborations, which are so often of doubtful practical use.

The components are few and, in view of this, I would suggest that those of doubtful or inferior make are barred from the ultimate selection, otherwise the efficiency of the amplifier and the quality of its output will be seriously affected.

Circuit Details

A four-pin valve holder mounting valve holder is used to form the input connections, thus allowing input, L.T. and one H.T. feed to be obtained from the first unit via the four-pin plugs and a four-pin cable.

The input—i.e., the grid socket—is taken to one side of a 5 megarhm potentiometer through an H.F. stopper resistance of 50,000 ohms. The potentiometer is directly across the grid circuit of V4 and serves the purpose of volume control and grid leak. It is placed in this stage to enable a complete control to be maintained over all the L.F. feed method of coupling was selected to allow the primary winding to develop its maximum inductance by keeping it free of any direct current. A high-inductance valve is very essential for good bass response.

The anode circuit is completed by two fixed resistances the first forming the anode load and the second the decoupler, the function being by-passed to earth by means of the 2 nfd. condenser.

The tone control is also introduced into the circuit in this stage, it being formed by a 50,000 ohm potentiometer connected in series with a 575 ohm fixed resistor between the anode of V4 and earth. Although this arrangement will be found most useful, it is not, in the event of the tone control being short-circuited, the lower register by cutting it out, reducing some of the higher frequencies. However, if a complete high and low-note control is required, then I would draw attention to the very efficient little unit which is described in the issue for February 11th, 1939, as this could quite easily be embodied in the amplifier.

The secondaries of the input transformer are taken to the grid sockets of the two output valves via R.F. stoppers of 50,000 ohms, the necessary bias being applied by means of the centre tap in the normal manner.

As an additional precaution against parasitic oscillation, two mica capacitors are inserted in the anode circuits, and it is essential for these to be connected direct to the anode pins of the valve holders. The values are quite low, 100 mfd. being sufficient. It must not be overlooked that the output from the amplifier will consist of three connections, namely, one from maximum H.T. and one from each anode of the output valves. A push-pull output transformer is not included in the list of components, as most modern P.M. moving-coil speakers are provided with a suitable matching transformer. However, if it is a question of purchasing a new speaker, the make and type of the output valves should be specified when ordering.

Construction

The chassis is 9in. by 8in. by 3in. It is constructed from aluminium of the same gauge as the H.F. unit, the bending, marking off and drilling being carried out in the manner described last week for the first section.

Mount all the smaller components first and complete as much of the wiring as possible before bolting on the heavy input transformer, taking care to protect the upper surface of the chassis from damage by scratching, etc.

The potentiometer used for the volume control must be of the type having its spindle insulated from its fixing, otherwise when it is mounted on the chassis the grid of V4 will be earthed. With the tone control this is not essential, as the moving arm is normally connected to earth.

Operating and Testing

Before coupling the L.F. section to the H.F. and det. portion, exhaustive tests

(Continued overleaf)
IMPORTANT BROADCASTS OF THE WEEK

NATIONAL (261.1 m. and 1,500 m.)
Wednesday, March 1st.—Symphony Concert from Queen’s Hall, London.
Thursday, March 2nd.—Lucky Dip programme.
Friday, March 3rd.—Radio Pie, light entertainment programme.
Saturday, March 4th.—Rugby Union Football: A commentary on the Royal Navy v. The Army, from Twickenham.

REGIONAL (432.1 m.)
Wednesday, March 1st.—I Remember, presented by Percy Edgar.
Thursday, March 2nd.—Transatlantic Special, by N. C. Hunter, the story of Irish emigration.
Friday, March 3rd.—Midland Parliament: The School Leaving Age, a round table discussion.
Saturday, March 4th.—Music, Maestro: Please, a parade of song hits.

MIDLAND (297.2 m.)
Wednesday, March 1st.—I Remember, presented by Percy Edgar.
Thursday, March 2nd.—Variety from the Opera House, Cheltenham.
Friday, March 3rd.—Cascabella Rusticana (Masaccini’s opera), from the New Theatre, Northampton.
Saturday, March 4th.—Leicester Brass Band Festival, from De Montfort Hall, Leicester.

WEST OF ENGLAND (285.7 m.)
Wednesday, March 1st.—Made in the West—4. The Bridport Trade: The rope, twine, line and net industry.
Thursday, March 2nd.—The Leader of the Band (American series): Dance music on gramophone records.
Friday, March 3rd.—Choral programme.
Saturday, March 4th.—Sports Special, a feature for fans.

CROSSTOWN NEW YORK
The past year of William N. Robson's visit to this country will be in some measure compensated for by a second performance of his brilliant sound presentation of life on 52nd Street. This famous New York Street is to Americans what Piccadilly, Park Lane, the Old Kent Road and Limehouse Causeway are to Londoners. It cuts right across the city from East River to the Hudson, taking in its stride every phase of New York life.

Luxurious apartment houses, smart shops and restaurants, night clubs and smoky docks—all these will have a part in the broadcast. The programme, which was written in the New York offices of the B.B.C. and sent to London on records, will be handled by Laurence Gilliam. This broadcast will be given in the National programme on March 12th.

JENNY LIND
The greatest dramatic soprano of her time, and perhaps of all time, died just over fifty years ago. The "Swedish Nightingale" during her lifetime was idolised as few women or artists have ever been, but what does she mean to listeners today?

Denis Constantinos has prepared a programme which conveys skilfully the essence of greatness of Jenny Lind and brings forcefully to life the romantic details of her career. She was born in 1820, and after studying in Stockholm and Paris achieved sensational success in a now-forgotten opera by Meyerbeer in Berlin. This was the turning point of her career, after which she became a diva beloved alike by connoisseurs and masses. Maurice Brown, who will produce the programme, is the music adviser to the Features and Drama Department of the B.B.C. This broadcast will be given on the Regional wavelength on March 18th.

WELSH (391.1 m.)
Wednesday, March 1st.—Crag-y-Bar, a romantic play by Rhys Dafydd Williams.
Thursday, March 2nd.—A. St. David’s Day Service, from Llandaff Cathedral.
Friday, March 3rd.—Haraldsson Lofius: Greetings to Brittany: a special programme of music and folk lore.
Saturday, March 4th.—Songs by London Welsh Children: A. St. David’s Week celebrations by the London Sections of the Welsh League of Youth.

NORTHERN (449.1 m.)
Wednesday, March 1st.—Music of the People: A Lancashire Concert from Colne.
Thursday, March 2nd.—The Hall’s Society’s Concert, from the Free Trade Hall, Manchester.
Friday, March 3rd.—Concert Orchestra: Sheff Seked.
Saturday, March 4th.—Across the Garg- way: Sea Lore for Landmen—thrid talk in the series.

SCOTTISH (391.1 m.)
Wednesday, March 1st.—Timber, a documentary programme (recorded).
Thursday, March 2nd.—Single Ticket, a one-man journey under the direction of Ian Stolier.
Friday, March 3rd.—Gaelic Concert.
Saturday, March 4th.—The CaledonianStralesgvay and Red Society.

NORTHERN IRELAND (307.1 m.)
Wednesday, March 1st.—Saturday Night at the Wellington Hall, a ball.
Thursday, March 2nd.—Transatlantic Special, by N. C. Hunter, the story of Irish emigration.
Friday, March 3rd.—Northern Ireland The Champions’ Trim, from the Plaza, Belfast.
Saturday, March 4th.—Orchestral Concert in co-operation with Belfast City Y.M.C.A., from the Wellington Hall, Belfast.
Interesting Details of the Apparatus and Principles Involved in Broadcasting Outside Events

March 4th, 1939.

Vol. 4. No. 141.

The largest television receiver on the market, and for comparison, the smallest. These receivers may be seen at the Selfridge exhibition.
PRACTICAL TELEVISION  
(Continued from previous page)

PRACTICAL AND AMATEUR WIRELESS 
March 4th, 1939

east of 250/300 watts. The transmitter uses special air-cooled valves of new design for the last stages.

Aerial Difficulties

One of the difficulties with the radio link is in the provision of suitable transmitting and receiving aerials. When the radio link was first provided, a directional aerial was supported by two 30ft. wooden supports and was fed by a concentric cable of low-loss on the transmitter, while a special receiving aerial was erected on the roof of the mast at Alexandra Palace. It was soon found that the range which could be obtained with this arrangement was smaller than expected, and that the physical position of the transmitting site in relation to the contour of the ground between it and the receiver, as well as the height of the transmitting aerial, were very important. This led to consideration of a more portable aerial, meant for transportable use, and the suggestion was made to use a fire escape. To this end a second-hand fire escape was purchased and found to be satisfactory in use, even though it was necessary, instead of using a complicated aerial array, to use a single dipole and reflector. Since then a new aerial has been specially constructed and now in use, which is carried in a considerable amount of spare gear, such as cables, etc. The mast and top of the fire escape were shown in last week’s issue.

The receiver for the radio link is situated at Alexandra Palace, and the receiving aerial is situated on top of the main mast. Considerable difficulty has been experienced with this arrangement, not from direct interference from the main transmitter on 45 mc/s, as the radio link frequency of 64 mc/s is sufficiently far removed to make adequate filtration a relatively simple matter. The type of interference was akin to “spurting” and consisted of intermittent bands of black across the picture, often of sufficient intensity to throw the received picture out of synchronisation. As at that time all efforts to trace and eliminate this interference had failed, search was made for a second receiving site removed from the interference, but situated on the Alexandra Palace-Broadcasting House cable route, so that the cable could be used for linking the receiver with Alexandra Palace.

A suitable site was found, as has already been reported in these pages, at Highgate, and was used with a temporary 50ft. mast. A permanent station is, however, being established with a 150ft. self-supporting wooden mast. The source of the interference itself has been traced to loose and broken wires in the main transmission system, and although it is now possible to receive at Alexandra Palace, there is always the danger of the interference reappearing, which it sometimes does at the most inopportune moments. Further, the Highgate site is less noisy electrically and is geographically better situated for some outside broadcasts, and therefore it is still to be retained.

