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WIRELESS

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WIRELESS WEEKLY

2D WEEKLY

Vol. V.] SEPTEMBER 4, 1926 [No. 3

HOW TO BUILD A "HOME OR COUNTRY" SET

HOW YOUR VALVE AFFECTS SELECTIVITY

By J. H. REYNER, B.Sc. (Hons.), A.C.G.I., D.I.C., A.M.I.E.E.

BROADCASTING "THE WHITE CHATEAU"

[Registered at the G.P.O. as a Newspaper.]

One Dial—5 Valves—50 Stations

STATIONS HUNDREDS OF MILES AWAY BROUGHT IN AS EASILY AS THE LOCAL

In this unique receiver the Elstree engineers have at one stroke solved a problem as old as radio itself. Here at last is the ideal one-dial set. Hitherto, inferior range and selectivity have accompanied attempts to reduce the number of controls. The demonstrated results of this set, however, show that stations hundreds of miles away will come in on the loud-speaker by turning a single dial. Every modern device is embodied in this set, which sacrifices nothing in order to get simplicity of control. From a constructional and wiring point of view this set is, if anything, simpler than the ordinary modern set.

You can cover any wavelength band by merely changing the screened transformers, and the precision manufacture of these single-layer coils has contributed to the possibility of single control without special matching. This receiver is the first of its kind to be developed in this country, and it is anticipated that thousands will be built all over the country.

THIS ISSUE OF "MODERN WIRELESS" IS A SPECIAL AUTUMN DOUBLE NUMBER, AND AS THIS ABRIDGED LIST OF THE CONTENTS SHOWS, IT IS OF EXTRAORDINARY INTEREST.

Radio Revolutionised!
By JOHN SCOTT-TAGGART, F.Inst.P., A.M.I.E.E.

American or British?
By Percy W. HARRIS, M.I.R.E.

The Mewflex
A Star Set described by J. H. REYNER, B.Sc. (Hons.), D.I.C., A.C.G.I., A.M.I.E.E.

A Set to Suit any Loud-Speaker
By C. P. ALLINSON, A.M.I.R.E.

The "Colonial" Transmitter
By L. H. THOMAS (6QB)

Selectivity with Capacity Coupling
By STANLEY G. RATTEE, M.I.R.E.

Picking Them Out
By G. P. KENDALL, B.Sc.

Softening the Voice of the Local Station
By H. J. ROUND, M.I.E.E.

Standard Types of Screened Coils
By J. H. REYNER, B.Sc.(Hons.), D.I.C., A.C.G.I., A.M.I.E.E.

Bringing the Continent to Your Door
By C. P. ALLINSON, A.M.I.R.E.

Charging H.T. Accumulators from the A.C. Mains
By The Staff of The Elstree Laboratories.

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MODERN WIRELESS

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As interesting as your Wireless Set.

WIRELESS
INCORPORATING
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THIS WEEK'S NOTES AND NEWS

A New Service

THE wireless service between Vienna and Amsterdam has just recently been inaugurated by the Dutch Minister in Vienna. The first message to be transmitted was, according to the usual custom, a telegram from the Austrian President to Queen Wilhelmina.

A Postponement

I HAVE heard definitely that the Liverpool Wireless Exhibition, which was to have been held shortly, has been postponed in view of the coal situation. It will, however, probably take place some time before the winter.

Hunting the Pirates

THE G.P.O. is still busy tracking down pirates. Unfortunately, the howlers do not seem to have met with the fate that they deserve, and are, in my neighbourhood at least, as prevalent as ever. One does not notice them on 2LO, but, as soon as the B.B.C. stations close down, all the squealodynes and squawkoflexes in the neighbourhood proceed to make a magnificent hash of Madrid, Rome, and the German stations, most of whom would be well worth listening to were it not for these offenders. What about it, G.P.O.?

Well Caught, Sir!

I KNOW of one case in which two amateur transmitters tracked down a howler very neatly. As soon as one transmitted, the other, who was listening to him, heard the howler on his wavelength, so the first station gave an extra long call to keep the oscillating man still, while the other took a reading on him with a frame aerial. The performance was then repeated by the other station. With the two readings obtained, they managed to find his location fairly accurately, and eventually tracked him down and gave him a good talking to. No more has since been heard of the gentleman in question!

Perhaps!

THERE has been a suggestion recently that all British receivers should be labelled as they are produced, and the "yearly model" system introduced, as with motor-cars. We shall be hearing of 1927 sports models with overhead valves even yet!

A distinguished visitor from the United States, Mr. David Sarnoff, Vice-President of the Radio Corporation of America. Mr. Sarnoff is seen with a British receiver at the Savoy Hotel.

Re-union by Radio

AN interesting "radio reunion" took place a week or so ago, when Mr. H. S. Suhrawardy spoke from all the B.B.C. stations. He is the son of Mr. Justice Suhrawardy, of Calcutta, and has not seen his father for seventeen years. It appears that his father succeeded in hearing his son's voice. One does not realise quite how radio kills distance until one hears of cases like this.

Help for the Fogbound

THE Corporation of Trinity House is shortly to equip two lightships with submarine sound signalling apparatus, which will be used in conjunction with radio signals. Under-water signals are reliable when the ordinary light and sound signals are rendered partially useless by fog. Where the submarine signals and the radio signals are used simultaneously, the wireless operators of passing ships are able to find their distance from the lightship by the time that elapses between the reception of the first dot by radio and the first dot by "water-wave."

In the Tank Corps

WIRELESS on tanks has been receiving a good deal of attention recently. The 23rd London Armoured Car Company has been carrying out tests in the Aldershot Command, and surprisingly good results have been obtained. The next step seems to be wireless on 'buses!

A Visitor

A DISTINGUISHED visitor recently arrived in London from America. He is Mr. David Sarnoff, Vice-President of the Radio Corporation of America, and, although he is not yet thirty-five years old, he has been largely responsible for creating an industry that in America alone represents £100,000,000 to-day.