Experiments Still Being Made

The present transmitting aerial for the radio link is by no means final. The experiments which have been made to compare horizontal and vertical polarisations are of interest, but that for television, a radio link horizontal polarisation is considerably better, and that with a suitable design of transmitting and receiving aerials a gain of 6 to 12 decibels in signal strength over the present arrangement is expected, in addition to the improvement obtained by the reduction of general interference from motor-cars and so on. As a result of these experiments new aerial arrays for both transmitter and receiver are now being designed.

Further details regarding the present television system may be read in the remainder of this lecturer’s copy which are printed in the Journal of the Royal Society of Arts, and which may be obtained for 1s.

CINEVISION

For want of a better name, the word “cinevision” has been coined to represent the latest phase of television’s development, namely the portrayal of television pictures inside a cinema. The arrangements made in connection with the Bono-Danahar boxing match for the British light heavyweight championship involved an agreement which it is felt may have very far reaching effects on television pro-

During a recent television broadcast, Miss Jasmine Bligh was televised taking part in an autogiro flight. She described her experiences on a special radio link.

grams in the future. First of all, there is no doubt that the B.B.C. deserve commendation from the public for having made a material gesture which will certainly relieve the condition of apparent impasse which arose between an established form of entertainment—the cinema—and the newest form of picture portrayal—television. It is not too much to say that all forms of entertainment can be classed as one industry, and every new scheme which assists in making people more entertainment-minded is an asset to that industry. The greatest enemy to that industry is lack of interest, and any novelty such as is provided by big-screen television in its initial stages will help to bring about a new enthusiasm, and restore box office appeal in such a manner that all forms of entertainment will benefit. It is understood that the B.B.C. made no payment for the television transmission itself, but in return, conceded to the fight promoters the right to show the reproduced pictures to a paying cinema audience, a concession sold to the Gaumont British Picture Corporation. 

For the occasion, the prohibition imposed by the B.B.C. on the commercial exploitation of its televised programmes, especially in so far as outside broadcasts are concerned, and that placed by the Government’s Television Advisory Committee, and on the success of the experiment will depend any future action.

The Installation

Since the necessary arrangements for the occasion were made out rather late, the Baird engineers had to undertake the installations in the two cinemas involved—the Marble Arch Pavilion and the Trafalgar—at rather short notice. Both theatres were therefore shut down for a few days to enable the necessary finishing touches to be effected to the entirely new equipment. Technical details of the apparatus have not yet been released, but it is known that projection cathode-ray
The Silent Screen

A FRIEND of mine who has just purchased a television receiver made a suggestion which I think is worth passing on to the B.B.C. My friend is most enthusiastic over television, and has been a keen theatre-goer all his life. He is, therefore, accustomed to applaud at the end of an enjoyable item. Now, the television audience are unable to applaud, and he thinks, and I do, too, that at the end of each item the B.B.C. should run a few strips of Blattnerphone through the machine to give some recorded applause, and thus complete the illusion of being in a theatre. There does seem to be at the end of each item a dumb period, and I think that some fake applause at the B.B.C. end would help to liven things up.

Picture Size

I see that at a meeting organised by the Wireless Retailers Association they reached agreement on various points, not only concerned with marketing. I am pleased to record that the dealers are appreciative of the co-operation they are receiving in connection with television on the service side, and that they also gratefully acknowledge the training facilities offered by manufacturers at their schools. They emphasised, however, that there was need for standardisation of particular types of aerial to be made. They suggest that the present cross used for tuning purposes should be replaced by a tuning picture, and that a signal of this form should be transmitted from 11 a.m. to 1 p.m. to supersede the present demonstration film which many dealers think is useless. The Television Advisory Committee I see have agreed to consider the possibility of radiating some short films between 6 and 8 p.m. with a five-minute interval between each. Dealers were unanimous in recommending that no picture smaller than 6in. by 5in. should be regarded by them as satisfactory, and they were of the opinion that some of the sets giving a smaller size have resulted in dissatisfaction amongst the public.

One other point which I think is worth recording is that dealers are of the opinion that manufacturers should push combined radio and television receivers, as it would provide a solution to the part-exchange problem.

Interference

ONE of my readers, A. D. C., of Southport, complains that his short-wave set suffers from motor-car interference, but not to the extent of 90 per cent. He also agrees that it would be unfair to force every motorist to fit suppressors. I do not, however, subscribe to the view which my correspondent expresses that three or four million all-wave sets are in existence in this country, and his suggestion that 12 million people suffer from interference on short-wave sets is not only ludicrous but fantastic.

And now our old friend "Torchi" writes to me as follows: "Be calm! This time the following epileptic does not imply any poetical 'Torchure,' as my divine afflatus is on a short vacation. (Thermion: 'Thank God for that!')" "I quite agree with what you said last week re television. A good job that someone has a sense of proportion. Did you come across the matter I attach from last Sunday's ——? Would it not make one sick? Such misleading hooey is a disgrace to any paper it is published in, and I have taken leave to tell the editor of that particular paper so. When this sort of thing is spread abroad amongst so millions of people, no wonder the plague of inventors never gets any less. Many thousands of pounds are extorted annually from the pockets of such as can ill afford their complete loss by these frequently recurring and most misleading fairy tales of fortunes in patents. Let the figures of the Patent Office speak for themselves. Every year some 30,000 patents are applied for; some 17,000 are refused (fees not returnable), and of the remaining 13,000 patents which are actually granted, not 5 per cent. ever reach any commercial success or result in anything but misery and loss to their inventors. "To find one's way through the Hampton Court Maze is mere child's play to trying to work one's patent through the mazes of the Patent Acts successfully and profitably. The dice are loaded against the inventor in many insidious ways from the moment he turns his steps towards that Mausoleum of Buried Hopes, the Patent Office. And there are many interests which are only too willing for this state of blissful ignorance to go on for ever. I think that no greater service could be done by any reputable journal than for it to warn its readers against being misled by this romantic but quite untrue Tom Tiddler's Ground blarney about fortunes in patents, at least so far as their inventors are concerned. The fortunes are there all right, but the invention is the only one who, as a general rule, never gets a sniff at them. The Patent Office itself collects a nice little fortune of a profit of £100,000 per annum after paying all its working expenses, and this it hands over to the Exchequer out of the pockets of the 'Fortune-hunters.' 

"It would be an excellent reform if the Patent Acts were abolished entirely, and new inventions have to take their chance commercially on their merits and quality alone; but as there are so manv vested interests against this, the next best thing is to let the alleged 'fortune' go hang. For quite 95 per cent. of inventors this will ensure a much more peaceful life, and their pockets will be far better lined by buttoning them up when the idea of taking out a patent enters their heads."

My Suggestion

I am glad to see that my original suggestion for obtaining statistics on television interference is being acted upon. In the meantime, I suggest that all wireless clubs should conduct experiments on television interference, and I shall be glad to
draw up a form of investigation if there is wish to do so, and to pass along their results to the B.B.C.

It is my view that this television interference problem is one which the B.B.C. itself should tackle. We know that manufacturers have suppressing apparatus, but no-one is prepared to say which is the correct apparatus which will suit every case. Whilst competing commercial interests must inevitably have a strong bias for their own wares, I feel that the matter is one which should be investigated impartially, in just the same way as the B.B.C. was left to choose between two television transmitting systems.

The position at present is somewhat tantamount to asking motor-car manufacturers to solve the problem of the roads. In this respect the B.B.C. or the Television Advisory Committee is somewhat in the same position as the Ministry of Transport. I repeat that the investigation of television interference is not one for the trade. It is my experience that some suppressing systems for motor-cars interfere with the efficiency of the ignition system, so if such systems are made compulsory it would certainly be argued that television was causing interference with motor-cars. The needs of the few must be sacrificed to the needs of the many. Television is, after all, a form of entertainment, whereas motorizing is largely a necessity, and motorists are likely to outnumber those owning television receivers by about ten to one for some time to come. The suggestion that motorists should be compelled to buy suppressing apparatus is a particularly selfish and unnecessary position to take up, and it is likely to do damage to the development of the television industry. This is particularly true when we remember that suppressing apparatus has by no means reached that stage where it can be standardised. I have communicated my point of view to the B.B.C.

Success for British Wireless Industry

It is interesting to note that in face of keen competition from American, Dutch, French and German companies, Marconi’s Wireless Telegraph Company Ltd., has secured an important contract from Finland for the supply of an installation of a 50-kilowatt short-wave broadcasting station, to be installed at Porvoo, near the Gulf of Bothnia. The equipment is being designed and manufactured at the Marconi Company’s works at Chelmsford, and will provide work for many skilled craftsmen.

The station is to be completed in time for the Olympic Games which will be held in Finland in 1940, and will thus provide a world-wide channel for the rapid dissemination of news and commentaries on the sporting events.

Big “All Region” Plan

I AM informed that all the B.B.C. Regions will contribute separate features to a new series of variety magazine programmes entitled “Roundabout,” which is to be presented by John Watt, B.B.C. Variety Director, and will be given after next month in the main Wednesday night variety programme. This will be the first time that the B.B.C.’s programmes broadcast from London and all the Regions will have been regularly “fooled” in a co-operative variety programme series.

“Arrangements are not yet complete,” John Watt said recently, “but we hope to include musical and other features, interest items, a comic strip, outside broadcasts, sketches and a new type of serial, in which listeners will be able to take a particular interest. All the contributions will be ‘live’ and will be co-ordinated through a control panel in Broadcasting House.”

“The idea for Roundabout” suggested itself as the result of the success of the ‘Seaside Nights’ and ‘Famous Music Halls’ series, in which we had the co-operation of the Regions. We want to extend the principle by which we all work towards one end—the best entertainment for the listener.”

The Passing of “Band Waggon”

T HAT popular weekly feature, the Band Waggon, will make its last happy-go-lucky radio journey on March 15th in a programme that will end the present run of one of the stubbornly successful B.B.C. variety series. Whether it will eventually be revived remains to be seen. Certainly there is quite an element of doubt about it. The future of Mr. Walker, the philosophical junk-man of the programmes, however, is a little more definite.

“You can say,” declares John Watt, B.B.C. Variety Director, “that Mr. Walker will not be permanently lost to radio, though I cannot tell you how, or when he will make his return on the air.”

To follow “Band Waggon,” the B.B.C. has booked Greatrex Newman’s “Fol de Rols,” one of the most famous concert parties in the country and probably the biggest organisation of its kind. They will be on the air every Wednesday evening for six consecutive weeks.
LAST week we described the construction
of a detector stage which alone forms a
good single-valve receiver for
short-wave use. The original idea was,
however, to make this the basis of a multi-
valve which could be used at any time in
a particular form. Therefore, we need
an H.F. stage and one or more L.F. stages,
which may be added to the original unit.
The H.F. stage may be accommodated on
a chassis 3in. deep, and this may be made
of the same length as the original unit so
that the two may be placed together to
form a single chassis 9in. by 9in. L.F.
stages may be accommodated on similar
sizes of chassis and placed at the side, or
they may be made 9in. deep and two
stages may be placed on one chassis. The
exact arrangement of these may be left
valve with holder. The valve may be
either an H.F. pentode or an S.G. com-
ponent, but should not be of the variable-
mu type. At the front of the
chassis a small
strip of bakellite
may be bolted,
and attached to
this are two solid
plugs capable of
fitting into the
aerial and earth
socket strip on
the rear of the
detector chassis. If these are
properly posi-
tioned it will be
possible to plug the two
units together. Bolted
to the front runner of
this unit is a vertical
panel of aluminium,
through which clearance
holes for the plugs and
condenser spindle must
be cut (Fig. 1). When
the two units are placed
the panel will
act as a screen and
effectively prevent
interac-
tion between the H.F.
and detector stages,
keeping the condenser
either of the coils.

In this way maximum
efficiency is obtained.
At the back of the H.F. chassis a similar
aerial-earth socket strip should be mounted
for connection of aerial and earth. To
avoid the necessity of threading the battery
cable through the chassis when changes
are made, small sections should be cut out of
the front and rear runners and thus the
chassis may easily be placed over the
cords without difficulty. The condenser
should be mounted on a standard bracket
and placed at a convenient height and
distance from the front of the chassis, so
that it may be locked to the spindle of the
front condenser.

Standard connections will be made to
the coil and valveholders, the filament
terminals on the latter being provided with
crystal leads which may be joined to the
detector valveholder or to the accumulator
direct. It is not often that it will be
necessary to make rapid changes
from one unit to another and thus “clip on”
connections could be used for the
valve filaments, provided that the clips
gave really reliable contact. Failure to
attend to the latter point may give rise to
background noises due to vibration of the
connection. If desired, a duplicate
socket strip may be mounted
at the rear of the detector chassis and a
pair of plugs mounted as already described.

Fig. 1.—The complete H.F.
unit ready for connecting to
the detector unit.

Fig. 2.—Top and underside wiring diagrams of the H.F. unit.

The H.F. Stage
For the H.F. stage we need a single
condenser identical to that used in
the detector unit, a coupler by means of
which the two condenser may be ganged
together, a 6-pin coil and holder, and a

Fig. 3.—Theoretical circuit of the H.F. unit.
PRACTICAL AND AMATEUR WIRELESS

SHORT-WAVE SECTION

CONTINUED FROM PREVIOUS PAGE

mounted as shown in Fig. 4. These are subsequently linked to the two 'phone terminals on the detector chassis when the L.F. stage is to be added. Filament connections may be taken care of in a similar manner to that indicated for the H.F. stage, the plug-and-socket arrangement being, of course, the most reliable. It will be seen that the L.F. chassis may be duplicated for a further stage if desired.

The single L.F. chassis will accommodate two L.F. stages, and for a really powerful multi-valve the second L.F. chassis could include push-pull valves fed from the second valve in the first unit—thus providing a five-stage receiver. There is ample room for such circuit arrangements in the chassis sizes which have been given, but the omission of the second L.F. chassis will still enable a four-valve to be built in small limits. The only point here is that there will be no ready means of cutting out the last L.F. stage where the additional low-frequency amplification is not required. This point could, however, easily be taken care of by mounting a standard jack on the front of the chassis, with plug connections for the 'phones or loudspeaker, for maximum results. Furthermore, each stage may be decoupled more directly and thus may be used for experimental use outside the combination for which it is originally intended. It will be seen that by means of the idea outlined in this article a set may be built up which is no larger than a receiver built as a complete unit, but at the same time complete flexibility is provided so that economy may be effected when desired, and the best performance obtainable at all times under all conditions. The overall size of four chassis, which will provide H.F., detector and 2 L.F. stages is approximately 14in. by 9in. by 5in. runners.

Leaves from a Short-wave Log

Brazil and Germany

RELAYS of programmes destined to be re-broadcast through the German radio network have been picked up on two channels, namely, 14.53 m. (20.08 Mc/s) and 20.07 m. (14.35 Mc/s), both transmitted through FSA and PSC, Maracpoie (Brazil), respectively.

New Abyssinian Station

U1[2]. Addis Ababa, is a new transmitter installed by the Italian authorities; it is now testing daily between G.M.T. 1830-1930. It is reported that the station is only a provisional one as the eventual power will be 10 kilowatts.

Franco's Main Short-wave Station

The Nationalist party broadcasts from its headquarters at Burgos news bulletins in the English language, as well as in Spanish, Italian and German, daily through station FET5 (Burgos), working on 40.8 m. (7.353 Mc/s) from G.M.T. 1840 onwards.

Radio Nations' Altered Schedule

From February 12th English broadcasts by the Secretariat of the League of Nations at Geneva (Switzerland) are being made through HIO and HBO, Prangins, on respectively 26.31 m. (11.14 Mc/s) and 44.84 m. (6.675 Mc/s) at G.M.T. 1930.

Moscow's Multiple Channels

Broadcasts from Moscow for the benefit of neighbouring and other nations are now broadcast on seven different channels. They are: RW96, 19.72 m. (15.21 Mc/s), G.M.T. 0900 (English); RKK, 19.06 m. (15.08 Mc/s), G.M.T. 2400 (English); RW96, 31.25 m. (9.6 Mc/s), G.M.T. 2300 (Spanish); 2400 (English); 0215 (French); on 31.31 m. (9.52 Mc/s), G.M.T. 1800 (German); 1900 and 2100 (German); RNE, 35 m. (12 Mc/s), G.M.T. 0200 (Spanish); 1100 (English); 1200 (German); 1300 (Dutch) and 1400 (French); RNE, 50 m. (8 Mc/s), 1500 (English); 1600 (Spanish); 1700 (German); 1800 (French); and RIA, 51.24 m. (5.88 Mc/s), G.M.T. 2030, in the Czech language.

Baghdad Heard on 30.7 m.

LISTENERS report reception of a broadcast by YISKG, Baghdad (Iraq), on 30.7 m. and on the regular channel of 41.67 m. (7.2 Mc/s). The former wavelength cannot be traced as having been formally allotted to this station, and it is presumed that it is an experimental one. Reports should be addressed to J. Hassen, Director of Radio Station YISKG, Civil Airport, Baghdad (Iraq). The station is on the ether daily between G.M.T. 1230 and 2000.

Manizales Changes Call-sign

H6ABB, Radio Manizales (Republic of Colombia), on 40.15 m. (6.105 Mc/s), has altered its call-letter to H6RFA. It is on the ether daily (Sundays excepted) from G.M.T. 2230-0300. Address: Apartado Postal 175, Manizales.

And Havana . . .

THE 1-kilowatt COOQ station at Havana (Cuba) is now working on 33.52 m. (9.58 Mc/s). The call is Estaciones La Voz de la RCA Victor, COOQ en Cuba, Republica de Cuba. Interval signal: two gongs (one high and one low pitch). Address: Calle Maximo Gomez, 18, Vedado, Havana.

Radio Guadeloupe Logged

A TRANSMISSION by P68AA, Pointe-a-Pitre (Guadeloupe, French West Indies), was recently logged by a listener on the south coast of England. The wavelength announced was 42.5 m. (7.68 Mc/s), and transmissions are made daily from G.M.T. 2300-0300. The power is 100 watts, but it will be shortly increased. All announcements are in French, barring the last one before the station closes down for the day, and this is given in the English language. Broadcast concludes with the playing of La Marseillaise. Address: Boite Postale, 125, Pointe-a-Pitre, Guadeloupe.
Automatic Cupboard or Room Light

A SIMPLE device by means of which a light can be switched on or off by opening or shutting a door can easily be constructed from an ordinary electric-light switch and a component-mounting bracket. The switch, which should preferably be one of the old type with a metal dial, is screwed into the centre of the top of the door frame. The component-mounting bracket is screwed into the door as shown in the illustration.

On almost shutting the door the point "A" of the bracket pushes the switch back, thus switching off the light, and when the door is completely shut the arm of the switch rests inside the centre slot of the bracket. When the door is now opened the point "B" of the bracket pulls the switch on and then slides free of the switch.

—B. Lovrel (Newcastle).

A Drill Guard

A SIMPLE device for preventing metal particles from getting into your eyes, when drilling, is contrived as shown in the sketch. The bell dome from an old electric bell or alarm clock is taken, and in the centre is soldered a sleeve made of tinplate, which is passed over the drill in the manner indicated. When the drill is used in the position shown, this device also prevents the accumulation of metal particles on the bench.—R. Fieldhouse (Horrogate).