(*Continued on next page.*)

THIS WEEK'S NOTES AND NEWS

(*Continued*)

Alteration of Hours—Coming Events—A Novelty—Dublin's New Wave

Programme Changes

A NEW time schedule will come into operation at 2LO for the evening programme on and after September 20, as follow:—7: First News Bulletin. 7.10: Talk. 7.25: Light Music. 7.40: Topical Talk or Music. 8: Main Programme. 9.20: Talk. 9.45: Musical Recital (similar to those now given at 7.25). 10: Second News Bulletin. 10.15-10.30: (Monday, Wednesday and Friday) General Programme. (Tuesday, Thursday and Saturday) "Feature." 10.30-12: Dance Music.

Some Coming Events

WE are to hear "Wireless Willie"—Willie Rouse—on September 3, from 2LO. On the following day "The Awful Revue" will be broadcast from Olympia. It is by Peter Haddon, of the Winter Garden Theatre, and visitors to the Exhibition will (if they are lucky!) be able to see the revue actually in progress.

Carillon recitals from Loughborough will be broadcast on September 19 and 26. Both transmissions will be broadcast from 5IT, and the latter from 2LO and 5XX as well. It is interesting to note that the length of landline from the War Memorial Tower at Loughborough to the Birmingham station is 45 miles.

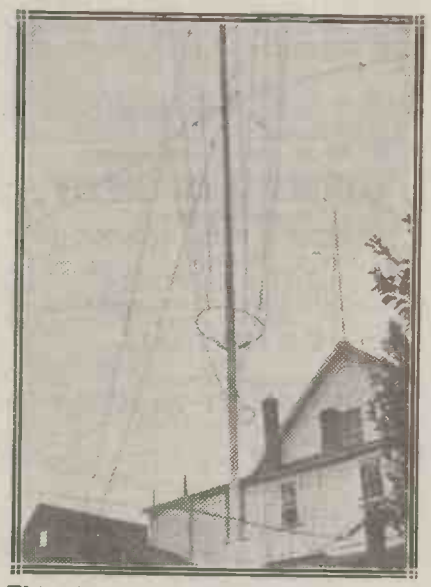
Mr. Jock Walker, who has "deputised" for Sir Harry Lauder at Edinburgh, is appearing at the B.B.C. stations in variety turns. He has already "done" London and Bournemouth, and will appear at Belfast on September 4 and Plymouth on September 2.

2RN Again

HAVE you heard the Dublin station testing on its new proposed wavelength of 319.1 metres? It is believed that even during the preliminary tests the signals were received as well as ever.

A Novelty from 2ZY

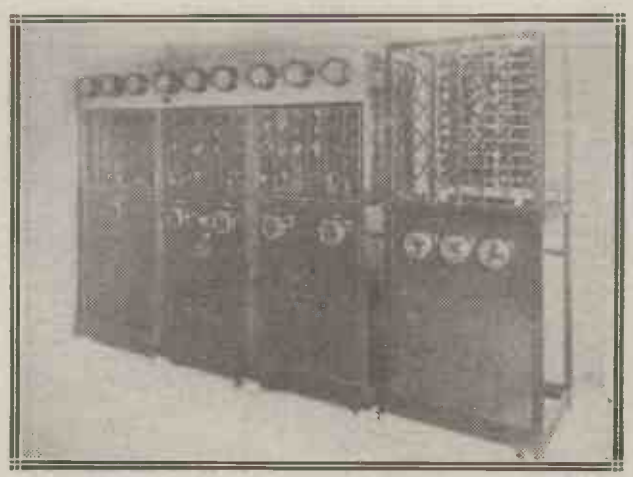
ON August 30 a "film play" was broadcast by the B.B.C. from the Manchester station. This experiment is the result of negotiations between First National Pictures, Ltd., and the B.B.C. The sub-titles will be replaced by descriptions, made by the story-teller, and dialogue and sound effects will supply the scenes, the usual background of orchestral music being retained. The film to be broadcast is "The Greater Glory," adapted from Edith O'Shaughnessy's novel, "Viennese Medley."



This elaborate aerial, which was used by the American amateur "6DD" for work on the old amateur wave, forms an interesting contrast with the simple vertical wire often used now for really short wave work.

Opening of the Beam Service

AN official message from Melbourne states that a beam wireless station will commence tests in October, and will begin general work very soon after. The rates for transmission from Australia to Great Britain will not exceed 2s. per word.



The French "Radio Electrique" station is a fine example of modern radio engineering. All the valve panels and other live pieces of apparatus are enclosed by safety screens.

Much Wanted!

THE *Sunday Chronicle* (Manchester) is organising, in its own words, a competition for "Amateurs who Devise Ideal Receivers." Cash prizes to the value of £500 are being offered. I myself would certainly give £500 for an "ideal receiver"! Let us hope still.

Harsh Treatment

A HEADLINE recently seen in a wireless paper reads "Accumulators—their use as abuse." Presumably by the old-fashioned method of using them as missiles!

Yet Again

MORE assaults have been caused by the terrible practice of running loud-speakers for hours at a time, especially on a Sunday afternoon. This time the annoyed party has indulged in "aerobatics" and cut down the aerial of the offending one. Considerable annoyance is also caused by their presence in hotels, in such places that it is impossible to escape the sound of them. Surely hotel-keepers realise that not *quite* everyone is "wireless-mad"?

A Tall Story

APPARENTLY my remarks a few weeks ago about Rugby were not wholly deserved. While working on the normal high wavelength with C.W. no interference seems to result, but I have since heard that when the transatlantic telephony experiments are carried out on Saturdays and Sundays there is quite a different tale to tell. Apparently all the crystal sets within 20 miles or so report hearing a nasty scratchy noise "resembling a pencil-sharpener," as one of the reports puts it, which is due to the side-band telephony used. One correspondent reports having an expensive milliammeter ruined by these transmissions. Some "pep"!

Future Items

THE Day of Remembrance Parade from the Cenotaph in George Square, Glasgow, will be broadcast from 5SC on September 5. Sir Ian Hamilton will be one of the speakers.