Auto-switching for Aerial Condenser

The accompanying sketch shows a simple arrangement for automatically switching a pre-set condenser in and out of circuit on the long and medium wave-lengths. The contact strips are made of thin brass strip taken from old flash-lamp batteries. The strips are bent, as shown, and clamped under the terminal nuts of the condenser. The condenser is shortened out on the long waves, and a piece of hardwood disc was then cut out, having six slots as shown. This was placed between the two heads, and the three parts bound firmly together by means of silk thread as indicated. An alternative method of fixing might be tried of running hot pitch into the space formed by the mica and the bevelled edges of the discs. In this case, the slots in the mica and binding could no doubt be dispensed with. The capacity of this condenser is, of course, in the micro-microfarad class, but will be found quite sufficient on the higher frequencies.—R. L. Gravett (Chelmsford).

A Tinning Dodge

A SMALL clip for attachment to the soldering iron is useful for getting over the tinning difficulty when soldering. The clip is constructed from 20-gauge copper sheet, and four square upright pieces are made by cutting three sides of a square and bending upwards. This forms the holder for the tin lid, or solder container. The sheath and tin lid are then slid on to the heater section of the electric iron, and small parts are dipped into the molten solder. The clip is easily removed when not in use.—E. Bestley (Harrow).

THAT DODGE OF YOURS!

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SPECIAL NOTICE

All wrinkles in future must be accompanied by the coupon cut from page iii of cover.


THOSE amateurs experimenting on the ultra-short waves may be interested in the simple grid condenser shown in the sketch. Two brass drawing pins were used for the plates, these being of the type shown, having flat heads, 4in. outside diameter, and a slightly bevelled edge. The steel pins were then extracted, and a short length of 16-gauge tinned copper wire soldered into each hole. A small mica
The majority of component tests likely to be made by constructors are those for insulation and continuity of windings. Quantitative tests—measurements of inductance and capacity for example—generally call for more elaborate test gear than that normally possessed by the amateur.

By far the most effective tester is one made by simply connecting a small neon tube in series with a fixed resistor, as shown in Fig. 1. A mains plug is connected to one end, whilst a couple of test leads with a long piece of twin flex are connected to the other. For the neon tube, a Bulgin midget neon indicator lamp is in most convenient; it costs 3s. 6d. and can be fitted into a holder of the type used for standard 1 in. fuses. This lamp passes a negligible current and should always be used with a series resistor of between 3 and 1 megohm. It has a striking voltage of about 180, which means that it will ring at a loud clear bell when a pulse of electricity is applied to it. Bear in mind that, because of the infinitesimally small current passed, the series resistor does no harm to the applied voltage to any measurable extent.

Tester Construction

To avoid any possibility of touching the "live" leads it is a good plan to place the neon tube, in its holder, and the resistor in a shallow box. A hole could be cut in the lid, this being covered with glass or Cellophane to provide a window. Both twin flex leads should be passed through holes in the opposite ends of the box, and should be knotted on the inside to prevent their being pulled out. The mains connector could be either a five-amp plug or a lamp-holder plug. Standard test probes are best for the output leads, but two lengths of 16-gauge wire could be soldered to the ends of the flex leads if they are well bound with insulating tape to within about 1 in. of the ends. Actually, it is unlikely that any appreciable shock would be felt if the metallic parts of the test probes were touched, but those who are very sensitive to electricity might experience an unpleasant "tingle."

A small test unit of the kind described is shown in Fig. 2, where the simplicity and neatness of the arrangement is illustrated. In this case a small cigar box is used, but any kind of wooden container is perfectly satisfactory.

How It Works

Now let us see how this tester works. If the two test probes were joined together while the mains plug was connected the lamp would emit an orange glow, showing that the circuit was complete. Similarly, if the probes were connected to the two ends of a coil or transformer winding the lamp would glow if the winding was intact. Should the probes be held against the two terminals of a fixed condenser, the lamp would give a series of "flashes" if the component were defective, the number of "flashes" in a given time being governed by the capacity of the condenser. For example, if it were found that the lamp lighted 30 times a minute with one condenser and, say, 75 times a minute with another, it would be known that the second had a larger capacity than the first. It is actually possible to calibrate a device of this kind so that it can be used for measuring capacity, but that aspect will not be considered further in this article.

It will be clear from what I have written above, that the tester could be "reversed" for testing inductors to see if current was reaching certain points. Thus, if the two pins of the mains plug were shorted, the lamp would glow when the test probes were connected to two points between which there was a potential difference of 180 volts or more.

In testing resistors the method is the same as for coil or transformer windings, except that if a component has a resistance of more than one megohm it would probably be necessary to short the series resistor in the test unit. Alternatively, if the resistor were mounted between two clips or between two terminals, a component to be tested—with a value of not less than 200,000 ohms—could be temporarily fitted in its place. The two test probes would then be touched together, of course.

Transformer Tests

Another excellent use for the tester is in checking a homemade transformer before it is put into service. First the primary and secondary windings would each be tested for continuity by touching the test probes against the ends of the output leads; the lamp should glow practically brightly as when the probes are connected together. Should the lamp fail to light, or should the light be intermittent, there is a fault in either the winding or the connections to it. Next, a test should be made of the insulation between the windings. For this, one test probe is touched against one primary
Checking Windings of Transformers, Coils and Testing Transformer Outputs - By Frank Preston

lead, the second prod being touched against one secondary lead. This time a continuous glow would indicate a short-circuit between the windings, due perhaps to one turn having slipped down past the inter-winding insulation. It is very important that the fault should be set right before the transformer is connected to the mains. An occasional "flick" of the neon lamp would not point to a fault in most cases, but would simply indicate that there is a certain amount of capacity between the two windings, as there must inevitably be.

A final test should be made between the windings and the core. Here again there should be no more than a very occasional glow from the lamp. The tests just described are shown in Fig. 3.

Coil and Choke Tests

The same kinds of tests can be applied to coil and choke windings. Fig. 4 shows:

Fig. 4.—Test points for continuity and insulation between windings on a tuning coil. An insulation test would also be made between reaction and grid windings and between reaction and aerial windings.

tests described, with the exception of those for high-value resistors, can be made fairly successfully. One prod is held firmly against one end of the part to be tested for continuity, while the other prod is sharply touched against the other end. If the continuity is intact a double "plop" should be heard from the speaker. When there is an open circuit—as there should be between adjacent windings, and between windings and iron core—nothing more than a very faint "click" should be audible.

When the resistance of the component under test is more than about 20,000 ohms it will probably be necessary to increase the energizing voltage, replacing the G.B. battery with an H.T. voltage. If this course is followed, proceed carefully, starting with a low voltage and gradually increasing it. Resistances up to 0.5 megohm or so will usually pass enough current to produce a "plop" in the speaker if the supply voltage is raised to about 100 or just over.

Measuring Transformer Output

It is often desirable to check the output voltage from the secondary winding of a home-made mains transformer. For this to be done satisfactorily the normal "load" should first be joined between the ends of the winding. For example, if a test is to be made of a 4-volt 2-amp. L.T. secondary, a resistance that would pass 2 amp at 4 volts should be wired across the connections, as shown in Fig. 6. In this example the correct value for the resistor would be 2 ohms. Such a resistor could be made from two yards of 22-gauge Eureka resistance wire, which has a resistance of almost exactly 1 ohm per yard. With this resistance across the winding the voltage measured with a reasonably accurate moving-iron meter should be almost exactly 4. If it is more than this, the length of the winding should be slightly reduced; if less the winding should be slightly increased in length.

For this test to be absolutely accurate the H.T. winding also should be normally loaded by connecting a fixed resistor across it. Thus if the winding were rated at 200 volts 100mA the resistor should have a value of 2,000 ohms, and should be rated at not less than 20 watts. With a fairly heavily constructed transformer, such as those described in these pages recently, it is not really necessary to take great care to load all windings exactly in order to measure output.

To test H.T. secondaries it is usually best to connect the transformer to the rectifier, which can in turn be connected to the receiver or suitably "loaded," and to measure the rectified voltage with a high-resistance voltmeter. Alternatively, the current passing through a known load can be measured with a milliammeter and the voltage thus determined from the old Ohm's Law formula: Voltage = Current times Resistance.
TELEVIEWS

Film Co-operation

It has been left to America to give a lead in a new form of co-operation between the film and television industries. The R.K.O. Radio Pictures Co. has, in conjunction with the National Broadcasting Co., further extended the use of the film "Gunga Din." This has been done by utilising actual shots from the film, the bulk of it cooperate close-ups, and medium depth scenes. The film is timed to run for about ten minutes, and any gaps in the action of the story will be made up by subtitles and commentary. Since many of the leading stars are featured in the trailer, it is felt that the idea will help to publicise the show properly, and in consequence both industries will benefit by the showing of the "short" by television during the World Fair. So far in this country there has been a ban on the use of feature films by the B.B.C., although cartoons, news reels, and educational shorts, have been used freely with an occasional transmission of a Continental film, having sub-titles to help the foreign spoken word. Realising that film material must play its part in the programmes which sooner or later will have extended hours on the air, this new experiment should serve as a useful guide to immediate co-operation between the B.B.C. and film companies. The public will welcome it, for they will be given an opportunity of seeing in their own homes stars with whom they are familiar, and since any confused version of the programme must inevitably become a glorified trailer it will provide an excellent advertisement, and encourage the public to see the whole film at local cinemas.

Greater Emission

In the ordinary form of electron multiplier the primary electron impact on the plane of the secondary emissive surface brings about a multiplication ratio of the order of ten. To give the degree of amplification required, it is necessary to have successive stages, each contributing its quota to the main stream before final collection at the end of the tube. It is now learned, however, that Zworykin, who has contributed so much to the development of electron tubes, has discovered a method whereby the factor of ten can be increased to over a thousand. For this to occur, the target electrodes, against which are directed the impinging electrons, are built up by including a very thin layer of insulating material between the metallic backing plate and the caesium secondary emissive surface. It is difficult to see why this procedure should give more than a hundredfold secondary electron increase. The result may be due, however, to a polarising effect brought about by the initial electron bombardment, this causing abnormal sensitivity within the composite surface.