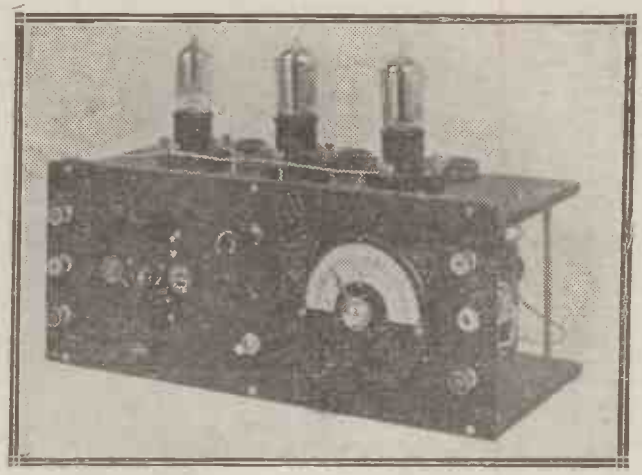
* * *

THE Sitwell family—Edith, Osbert and Sacheverell—will broadcast from London on September 3. They are already well known, I believe, in certain sections of Chelsea, and there will probably be a phenomenal sale of wireless sets in those areas!

The "HOME or COUNTRY" RECEIVER

By H. BRAMFORD

Though not essentially a portable receiver, this three-valve "local" set will meet the requirements of those who desire to build a compact self-contained instrument which may be easily moved from place to place. It is so arranged that it can be removed from its "home" cabinet and packed into a suitcase with its batteries for use as a portable set. Complete constructional details of the set itself are given this week.



THERE is much talk of portable receivers for summer - time, but why should not this type of receiver be looked upon as an "all - the - year - round" convenience? There are several reasons why a "portable" is preferable to the ordinary type of receiver, if certain points in design and construction are observed. The complete equipment about to be described is not so much intended for actually carrying about from place to place, as it is somewhat weighty for the average person to tax his strength with.

On the other hand, it is often desirable to have a receiver such as may be conveyed with ease to any part of the house at any time. In addition to this, it is certainly an advantage to have all the varying paraphernalia neatly boxed up in one cabinet instead of lying about in odd places remote from the receiver itself. Such a set can be always kept neat and compact, and may be used with no trouble whatever anywhere or in any part of the house.

WHAT YOU WILL NEED

One ebonite panel measuring 15 in. by 6 in. by 3/16 in. (Trolite.)

One retroactive tuner. (Radio Instruments.)

One multi-ratio transformer. (Radio Instruments.)

One variable condenser .0005. (Cleartron.)

One vernier dial to suit. (Cleartron.)

One Auto-Audio frequency choke unit. (Bretwood).

One variable grid leak. (Bretwood.)

Three adjustable baseboard-mounting resistances. (Lissen.)

One open-circuit jack with plug. (Igranic.)

One "On-off" switch. (Igranic.)

Three valve-holders. (Benjamin.)

Five triple purpose terminals for aerial, earth and L.S. (Eastick.)

One dozen battery plugs, six red and six black. (Autoveyors.)

One .0003 fixed condenser (Dubilier).

One-and-a-half dozen spade terminals.

Two pieces of plywood measuring 15 in. by 6½ in. by 3/8 in. (Peto-Scott.)

Details of Design

In its present state the receiver proper incorporates three valves, one being the detector and two the low-frequency amplifiers. No plug-in coils are necessary in view of the fact that a special retroactive tuner such as is specified in the component list is incorporated in the receiver. For amplification there is one stage of multi-ratio transformer coupling and one stage of choke coupling, using a special unit. (The receiver is so designed as to enable the stages of amplification to be easily transposed, as will be explained later.) Besides the receiver itself, the cabinet accommodates the high-tension and low-tension batteries, a pair of 'phones, a special built-in loud-speaker, and a frame aerial of neat design. The frame aerial, however, is not so much intended for use with the receiver in its present state, but is for use with an additional stage of high-frequency amplification. It is intended to describe at a later date how to add an H.F. valve without disturbing or altering the existing receiver to any appreciable extent, for the benefit of

(*Continued on next page.*)

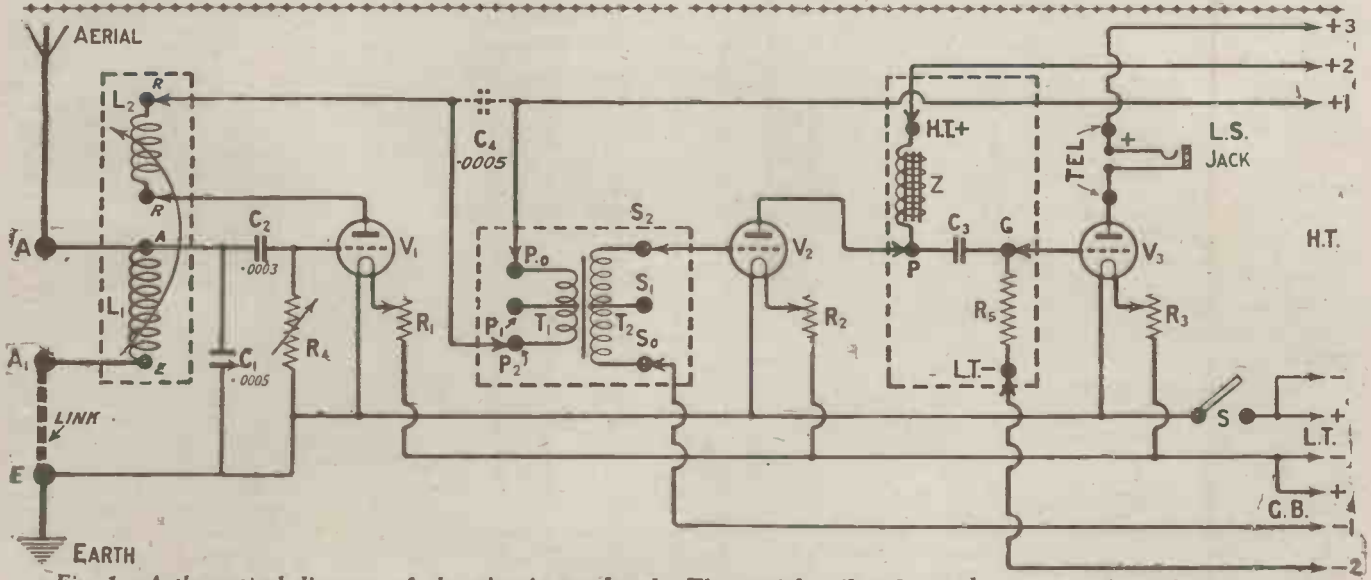


Fig. 1.—A theoretical diagram of the circuit employed. The aerial coil and reaction unit, L.F. transformer, and choke unit are enclosed by dotted lines.