A Continuous Projector

Some time ago a good deal of discussion took place concerning the best type of cinema film projector suitable for the broadcast standard forms of television films. It was felt that one of the earlier forms of continuous projectors would meet the required test. The Baird company illustration indicates one of these machines as it was applied by the Baird Company to the early transmissions of films for television purposes. In the more usual projector the film is fed intermittently through a small gate, and the light is cut off at least twice for each frame of the film. With the form shown, however, a compounded but efficient combination of cam-operated mirrors gives the pictures of the film continuous movement when projected on to a remote screen, irrespective of the speed with which the machine is operated. When used in conjunction with an electron camera, therefore, the pictures projected on to the signal plate are essentially similar to those secured by studio or outside scenes. Questions of signal suppression during the frame jump period do not arise, and normal black out and synchronising pulse injection into the generated signal follow direct camera practice. There seems little doubt, therefore, that machines of this character will be adopted for all film work in so far as it applies to television.

Constant Spot Size

The theoretically perfect cathode-ray tube has to satisfy a number of important points when used for television picture reconstitution, but one of the most important is constancy of spot size, irrespective of degree of modulation. In other words, it does not matter whether the intensity modulation beam of electrons is reproducing a section of the picture which is full white or full black, the area of the tracing spot should not vary if a sharply defined image is to be observed. For a lot of reasons this does not always occur in practice, and tube designers have given special attention to ways and means whereby this desirable feature can be present in modern tubes. The most promising schemes to be suggested is the use of a dual electron optical system. In the first section a pre-concentration effect is brought about by a relatively weak electron lens, and following this is a stronger lens. Made in conical-shaped section pointing towards the cathode and having aspheric circular diaphragms are used, the positive potentials applied increasing as each anode is approached further from the cathode. This scheme is said to give quite material improvement in maintaining spot size constant irrespective of modulation. It is imperatively sensitive control of the actual beam.

Modulation and Interference

Since the announcement of the standards to be employed in America for their initial television service, considerable controversy has existed among engineers as to the comparative merits and demerits of the English and American methods. Apart from the differing frame frequency and the presence of pictures in two other sections which are diametrically opposite in the standards chosen. In this country the radiated signal has a positive modulation, that is an increase from black to white in a picture brings about an increase in carrier-wave modulation. With the American practice the reverse is the case—zero modulation is full white and 100 per cent modulation corresponds to the troughs of the synchronising pulses. Again, the B.B.C. use a vertically polarised signal from the aerial system at Alexandra Palace, but in the United States they propose to use horizontal polarisation. Since there has been no public service in America it is impossible to ascertain the degree of success which their methods will bring about. There are disadvantages, but on the score of interference—a problem which is engaging the attention of all interested parties in this country—it would seem at first sight that the American method may prove satisfactory. The light splashes seen on the television receivers here when, say, within range of the ignition systems of cars are quite familiar, but in America they will not be so obvious. The interfering signal receives a strong echo when it is received by the receiving aerial, but since full modulation is black, then the spot is of course not so conspicuous. Furthermore, it has been demonstrated that the field of interference encountered from a car's ignition system is in the main vertically polarised, that is, the present aerial system of a vertical dipole is efficiently oriented to give a maximum pick-up to the offending signal. Using horizontal polarisation, the Americans are therefore in the happy position of using aerial systems with a minimum sensitiveness to the interfering field. Whether the results on the score of interference will justify the United States signal standard can only be assessed when the service commences operations and sets are installed in the homes of the public, but it is certain that English experts will make this one of their first observations when comparing the two systems.
Television Features

Television Surveys No. 6—Canals

Mr. A. P. Herbert, M.P., who will accompany the television cameras to a lock on the Grand Union Canal, on March 12th, to give viewers an insight into life on canal barges. The lock is the ideal venue, for each bargeman has plenty of time to talk with its occupants, and as the television cameras will range the decks from bow to stern, nothing of importance will be missed. Mr. Herbert, who has made a special study of canal lore and traditions, will unravel many mysteries as he talks to the bargemen and their wives and families. Viewers will perhaps learn why every cabin door carries the sign of a goat, why no barge is without its collection of gaily-coloured brackets, why the busy bargeweife finds time to polish those bright brass knobs which seem more ornamental than utilitarian.

“The Unquiet Spirit”

Catherine Lacey has been booked to appear in Jean Jacques Bernard’s brilliantly original play “The Unquiet Spirit,” which will be televised in the evening programme on March 3rd. The English translation is by J. Leslie Frith.

This is a play with an interesting idea subtly communicated to the audience less by what the characters say than what they withhold. With compelling suggestion, the author builds upon the theme that everyone has one, and only one, completely sympathetic “mate”; that proximity to this twin soul, whether

BRIGHTNESS AND LINEARITY RESPONSE.

It is not always realised that in a complete television system from camera to receiver it is essential to arrange linearity of reproduction between the differences in brightness of the reproduced image. This factor, together with that of brightness range between high-intensity objects and shadows, and the degree of lightness of the scene, are really just as important as picture detail and phase distortion. The range and linearity questions are often compared with the photographic analogies of contrast and gamma. In one case the gamma of a television system has been described as the exponent of the curve which is assumed logarithmic in form, and which relates the brightness level in the studio with the corresponding level in the reproduced picture as seen on the screen of the television set. With a linear relationship between these quantities the gain of the system is said to be unity, and there is therefore an accurate reproduction between the distinctions of brightness in the televised subject. To achieve this desirable condition, a number of intermediary factors have to be considered, and in practice it is often found desirable for some of the apparatus to depart from unity provided the overall effect is correct. For example, in America it has been suggested that the response of the transistor can be a compressive characteristic, corresponding to the gamma less than unity, while the receiver has an expansive characteristic (above unity). The combined effect will obviously be unity, but by working in this way it is claimed that the camera could be used more efficiently and have a better signal-to-noise ratio.

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ALL-WAY 5-B.R. Battery Model 60D. 1939 6-B. Receiver, comes with 4-foot co-axial and internal loudspeaker cable. 5 watts output. 55/65/70 all-wave controlled tuned or complete with 2 or 3 metal-plates at 50/54/72. Normal list value, 75/1.00; OUR PRICE, 69/7.50; 4-month payments of 7.50. Full warranty.

ALL-WAY 5-Stage B.C.H. Battery Model 60D. 1939 5-B. Receiver, comes with 4-foot co-axial and internal loudspeaker cable. 5 watts output. 55/65/70 all-wave controlled tuned or complete with 2 or 3 metal-plates at 50/54/72. Normal list value, 90/1.00; OUR PRICE, 79/2.00; 4-month payments of 12.00. Full warranty.

ALL-WAY 5-Stage B.C.H. Battery Model 60D. 1939 5-B. Receiver, comes with 4-foot co-axial and internal loudspeaker cable. 5 watts output. 55/65/70 all-wave controlled tuned or complete with 2 or 3 metal-plates at 50/54/72. Normal list value, 90/1.00; OUR PRICE, 79/2.00; 4-month payments of 12.00. Full warranty.

ALL-WAY 5-Stage A.C. Model 50. 1939 6-B. Receiver, comes with 4-foot co-axial and internal loudspeaker cable. 5 watts output. 55/65/70 all-wave controlled tuned or complete with 2 or 3 metal-plates at 50/54/72. Normal list value, 60/1.00; OUR PRICE, 59/2.00; 4-month payments of 10.00. Full warranty.

NEW SUPER QUALITY MICROPHONES

Pete-Scott have now produced two entirely new HIGH-FREQUENCY TRANSCISTOR CURRENT MICROPHONES. These Microphones are definitely not to be confused with the “tinny” microphone types offered to the talkers—you can order Pete-Scott microphones in the same way as any microphone of whatever purpose that you now require. These Microphones are now in stock, and ready for immediate delivery. For use with all types of battery and valve equipment, they are available in the price range of 2.50.

DESK MODEL Complete with Transmitter and Amplifier. Normal price, 75/1.00; OUR PRICE, 69/2.00; 4-month payments of 9.00.

PROFESSIONAL MODEL Complete with Transmitter and Amplifier. Normal price, 125/1.00; OUR PRICE, 115/2.00; 4-month payments of 22.00.

7-WATT A.C. AMPLIFIER at third off usual price

For Public Address work, Dance Band work, etc. 7-WATT A.C. Amplifier at third off usual price. 4½ down payment. 10 months to pay. Complete with 4 valves. Normal price, 45/1.00; OUR PRICE, 31/1.00; 4½ down and 10 months to pay.

PETO-SCOTT CO., LTD.
77Dept. SC, City Bank, London, E.C.,
31Dept. SC, High Street, London, W.8.,
short-wave Frequency Changers

Several members have made up superf
kits for use on all-waves and in
many cases have experienced difficulty
when tuning to the short waves. The point
which generally seems to be raised is that
the sets are required for use down to the
television wavelengths. Under all normal
conditions, it is quite possible to build a
set which will utilize standard circuits and
arrangements and which will function down
to, say, 10 metres. When going lower than
this, however, difficulty is often experi-
cenced owing to the effects of stray capaci-
ties. In a straight receiver this is not too
difficult to overcome, but as the efficiency
of a superhet depends upon the frequency-
changing stage, poor results are often
experienced below 10 metres, simply because
the stage does not function correctly. We
give below the circuits of the frequency-
changing stage of a superhet, using an
Osram triode-hexode valve, and the
arrangement recommended by the makers
of the valve for use down to 10 metres
is shown in the first illustration, and for
use from 5 to 10 metres is shown in
the second diagram. It will be noted
that a drastic change is made in the
connections to the triode, or oscillator,
section. In place of a separate grid and
reaction winding a centre-tapped coil is
employed and the tuning condenser is split,
with B.T. fed to the tapping on the coil.