The "Home or Country" Receiver—*continued*

those who wish to dispense with an outside aerial for their "local" reception.

The set itself is a specially compact affair, complete in itself, so that it is suitable also for forming the nucleus of a truly portable outfit. For example, it can be removed from the fairly large and heavy cabinet which houses the complete "home" installation and packed into a medium-sized suitcase with all the necessary batteries, wire and insulators for improvising an aerial out of doors, and so on.

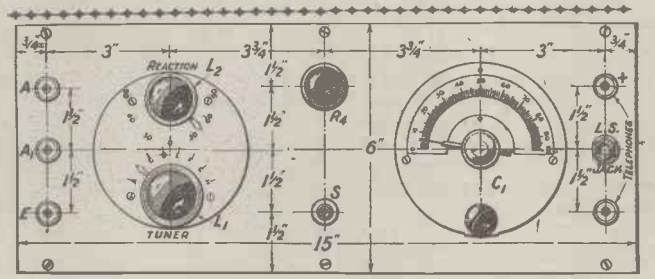


Fig. 2.—Panel drilling dimensions may be obtained from this diagram.

as shown in the back of panel diagram. This diagram shows some of the connections numbered. These numbers indicate that such connections are taken through the upper board to points correspondingly numbered. It is a good idea, therefore, to first proceed to wire up the panel and baseboard connections only, as shown in the diagram, which is self-explanatory. Flexible leads should be used where shown, and the ends of each lead equipped as indicated. Having progressed thus far, the upper board should have the following components mounted upon it: Three valve holders, three adjustable resistors, and the grid condenser. Details of the assembly of the upper face of the upper board are shown in one of the diagrams. The points which connect to the baseboard or panel components are numbered to correspond with similar numbers given in the other drawing. The upper board should be secured to the panel as shown by means of five wood screws and a wooden fillet $\frac{3}{8}$ in. square by 14 in. long after the necessary components have been mounted upon it. When this stage is reached the wiring may be completed.

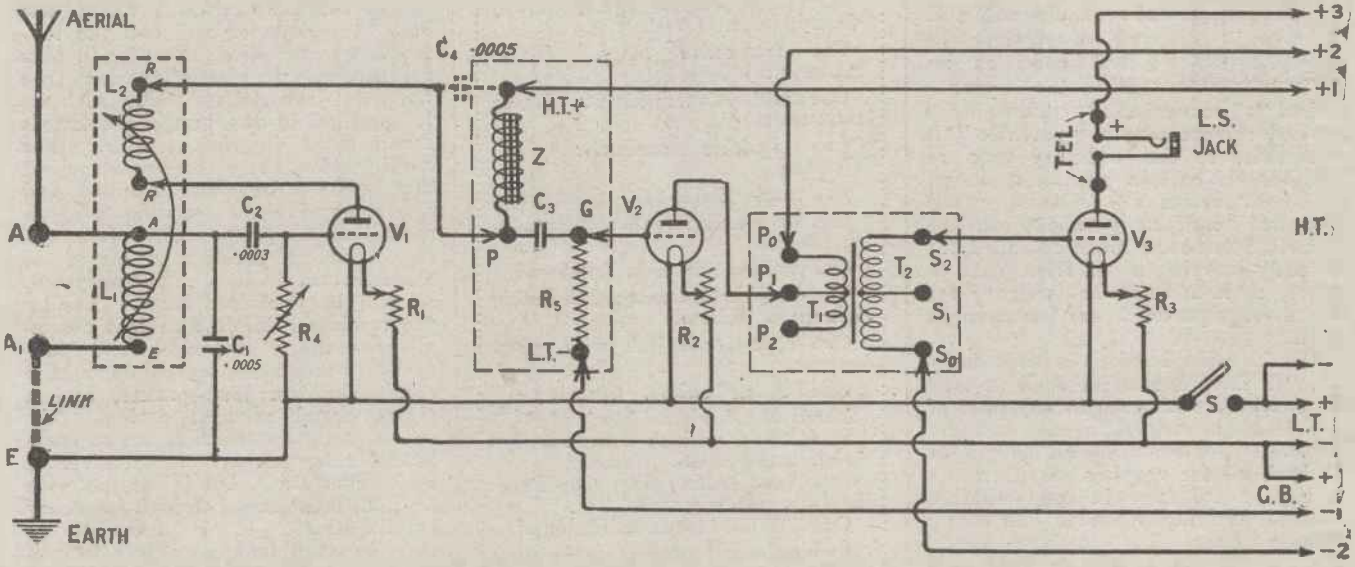


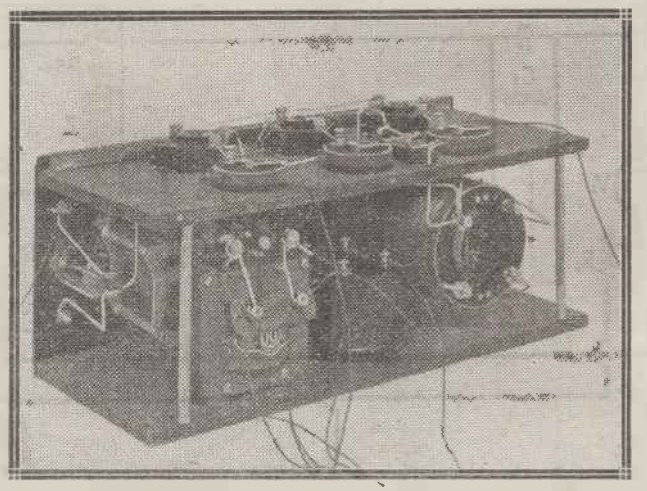
Fig. 3.—The receiver may be converted to employ this circuit merely by transposing the choke unit and L.F. transformer (compare Fig. 1).

Panel Drilling

Details and dimensions for the work of drilling the panel are provided in one of the diagrams. Drilling templates are supplied for the tuner, the variable condenser and vernier dial by the manufacturers; before proceeding to mount any components upon the panel, however, secure the panel to the baseboard by means of three wood screws as shown.

Building Up and Wiring

First mount upon the panel the tuner unit, the variable condenser and micro-dial, the variable gridleak, the filament "on-off" switch, the loud-speaker jack, and the five terminals, as seen from the front of panel diagram. The multi-ratio transformer and the audio choke unit are mounted upon the baseboard,



The condenser seen connected across the transformer primary winding (shown at C4 in Fig. 1) should be included if reaction is not easily controlled.

Circuit

The theoretical circuit is shown in one of the drawings. Here we have the detector valve followed by the multi-ratio transformer in the first stage, and the choke unit in the second stage of low-frequency amplification. The lines terminating in arrow heads indicate flexible

A Self-Contained Three-Valve Set

leads. A link is required across terminals A, and E where an ordinary aerial and earth is used. This circuit corresponds to the actual connections shown in the wiring diagrams.

Operation

General operation is a comparatively simple matter, and the set may advisedly be tried out before proceeding with the cabinet equipment. In this case, connect up the aerial, earth and loud-speaker, and set the filament resistors to a desirable position relative to the valves and low-tension batteries used. Adjust the multi-ratio transformer in conformity with the positions recommended by the manufacturer for the type of valve you are using. Finally plug in the valves and connect up the batteries. Operation is carried out by setting the variable condenser dial at 0 degrees. The tuner is then set in accordance with the wavelength range to be worked upon, having the reaction knob set at zero. To "tune in" rotate the variable condenser knob until signals are heard, and gradually bring in reaction, of course, stopping short of the oscillation point. A tendency to flop into oscillation may be overcome by adjusting the variable gridleak or by reducing the high-tension battery voltage on the detector.

WIRING INSTRUCTIONS

Join terminal A to A of L1 and thence to fixed plates of C1 and through top board (hole 6) to one side of C2.

Join other side of C2 to G of V1, and thence through top board (hole 7) to one side of R4.

Join other side of R4 through top board (hole 4) to the three F + contacts of V1, V2, and V3, and thence through top board (hole 9) to terminal E, one side of switch S, and remaining side of C1 respectively.

Join A of V1 through top board (hole 8) to right hand R terminal of L2.

Join other R terminal of L2 to P2 of transformer primary T1.

Join P0 of primary T1 to H.T. + 1 plug.

Join S0 of secondary T2 to G.B. — 1 plug.

Join S2 of secondary T2 through top board (hole 3) to G of V2.

Join A of V2 through top board (hole 5) to terminal P of Amplifier Unit.

Join terminal H.T. + of Amplifier Unit to H.T. + 2 plug. Terminal G of Amplifier Unit through top board (hole 1) to G of V3.

Join A of V3 through top board (hole 2) to lower contact of Jack and lower telephone terminal.

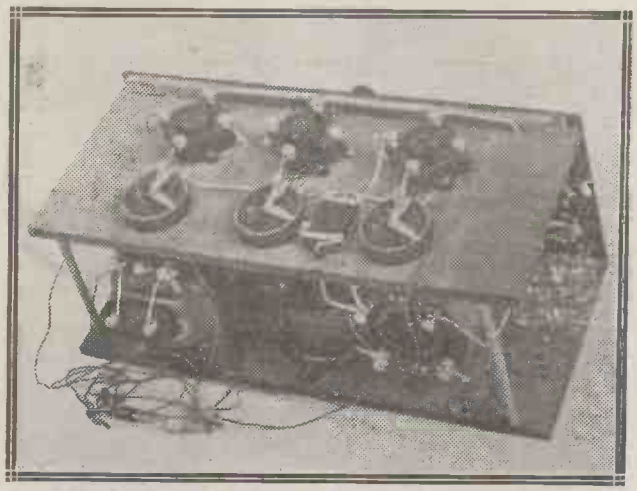
Join upper contact of Jack to upper telephone terminal and thence to H.T. + 3 plug.

Join H.T. — plug to remaining side of switch S and thence to L.T. + spade tag.

Join terminal L.T. — of Amplifier Unit to G.B. — 2 plug. Terminal E of L1 to terminal A1 of panel.

Join L.T. — spade tag to one side of R3, R2, and R1 respectively, and thence to G.B. + plug.

Join remaining sides of R1, R2, and R3 to F — contacts of V1, V2, and V3 respectively.



This photograph shows clearly the general design of the receiver. It is, of course, removed from its cabinet.

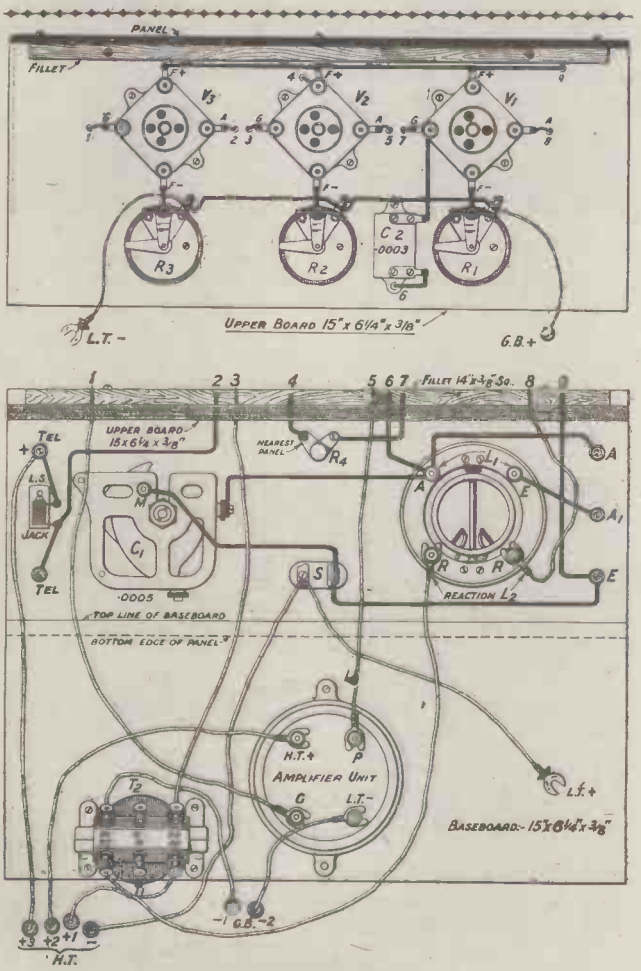


Fig. 4.—Where leads are taken through the upper board the holes are numbered. Any possible doubts will be cleared by reference to the wiring instructions.