Another interesting point in this ultra-
short wave design is the inclusion of the
.01 mfd. fixed condenser from one side of
the heater winding to earth. In practice it
may be found that when this is included
on one side it is more effective on the
other side and experiment is worth while
here to find the best position.

D.C. Mains Supply

When D.C. mains are available the
problem of supplying H.T. to a battery
receiver is removed but it is essential
remember that the supply as taken from
any mains socket will not be good enough
to supply directly to the receiver. A smoothing
circuit must be included and although in its
very simplest form a choke and condenser
are all that are called for (arranged in the
manner shown above), this may not
prove adequate on some supplies. As battery
valves operate with a maximum H.T.
of 150 volts it will be necessary to dispose
of 50 volts or more depending upon the
output of the mains. Therefore, in addition
to the choke a further resistance must be
included in the positive line, and the
exact value of this component will depend
upon the resistance of the choke and the
total current flowing through the H.T. line.
A good plan is to take the output from the
circuit shown here through a fixed resistance
suitable value to the output stages,
and to include a further choke of suitable
value (or with fixed resistance in series) for
the detector and other stages. It is, of course,
quite permissible to use electrolytic condensers of suitable rating
in place of the fixed condenser which is
illustrated.

Amateur Transmitting

Several members have written recently
asking for details of transmitting

circuits and of the necessary licence. It
should be borne in mind that no experiments
in transmitting may be carried out until a
licence has been obtained, and a “radiating”
licence will not be issued, except in very
special circumstances, and therefore it is
not possible to obtain a licence merely
to enable you to talk to a friend who lives
some distance away.

Two frequency-changing circuits, showing on the right the modifications required for ultra-short-wave working.
HARNESSING THE MAINS

Details of House Wiring and Other Mains Equipment

WHEN making adjustments or alterations to one's mains equipment, and when installing new apparatus, there are a number of points concerning wiring and construction with which some readers are not fully conversant.

Consider, first of all, the way in which the mains power is distributed; the district board derives its supply in a number of ways. Two of the more usual, dealt with here, form the essential circuit features of the other systems. For example, it illustrates what is known as the 'three wire system,' and referring to this circuit, it will be seen that the sub-station power output is divided into two feeders by the introduction of a neutral or earth wire, thus the maximum output, which may be 400 to 500 volts, is halved, one feeder giving 200 to 250 volts below earth potential, whilst the other feeder is 200 to 250 volts above earth potential. Therefore, one house or street may be wired to the positive side, whilst another will be wired to the negative side, both, however, receiving their positive or negative poles from the earthed neutral respectively.

Now from this it will be apparent that in a supply where the positive pole is at earth potential, the negative side must be guarded against possible short circuit to earth. Such a condition is known as a ground fault. Now, when the negative pole is at earth potential this is similarly applicable to the positive pole, although in this instance, there is less likelihood of this arising, since the majority of experimenters take care granted the negative pole as being at neutral.

In Fig. 2 the A.C. version of the D.C. three-wire system is modified slightly, but at the sub-station end, inasmuch as the earthed neutral is shown taken from the bottom of the power output transformer, this being the more usual method of distribution, and although space will not permit details regarding the benefits of this system, it serves, however, to show the fundamental difference of the A.C. and D.C. supplies.

The point to be noticed here is that each pole (Fig. 2) is alternating between positive and negative, and so far as radio is concerned, it is always advisable to locate the neutral pole, since in some receivers a hum will be more decided when the chassis is live in respect of earth, so that a reversal of the unit polarity should assist in curing the trouble. In all instances when endeavouring to locate the neutral wiring in a house it is useful to have a small neon light attached to a length of twin flex, thus permitting an earth return to be made through an inefficient or high resistance medium, such as one's own body.

The illustration particularly shows th effect referred to, but on no account should this be made in direct contact with the ground or a damp floor, and it is a wise plan to obtain, where possible, a definite earth connection to one side of the lamp, tapping the mains with the other wire until the dead side, as the case may be, is ascertained.

D.C. Hum

Now in this country, the location of the supply is approximately 100 volts, and in a number of instances, where mercury rectification is employed at the power station, consumers experience bad D.C. hum, and sometimes voltage fluctuation, thus necessitating extra smoothing with chokes and condensers. An alternative method of current derivation is the use of a converter, and this will be dealt with later.

Many amateurs are reluctant to tamper with the mains, and quite naturally, since the various regulations concerning specific cables and fuse box capacities are apt to be a little confusing; however, the local

(Continued on next page)
HARNESSING THE MAINS

(Continued from previous page)

PRACTICAL AND AMATEUR WIRELESS  March 4th, 1939

electrician should be consulted when it is a question of altering the wiring, since he is best suited to explain the correct cable to use for various circumstances.

- Incorrect gauge of cable can result in serious trouble by fire, for example, in some cases caused through fusing wires igniting adjacent woodwork, such as skirting boards or slots, and compensation would be difficult to obtain from an insurance company. This, of course, also applies to inferior installation, such as switches and points generally.

- Fig. 4.—The "live" side goes through the switch first and not direct through a socket.

When fixing a new switch or plug socket the first consideration is the supply; this should be switched off from the house wiring by the main switch, and to prevent confusion it should be remembered that a fuse box is designed to handle a specific number of points only, and in some cases it will be found that there are anything up to three or four even more independent fuse boxes, some of wood, whilst others are of the metal clad type. In the new housing property, the whole house supply is invariably divided into two separate units, one comprehensive fuse box of wood for handling all live-amp. points, whilst the other, for 15-amp. power points, is of the metal clad type.

- The fuses in the metal clad boxes are not accessible for replacement until the switch is turned to the "off" position. This unlocks the lid, which may be let down by unscrewing one terminal, usually on a hinged shank.

The cabling can be roughly traced from the switching to the points by following the direction of the cables emanating from the fuse boxes, but in cases where the fuses are installed in, say, the garage adjoining the property, the ascertainment of the switch governing the different points can only be made by experimentally switching on and off the different sets of wiring and noticing the points affected in the house; in fact, this is the better method to adopt, and the safest.

- Having switched off the supply, the next thing to do is to remove the switch can, loosen the wire clamps and remove the switch fixing screws. In the case of a switch mounting block, it may be found that the screws holding the block are those securing the switch, or again, separate screws may have been used for block and switch, but little difficulty should be experienced in this respect.

The switch or plug socket having been removed, the mounting block is usually left screwed to the wall through the centre; the wires should be examined for corrosion and cleaned carefully with a penknife.

Short-circuits

The dangers in using the incorrect circuit will be apparent when studying Fig. 4, which shows that the live side goes through the switch first and not direct through a socket or lamp holder returning to the switch, and this brings us to a simple rule, i.e., all metal work in the vicinity of a point, if within arm's length, must be earthed in any case. The council responsible will invariably require the earthing of the apparatus in question whether it applies or not.

With regard to the suitability of the supply for radio purposes, and recalling the instance of the bad D.C. supply, it is sometimes best remedied by independent smoothing by the use of reservoir condensers connected across the mains, with a centre tap made to earth, this being effected prior to supplying the apparatus. To quote a simple example, a battery-operated receiver employing an H.T. battery eliminator could be arranged to be fed from a condenser and choke filter pack, similar to that illustrated in Fig. 3.

- It may not be necessary to use more than a total capacity of 1 microfarads, but in some instances anything up to 40 mfd. capacity may be found necessary. In the pioneer days of radio this meant rather large condenser packs, but with the advent of the electrolytic condenser, it is now possible to obtain a capacity of as much as 1,000 mfd., for 500 volts working, although, of course, this would be rather large for ordinary use, and the maximum average voltage for this size of condenser is in the neighbourhood of 12 volts.

With the installation in question, the use of a multiple of electrolytics, each having a value of about 16 mfd., at 220-300 volts D.C. working, would be suitable.

The two high-frequency choices which are shown assist by impeding the passage of frequencies in the neighbourhood of 1,000 cycles, thus meeting the range of interference generally attributed to man-made statics, such as vacuum cleaners, refrigerators, small motors, etc., and as such as 40 per cent. suppression has been obtained in this manner.

The advantages in the use of alternating current mains are now well understood, but there are other points which may prove troublesome, for example, if a heater is used in the radio "den" and stands on bare boards, any dust or extraneous substances which has accumulated on the elements during the period of disuse will, the moment the current is switched on, cause a loud humming which sometimes may resonate through the house, being amplified by the sound box effects of the rooms underneath. This is due to the effective inter-turn insulation of the elements causing inductive influence on the metal work of the heater.

After a while this disturbance will gradually subside as the foreign substance on the elements is burnt away, but during the trouble the heater apparatus should be stood upon a mat or other suitable absorber.

Low-voltage Supplies

With regard to the radio receiver generally, it has often been stressed that it is advisable to insert in the earth lead of the receiver a suitable condenser, preferably one of at least 2 mfd., the reason being that in the case of a positive neutral, a short circuit to earth through the receiver will be avoided, and it is just as advisable to insert a condenser in the aerial lead, to obviate the possibility of shock to anybody touching the aerial lead when the earth is
radiation may be overcome by connecting across the output and input terminals of the converter, two 2 or 4 mfd. condensers centre tapped to earth. (See Fig. 8.) Mechanical vibration and resonance is usually due to a number of external causes, for example, through fixing the converter to loose boards or metal work, and the remedy here is self-explanatory.

With regard to (c) it is usual to arrange a "silence abode" in the form of a metal or wooden cover to completely encase the whole unit including the smoothing condensers, as shown in Fig. 7. The measurements are, of course, not shown owing to the varying degrees of requirements. A number of manufacturers supply the service cabinet or shroud with the converter, but occasions do arise when home construction is necessary.

The rotary transformer is available in various types, the most popular delivering 120 watts at 220 volts single or three phase—two phase being almost extinct now—and the output may be regulated as desired, as the input E.M.F. ranges from 24 to 250 volts D.C. Thus it will be apparent that this margin of control permits this type of converter to be even run from a battery of accumulators, within the voltages quoted.