Transposing the L.F. Stages

It is a simple matter with this receiver to transpose the order of the low-frequency amplification stages. Some may prefer to arrange the set so that the choke amplifier precedes the transformer-coupled amplifier. Results may sometimes be improved in this way, but this depends largely upon the type of valves used. However, both methods are worth trying in order to see which suits the individual purpose best. The theoretical circuit showing the connections necessary for this arrangement is shown in Fig. 3. It will be noted that only the flex connections equipped with spade terminals are changed over.

It should be a simple matter to make these alterations from the circuit diagram. The multi-ratio transformer connections may be altered in accordance with the various ratios recommended by the maker for second-stage work. Operation is, of course, the same as previously described.

Author's Results

The set was tried out five miles east of 2LO on a moderate aerial. London was received at good loud-speaker strength with good quality of tone. Daventry was also received favourably. Distinct improvement with reaction control was obtained by putting a fixed condenser of .0005 across the primary winding of the transformer. Other stations below 360 metres were heard including a German station, Spanish station, and one other on 'phones. The receiver in its present stage, however, is not recommended for selectivity or range.

The Complete Equipment

An article will appear shortly describing the details of the cabinet equipment, which will include particulars of how to construct the built-in loud-speaker. Constructional details will also be given regarding the special frame aerial which is incorporated in the receiver.

How "The White Chateau" was Broadcast

By Captain JACK FROST, M.I.R.E.

DID you hear the broadcast of "The White Chateau"? If you did *not* hear it, then you really missed a "treat." You may have heard and enjoyed it last Armistice Day, November 11. If you heard it then, I am quite sure that you took good care to see that your accumulator, so liable to be run down when you specially wish to listen, was fully charged for this occasion! Then, with pipe and easy chair, or with needlework and comfy settee, you settled down to live over again some of the stirring, sad moments of the Great War.

Have we forgotten? That was the question uppermost in my mind when the play was complete and the Announcer's voice reading the News Bulletin, called me back again over the years—back from 1915 to 1926. The state of the weather, even the result of the second day's play of the final Test Match seemed trivial, somehow, when compared to the memories which chased each other like lightning through my mind. Heigh-ho, yes! Let me see. There was Smith and James, Bob Hilliard and Bert Macdonald, and good old Mahon. All went. I wonder if they, too, remember.

The Sound Effects

But how was it all done? I mean, how were the sounds of crashing shell, the rat-a-tat-tat-tat of the machine guns, the screech and whistle of shapnel, and even the ping-zip of bullets made to appear so real? If you had "popped-in" to 2LO just as the "show" was commencing, you would have seen everyone in readiness. Within the studio itself were the "speaking parts," the people who were to take the various speaking parts in the play. Can you imagine the voices coming to your ear unaccompanied by the noise effects? How bare and devoid of realism the whole production would have been! It was the noises that "set off" the words and which gave the play its life-blood.

One of the first attempts at elaborate "noise" broadcasting was that of the play, "A Comedy of Danger," in which sounds were produced to imitate those heard in a mine.

Sound Pictures

We hear of pictures, colour pictures, but we rarely hear of *sound* pictures, do we? Yet we heard sound pictures as an important part of "The White Chateau." In scenes 3 and 4 of the play, a real sound picture was presented. Scene 3 opened, you will remember, in the trenches. The speakers were inside a dug-out, and shells were falling bursting overhead. This was the opening of the sound picture. The speakers within the dug-out rise and come from below ground into the trench above. Immediately, trench sounds are heard. The rap-rap of a distant rifle shot, the ping-pinging of bullets overhead. Then the rat-a-tat-tat-tat of bursts of machine-gun fire.

The dialogue resumes, and we learn that our own artillery are to drop a shell into the White Chateau, where the enemy have hidden a machine gun, the one which is doing all the damage to our front line. There it goes a g a i n — rat-a-tat-tat-tat. Then a deep roar is heard, followed by others, as a heavy gun at the rear of our lines fires at the White Chateau. Just to the left of the trench in which we, in imagination, find ourselves, the shell falls with a rending cr-r-ash. This is all part of the sound picture, which vividly conveys to our minds, through the medium of hearing instead of sight, the sounds surrounding the characters in the play.

The noises depicting the whining of shells, closely followed by the crash of the bursting missile, were extraordinarily realistic. Can you guess as to how they were made? I warrant that you have often made similar noises with a whistle blown softly in such a way that the whistle emits a note low in the scale, and then, as it is blown harder, gives out a higher and more piercing sound. Follow that by a good hard "bang" upon a sheet of metal, and then prevent the sheet from vibrating for too long a time. The

(*Continued on page* 82.)

The orchestral work, "Hyperprism," broadcast last year included the use of some "instruments" much like those used in producing "noise effects."

How "The White Chateau" was Broadcast—*continued*

two sounds will together give a noise very similar to that of a shell whistling through the air and then falling and exploding with a "crash."

All of this could not be done too closely to the microphone, because the sensitivity of that instrument would not allow of it. The distance from the microphone must be the subject of experiment.

Musical instruments may often give desired noises, and they, too, are made to play their part. Hence the rattle of machine guns and the report of heavy artillery guns. There is most certainly far more in sound production than anyone casually "listening" imagines.

A Striking Effect

Scene 4 opens with heavier bombardment, still in the distance. Our troops are about to attack under cover of our own artillery, who are pouring shells into the enemy's trench. This bombardment increases gradually, and then, at zero time, the moment appointed for our men to climb on to the trench parapet and to commence their advance across no-man's-land approaches, all is silence. The sound picture has, from the sound point of view, ceased. But the silence, absence of sound, is equally eloquent and full of meaning.

The dialogue carries on, and we hear the final instructions given by the Company Commander to his men through the Sergeant-Major and Company Sergeants. Crash - crash - crash! An inferno of noise, of shells whistling overhead and exploding just in front of the trench in which we, in imagination, stand. Our artillery have commenced to drop the barrage, they are dropping a curtain of shrapnel just a score of yards in front of our men as they emerge from the trench and advance, slowly, across no-man's-land towards the enemy's lines. As the troops advance so does the barrage. The shrapnel drops continually, and, as the seconds pass, seeming like hours, so it falls a few yards farther on, at the speed at which our men are advancing under its cover. Here the scene closes. Not a "scene," from the point of view of seeing; but truly, a "sound" scene, which has been none the less vivid. Our minds have produced the picture, painted by a few words surrounded by sounds.

Seeing by Wireless!

Wireless has not yet added television to its attractions, and without television we are unable to see the scenes portrayed, nor are we permitted to see the gestures and faces of the actors, as we should see them in a theatre. Sound has, therefore, come into its own. We hardly realised that there was so much in sound, in noises. Yet, without stirring from the armchair, we have heard the play, and can truly say that we have "seen" it.

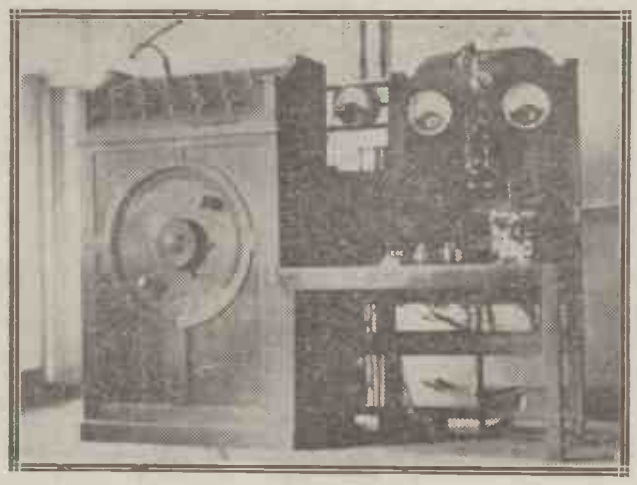
It would be interesting to have portrayed by various artists, who heard "The White Chateau," exactly the scene conjured up within their minds by the sound picture. The ruined Chateau, the pitted, tortured earth, bare of trees, and with only here and there a shattered, splintered, tree-stump to break the monotony of the desolation. The bursting shell, the shattered trench, the wounded, the dead, and, over all, the dust and smoke of an inferno through which lines of phantom figures move across the devastated landscape. There would be a similarity in the pictures, of that I am sure.

Was this the first broadcast of a "sound picture"? Uncles Rex, Jeff and Caractacus are seen enacting a scene from Macbeth at 2LO.

Where It Was Done

The studio was the scene of the acting, actors in a group around the microphone, and behind them, and in an adjoining room, other actors. These other actors have no need for speech. They are the artists who paint the sound pictures. Thunder sheets and bells, rattles and weird wind instruments, and, controlling them, the "O.C. noises," as we call him, signalling to first one and then to another as he follows the word score of the play. Men turning handles, others banging drums, another producing the sound of footsteps ascending dug-out stairs, by banging one block of wood upon another. It is all very wonderful, and there is more in it than you imagine; rehearsals and more rehearsals, inventing and contriving, listening on headphones until the *exact* sound required is obtained.

The picture which the sound artists have produced is worthy of a space in the Academy, the Academy of our memory. The view picture produced within our minds by the sound picture impressed upon our hearing must not be lost. I, for one, shall hang my picture upon the wall of my memory room. When nights are quiet and my pipe is smoking sweetly, then shall I unlock the door of that room and go inside, there to live over again the broadcast of "The White Chateau."



Some of the spark transmitting gear at the Helsingfors station: The broadcasting plant is housed in the same building.

□ □ □

COMING EVENTS

Sunday, September 5.
5IT Symphony Concert.

Monday, September 6.
5WA Music and Merry-making.

Tuesday, September 7.
5NO Italian Concert.

Wednesday, September 8.
2ZY Buxton Gardens Night.

Thursday, September 9.
2BE Irish Night.

Friday, September 10.
2LO Margate Night.

Saturday, September 11.
2LO Charlot's Revue.

A Notable & Popular Broadcaster's opinion of

'HART' BATTERIES

BY APPOINTMENT

'MEET EVERY NEED OF EXACTING WIRELESS USERS'

says

J·H·Squire

OF THE CELEBRATED
J·H·SQUIRE CELESTE OCTET

91, Templars Avenue,
Golders Green,
London, N.W.11

Messrs. Hart Accumulator Co. Ltd.,
Stratford, London, E.15.

Dear Sirs,

There is no doubt, in my opinion, that the "HART" High Tension Batteries and Low Tension Accumulators will meet every need of the most exacting "Wireless enthusiast" - whether for transmission or reception. The absence of noise in operation is only equalled by their strong construction and attractive appearance, whilst the additional guarantee for a full year makes me feel sure that all who try them will agree with me in testifying to their undeniable merits.

Yours very truly,

J H Squire

THE J. H. SQUIRE CELESTE OCTET.

June 22nd, 1926.

HART

THE BATTERY OF QUALITY

There are models of "HART" BATTERIES for all wireless circuits. Write to-day to Department W.1. for illustrated leaflets and full particulars, and call at our

STAND No. 56

NATIONAL RADIO EXHIBITION
OLYMPIA, SEPTEMBER 4TH TO 18TH

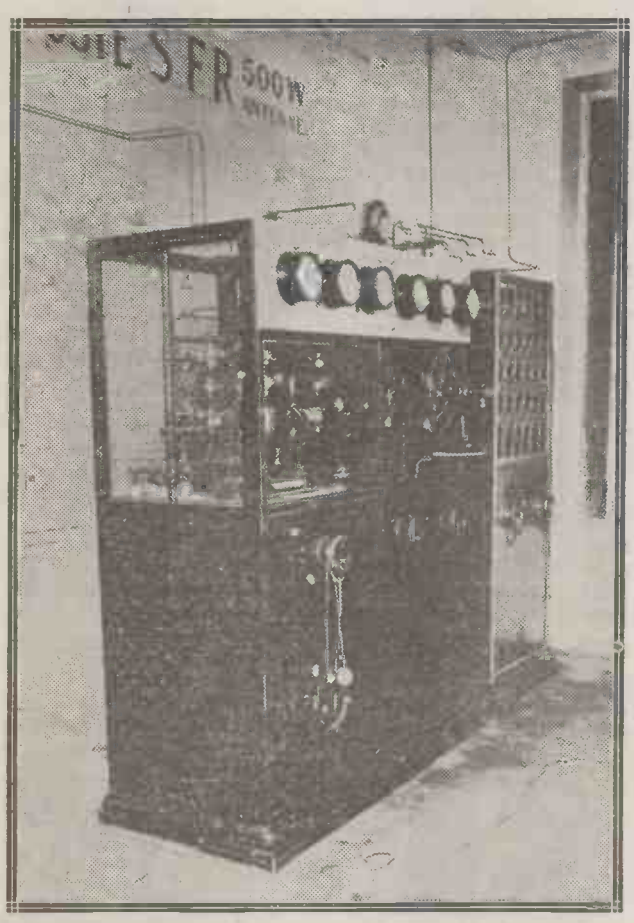
HART ACCUMULATOR CO. LTD. STRATFORD LONDON E.15