The rotary transformer is a particularly useful type of unit, being in some cases very small yet capable of delivering power in the neighbourhood of two to three hundred volts, with a very low order of input E.M.F. such as 12 volts, and one model gives 220 volts output at 50 milliamperes with an input voltage of 12; thus this model finds great favour with designers of portable equipment where anything up to 10 watts output is required.

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-they're blended better

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**PATENT AND TRADE MARKS**

Any of our readers requiring information and advice respecting Patent, Trade Marks or Designs, should apply to Messrs. Rayner & Co., of 20, Southampton Buildings, London, W.C.2, who will give free advice to readers mentioning this paper.
**NOTES from the TRADE**

**March 4th, 1939**

**"Stay-a-Lite" Lighting Set**

Messrs. RUNBAKEN announce a new Emergency Lighting Set, designed for A.C. or D.C. use. This differs from others in that it is self-contained as one unit—that is, it requires no separate batteries or wiring and no installation costs; it is portable and can be mounted anywhere; and additional lights for extension purposes may be added merely by plugging in. The unit contains a special robust accumulator which is kept fully charged from the mains, and thus in the event of a mains failure the emergency supply is readily available and the emergency lamps automatically come into circuit.

When the mains supply is restored the emergency set is switched off and the accumulators are put back on charge automatically. The Junior model will supply up to four lights and costs £15 15s. A larger model at £21 may be used to supply from 6 to 8 lamps.

**5 New Marconi Models**

**MARCONIPHONE** announce five new spring releases, ranging from an 8-guinea 3-valve 3-waveband T.R.F. battery table grand to an 8-valve 4-waveband superhet automaton for A.C. mains use at 20 guineas. The other models include a 5-valve 3-waveband push-button battery superhet table grand at 12 guineas, a 3-valve 3-waveband superhet table grand for A.C. use at 101 guineas, and a 6-valve 3-waveband push-button superhet with A.F. C for A.C. mains at 15 guineas.

Important features included in this range of receivers are the Q.P.P. output stage in the 12-guinea battery set and the mechanical push-button tuning system, and the special unit form of construction in the R.F. section of the 101 guinea superhet. Special leaflets describing the receivers may be obtained on application.

**New Exide and Drydex Batteries**

A NEW series of batteries is announced by Exide, designed especially for the new season's commercial receivers. For the Consor model "31," which is marketed with Exide, the Super 120-volt H.T. and Exide DM, with free acid or DMG, with jelly electrolyte are suitable. Drydrex type H.1036 and Exide accumulators DPG or unsippable type DFG3 are suitable for H.M.V. model "1401" and Marconiphone model "876"; while H.M.V. "1400" and Marconiphone "872" take Drydrex type H.1036 and Exide accumulators C3/4ac or J3/4 if an unsippable type is preferred.

Batteries for the Alba model "30" are Drydrex type H.1049 and Exide unsippable accumulator J5/8K.

All the above Drydrex batteries incorporate automatic grid bias.

**Television Test Prods**

**Very high voltages are present in television sets.** Consequently special precautions are necessary when testing or servicing such apparatus. Messrs. J. J. Eastick announces a special type of test prod designed for use in these circuits. The prods are 12ins. long and are provided with a 2ft. length of 2 mm. cable having a suitable plug at the end for connection to test meters. The prods are supplied normally as a pair—one red and one black—and the price is 6s. For those who require the single prods these may be obtained at 3s. in either red or black.

**Everett Edgcombe World Clock**

**SYNCHRONIZATION**

A new type of clock will be seen on the market shortly. It is known as the "Everett-Edgcombe" and incorporates a unique system of synchronizing which is a novel design and is now available for the domestic and professional market. The clock has an interesting feature marked on its outer edge with numerals, and this revolves once in 24 hours. An outer fixed dial has a number of important place-names engraved on it and arrows indicate the appropriate time in any part of the world at a given moment. A central moving hand indicates minutes. The clock is produced in three models—a square metal or desk type with oak base at £1 19s. 6d.; a wall model in black moulded bakelite at £3 (walnut, mahogany or white bakelite at 2s. extra); and a wall model in a black metal case at £2 17s. 6d. The motors fitted to these clocks are self-starting and provided with oil bath, suitable for 200,000 volts 50 cycles supplies.

**Claude Lyons’ Change of Address**

**Messrs. CLAUDE LYONS & CO., LTD.,** have moved to more commodious premises in London and the new address is Queen’s House, 180/182, Tottenham Court Road, London, W.C.1. The new premises have a floor space of about 2,500 square ft., and special arrangements have been made to provide display and demonstration layouts for test equipment and other gear.

**Imported Rectifying Valves**

The Board of Trade has received an application under Section 5 (5) of the Finance Act, 1930, for exemption from the duty of tax-free gasoline rectifying valves. The manufacturers representing that similar instruments are made, or are likely to be made in a reasonable time, in the United Kingdom and elsewhere, and that Majesty’s dominions, should be addressed to the Principal Assistant Secretaries, Industries and Manufactures Department, Board of Trade, Great George Street, Westminster, S.W. 1, before March 20th next, furnishing details of such similar instruments and quoting the reference I.M. 330/30.
The Editor does not necessarily agree with the opinions expressed by his correspondents. All letters must be accompanied by the name and address of the sender (not necessarily for publication).

“Audible” Radiations

Sir,—I was interested to read the remarks of B. H. of Nunstead, under the heading of “Reception from an Amplifier,” in your issue dated February 11th. This appears to be due to rectified (and therefore “audible”) radio-frequency signals being radiated from a straight mains and picked up by someone receiving on an amplifier. This reminds me that some years ago I was demonstrating a small straight battery set to another person who listened on headphones. He then informed me that he could hear the signals in the headphones when they were not connected to the set. As the signals were weak, I could not hear them myself, and I have had no time for further experiments. The set was not oscillating.

To my mind, if reception can be received from an amplifier, it can also be received from a pair of headphones with no apparatus connected to them, provided that the signals are radiated powerful enough. It would be interesting if some readers would experiment with fairly powerful straight battery or main streams to ascertain whether these “audible” radiations can be received regularly under a given set of conditions. If so, would they give particular details of the experiments concerned?

This would appear to open up possibilities of a new method of communication. Care would, of course, have to be taken not to cause interference with neighbours’ sets. It is assumed that this could be avoided by working on wavelengths not commonly in use.—F. C. Ford (Exeter).

A 20 and 40 m. Log from Ilkeston

Sir,—I enclose my log from this district, which may be of interest.

20 m.-W1 (48), W2 (50), W3 (30), W4 (15), W5 (15), W6FEK, F7H1; W6 (48), W6 (30), W9 (15); VE1, 2, 3, 4; V01, 2, 6; H1, HK, KN, KX, P01, 2, 4, 6; YV, TI, CE, VP4, 6, 9; HI, CO, CT, SU, HB, LA, L, YR, YL, YT, OK, OH, SP, SM, D, ES, SV, U, HA, OZ, LY, CNl-S, FAS-8; ON, PAO, LX, F, VR, ZR, and ZS2-8.

Altogether, over 400 stations have been identified on 20 metres.

40 m.—F (30), ON4 (15), PAO (12), LOX (6), CT (6), SM (3), O25BW, I1MTM, BB9CZ, FA3FG, YUMAY, SPIRI.

The receiver is a 4-valve superhet and the antennas are a 66ft. top inverted-L, directed N, and S, and an indoor aerial directed to provide broad bands from the west.—A. Hart (Ilkeston).

Correspondents Wanted

Sir,—I am thinking of taking up some amateur transmitting, I should like to get in touch with any “ham” (A.A. or fully qualified) or a short-wave enthusiast who lives near me.—E. B. BETTHECOAT, Sunningdale House, Sunningdale Avenue, Eastcote.

for the above reason and also because there is no crackle via the house mains, which at times spoils your search for DX.

Should our friend in Briton Ferry desire, I am prepared to enter into discussion with him of any other short-wave listener who is interested in the design and building of such a receiver.—C. E. WILLIAMS (Tredogan, Mon).

A 20 m. Log from S. Wales: Correspondent Wanted

Sir,—I append my log of 20-m. phone stations. My receiver is a short-wave adapter coupled to a three-valve broadcast set. The aerial is an inverted-L, 20ft. high, and 450 long.

On 20 m.: VK2QH, LHA; VK3WA, VA, KI, KL, WM, PY1FN, GR; PY2CK, ET, DA, BE, GO; PY4ES, CI; PY2L; HCWJ; Q2ORO, ML, JJ, LY; YY4AP4, AI; YY5AO; H15X; K4EMG; L4USW, BC, C; LUCZ; LUC7BK; VE1DK, BB, LC; VE3CT, MC, AA, EE.

I would like to correspond with an amateur in this country or abroad.—C. W. PARKE, 15, Dawlish Road, Williamstown, Rhodda, Glam.

The “P.W. Service Manual”

Sir,—Many thanks indeed for the “Practical Wireless Service Manual” that you recently sent me to a prize for solving the Problem No. 292. I must say it is a very fine book and should prove a very handy and helpful aid to the professional service workman.

Regarding Practical and Amateur Wireless I have been a regular reader since number one, and I find your wave instructive and of great help in solving my own radio problems from time to time. I also look forward to the transmitting articles of great interest.—F. G. SADLER (Stamford Hill).

CUT THIS OUT EACH WEEK.

Do you know

—THAT not all metal-cased electrolytic condensers have the case as the negative pole.
—THAT a reflector for a searchlight should not necessarily be in a direct line with the condenser.-s.

—THAT by moving it about it is possible to reduce interference in many cases.
—THAT some types of rectifier glow when in use and will not show any sign of discoloration, etc. unless, therefore, be tested direction.
—THAT in high-quality transformers, oil or similar types of condenser should be used for coupling purposes to preserve insulation in the grid circuit.
—THAT a reduction in losses for short-wave working may be obtained by removing as much distributed material as possible from between contact points.

The Editor will be pleased to consider articles of a practical nature suitable for publication in Practical and Amateur Wireless. Such articles should be written on one side of the paper only, and should contain the name and address of the sender. Whilst the Editor does his best to facilitate publication of all suitable articles, every effort will be made to return them if a stamped and addressed envelope is enclosed. All correspondence intended for the Editor should be addressed to: The Editor, PRAC TICAL AND AMATEUR WIRELESS, Ltd., Tower House, Southampton Street, Strand, W.C.2.

Copying of the rapid progress in the design of scientific apparatus and to our efforts to keep our readers in touch with the latest developments, a quarterly list of recent developments is set out in the Appendix of this issue. The apparatus described in this column is not the subject of limitation.

Copyright in all drawings, photographs and articles appearing in Practical and Amateur Wireless is specifically reserved throughout the world. Reproduction or imitation of all or any of these is hereby expressly forbidden.
THE CROYDON RADIO SOCIETY
Headquarters: St. Peter's Hall, Lothbury Road, Croydon.
Meetings: Tuesdays at 8 p.m.

This above society continued its policy of supporting its own talent when on Tuesday, February 14th, a six-weeks old member, Mr. A. W. Graham, gave a lecture-demonstration on "Push-pull Balancing Problems." It took place in St. Peter's Hall, S. Croydon, and Mr. P. O. Clarke informed attendees of his experiments in this field, which were so successful that the circuit was actually balanced. The demonstration was a success, with all members in attendance.

THE DOLLS HILL RADIO COMMUNICATION SOCIETY
Headquarters: Dolls' Hill West End, Warren Road, Croydon, Surrey.
Meetings: Tuesdays at 8 p.m.

On February 14th a talk was given by Mr. Saunders on the theory of A.C. as applied to radio. The discussion was well received, and a series of talks on transistors, during which the power supply, modulation, and other topics were discussed, will be held in the near future. The next two talks will be on March 14th and 21st.

BRADFORD SHORT-WAVE CLUB
Headquarters: Bradford Moor, Leeds, Yorks.
Meetings: Tuesdays at 8 p.m.

A talk of interest was given on February 14th by Mr. H. N. Millns on the subject of magnetic materials used in short-wave receivers. He described his experiments and demonstrated the results obtained. The lecture was well received, and a series of talks on the subject of short-wave receiver design will be held in the near future.

Richard (Stinker) March, who partners Arthur Ashby in "Band Waggon," is here seen during conversation listening to the "Band Waggon" programme.

THE MAIDSTONE AMATEUR RADIO SOCIETY
Headquarters: The Clubroom, Upper Road, Maidstone, Kent.
Meetings: Tuesdays at 8 p.m.

The May programme arranged for meeting in March is as follows:
March 15th—A demonstration of the 'QST' Speaker by Mr. G. F. LaFlor.
March 22nd—Mr. R. H. Allen (G2CL) will give the second of the two talks on 65-metre operation.
March 29th—A Film Night—The R.S.G.R. Films and others.

More practical will be provided before each meeting, and members are asked to bring their own headphones.

The Maidenhead H.A.R.S. invites all Kent and District amateurs to a social "Ham Evening" in the club-room, 214, Upper Road, Maidstone, at 7 p.m. on Wednesday, March 15th. Mr. J. J. Christopher, the Secretary of the R.S.G.R., will be present, and the Amateur Movement, To-day and To-morrow, and the必要 treatments will be provided and there will be no charge whatever. Anyone wishing to come along should write to the secretary, at the address above, not later than March 14th. No applications can be considered after this date, as arrangements being society to be made in the New Year.

We hope that as many amateurs as possible from Kent and district will come along to meet Mr. Christopher and their District Representative, Mr. R. H. Allen (G2CL). We think that a meeting of this sort can be the means of promoting greater unity and friendship, or "ham spirit," throughout the amateurs of Kent.

NEW PATENTS
These particulars of New Patents of interest to readers have been selected from the Official Journal of the Patent Office for publication permission of the Controller of H.M. Stationery Office. Further particulars can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2. The fee is a weekly subscription 12 18. Latest Patent Applications.

4127.—Brown, C. O.—Television-transmitting apparatus. February 8th.
3599.—Cole, Ltd., and Martin, E. W.—Tone correction, etc., in audio-frequency amplifiers. February 2nd.

Specifications Published.
500.217.—Baird Television, Ltd., and Johnston, D. M.—Method of amplifying electric signals.
496.981.—Farnsworth Television Inc.—Photocell-type receivers.
496.971.—M. O. Valve Co., Ltd., and Warren, G. W.—Thermionic valves. Printed copies of the full Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at the uniform price of 1s. each.

THE EXETER AND DISTRICT WIRELESS SOCIETY
Meetings: Mondays at 8 p.m.

At the meeting of this society held on Monday, February 14th, Mr. Cornish, of the General Electric Company, talked on short-wave aerials. He described the various types of aerials suitable for television and described the arrangements that were used on the Blackpool test. Unfortunately, due to the weather conditions, the talk was not well received by the audience.

WORKSHOP CALCULATIONS, TABLES AND FORMULAE
By F. J. CAMM
Copper is certainly much easier to work, is more efficient (electrically) than aluminum, but is more expensive. If you wish to make small screens for the coils you could make cylindrical screens from copper and they would be quite reliable. On the other hand, aluminum is much cheaper, but to overcome the difficulty of joining the screens you could consider making them rectangular, bolting the edges and even making a subdivided box into which all the coils could be included. In any case remember that the screens must make reliable contact with the bases to complete screening and a good tip here is to place thin stainless steel inside the bases so that when the screens are pushed into place the home there is an unscreened air gap through which interaction might be introduced.

Valve Layout

"I am making up a design as per the enclosed sketch, and in order to reduce H.F. interference, I would insert the following:"

RULES

1. Send your requests to R. S. Miller, Practical and Amatuer Wireless, Grace Building, Ltd., East Erie Street, Buffalo, N.S. (R.C.I. 1003). The copies must be enclosed with every query.

Heater Wiring

"I am making an A.C. mains set with separate amplifier, and in looking through some old books I am rather interested in the method of wiring the heater circuit. I see that in most designs you use two of the ordinary lighting type. In some of the old sets I notice that single wires are used, but in some designs these wires are spaced and run round the chassis edges, whilst in others they are laid side by side. Which is the best method, and what advantages do the different methods have?"

J. Y. (Preston).

In early A.C. sets it was thought desirable to space the A.C. carrying leads to avoid hum and other troubles. Subsequently it was found that by placing the wires side by side the A.C. field was reduced in size, but with improvements in circuit design it has been found that by using twisted wire the surrounding fields were cancelled out and therefore there is little risk of hum being caused by interactions between normal wiring and the A.C. wiring. The twisted pair is definitely preferable, therefore, in a modern receiver.

Coil Screens

"In making some coils on the lines recently given in your home-constructor articles, I wish to incorporate the best or most efficient scheme for a set of four for a superhet. Do you recommend copper screens, which may be made from the sheet, or aluminum? You appreciate that the latter would be difficult to make at home, with the process of joining, and I wonder if the copper would be as good."

H. T. (Newport).

Bleeder Resistance

"My mains unit has been disconnected from the old set which I wish to use it in a new one. The H.T. voltage and other points are in order, but the new receiver roughly takes 50 volts while the mains section is 95 volts. Will the extra current cause any undue voltage rise, or should I fit some device to absorb the extra current. If so, what do I use?"

O. T. (Bromley, Kent).

A bleeder resistance would be desirable across the H.T. output. The value of the resistance may be calculated by dividing the H.T. voltage (95 volts) by 45 and multiplying the answer by 1,000. The wattage of the resistance may be worked out by squaring the current (45 mA), and multiplying by the resistance (95 ohms). It is wise in this case to use a wattage rating very much greater than this calculation shows, as the valves would not be long time to heat up and there may thus be an excess of current across the bleeder resistance until maximum emission has been attained.

Super Control Valves

"In an American valve list which I have been looking at I see a reference to Super Control Pentodes for reducing cross-modulation. Are these distinctly better than any valves on the English market, and if so, are there any English equivalents? I note that modulation-distortion is also removed when these valves are used, and wonder if that is due to the fact that I do not understand these terms fully?"

M. L. (Bilton).

The valve is merely a variable-mu H.F. pentode. In a superhet it might be be received on a wavelength different from that to which the set is tuned, owing to the fact that the interference signal is brought across the power supply on the carrier of the desired station. This is known as cross-modulation. Modulation-distortion is generally introduced in the H.F. stages of a superhet, and a distortion of the modulated carrier caused mostly by partial rectification in the B.F. stages. A variable-mu H.F. pentode can avoid these troubles as the amplification factor is modified by altering the applied bias. Another name often given to this type of valve is a "remote cut-off" valve.

REPLIES IN BRIEF

The following replies are given in abbreviated form either because of space limitations or because the questioner is not of general interest.

W. W. (Bromley). We are sorry to say that we have no information as to the capacity of the tubes for modifying receivers which are out of our reach. We are not quite clear regarding your modifications on the battery side.

A. R. H. (Blackheath). Will you please let us have your full postal address, as we have a special letter for you.

D. Mcl. (Greenock). We cannot describe the device in the form of a query or reply, and can only suggest that you refer to back-issues. We may describe a new unit at some future date.

A. E. F. (Birmingham, 34). We have not described a set of this type mentioned, but the Fred 7.W. Three without the last stage, would be quite suitable.

R. E. and Sons (Lindsey). The 20-watt battery amplifier described in our issue dated June 18th, 1928, is the only one we can recommend in your case.

D. M. (Taynham). The set may not be gauged correctly, thus introducing the necessity of using selection to boost signals. It should not be necessary to adjust the circuit this way, but use the maximum drive, but without further details of the set we are unable to advise.

The coupon on page iii of cover must be attached to every query.
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