FEELING, I hear, is running high in Aberdeen at the moment, and when feeling runs high in Aberdeen almost anything may be expected to happen. The trouble is about this dastardly business of the common wavelength. In a very few days from now both Aberdeen and Birmingham will be transmitting upon 491.8 metres, and this is getting some of our Scottish friends really worked up. Two things stick in their sturdy gizzards. One is the audacity displayed by a southern station in daring to make use of practically the very wavelength that has belonged for all these years to a northern city. The other is far worse, for it is a matter of finance. You see the matter stands like this. At the moment of writing your ten shillings broadcast licence entitles you to listen to any one of twenty-one B.B.C. stations. This works out to 5.7142d. per station.

Serious Hardship

As soon as the new wavelengths come into force the number of possible stations for the Aberdonian will have been reduced to twenty; and it is therefore most unjust that a whole sixpence should have to go bang for each station; there is clearly an overcharge of .2858d. for each. There is therefore talk of a strong agitation to have the licence fee in Aberdeen reduced to 9/6.2858d. To this it may be objected that everyone is in the same boat, since nobody can get both Aberdeen and Birmingham. The reply to this is quite simple, that everyone except Aberdonians can get *both* stations, even if he has to have them simultaneously doing different programmes. I am sorry to say that there are signs of slight disagreement amongst those who are moving for the reduced licence fee. One school contends that .2858d. being less than a halfpenny should not count at all; another maintains that it is only fair to regard it as a farthing, whilst yet a third is strongly in favour of making payment for the licence with 9/6d. in coin of the realm and a packet of pins. If only they can agree upon the number of pins in the packet, these last are, I believe, likely to carry the day.

A FRENCH STATION.



French engineering practice is famous for its neatness and clean lay-out, as this view at "SFR" testifies.

A Menace

Personally I view this new wavelength re-shuffle with feelings of distinct apprehension, for if it really comes off and heterodynes are eliminated, what is going to happen to you and to me when friends drop in to hear what our sets can do? As things are at present there is no trouble at all. They ask, for example, to hear Rome. You and I fix up the telephones, saying that we always tune in that way in order to be able to detect the first signs of oscillation, and so to avoid causing interference.

Aided by the wave-meter, whose accuracy would be little short of perfect if its dial had not slipped on the spindle, we tune in. There is no sign of Rome. Do we tell our friends this? You can supply the answer just as well as I. We say: "I am so sorry, but I really cannot put Rome on to the loud-speaker because he is being very badly heterodyned." The friends express the deepest sympathy, and ask for Oslo. Oslo is, unfortunately, also being heterodyned, but as we descend to his wavelength we observe that 2LO is coming in magnificently. We, therefore, turn to the expectant friends, saying: "I'll get you some distant stations in a moment, but meantime London is sending out such a splendid programme that I really think we ought to listen to it for a little while." Unless some ass butts in with a topical talk on Atavism in Tadpoles, we can keep them listening to London until it is time for them to go, thus saving the situation and our own reputations.

What About It?

What on earth are we to do when there are no heterodynes? There will be no excuse whatever for not getting any station. Three courses seem open to us. (1) We can explain that we

Jottings by the Way—*continued*

are for the moment specialising upon crystal rectifiers, followed by low-frequency stages, but with no high-frequency amplification; (2) we may fall back on mush. This sounds a somewhat squishy proceeding, though it has frequently been a great help to me at difficult moments; (3) we can turn London temporarily into Vienna or Seville. To do this successfully it is essential not to turn on the loud-speaker unless a musical item is in progress, and to be exceedingly quick with the switch when it comes to an end. Should you be caught napping and allow the announcer to break loose in English, talk hard about the enterprise of some of these foreign stations in giving out their items in our tongue. It is unlikely, though, that you will be able to get away with this more than once in the same evening.

A Snag

And this is not the only thing that is worrying me. Myself I have a passionate desire to hear Zagreb and Jyvaskyla. What am I to do? If I tune in Zagreb I shall find a quartet in progress between Angers, Madrid III, Eskilstuna and the station that I want. If I go for Jyvaskyla it will be a quintet in which Agen, Leeds, Hanover and Cartagena are taking part. It is difficult enough at the present time to understand the news bulletins in Jugo-Slavian, but when you get them mixed up with French, Spanish and Swedish it will be, I think, a positively heart-breaking job. And is it fair to ask one's loud-speaker to reproduce simultaneously Polish and Czecho-Slovakian, as it will have to do if you tune to 400 metres?

The Professor Consulted

I was so worried about all this that naturally I went to see Professor Goop about it, for I felt sure that he would have some helpful suggestions to offer. I found the Professor engrossed in dealing with one of the most pressing problems of the day. Since his house, "The Microfarads," is situated upon the main road, he has been unable for some weeks past to obtain a wink of sleep night or day owing to the gentle purring noises emitted by motor-cycles as they pass. He has, therefore, been employing his great mind with the question of evolving a completely silent motor-cycle.

When I asked how he was getting on with his researches, he told me that the solution was in sight. On considering the question of noisy motor-propelled vehicles, he said, he had found, after deep thought, that they fall into two distinct classes. In the first class is the charabanc, in which the noise usually takes the form of Barcelona and Valencia emitted by concertinas and human throats. The remedy here is perfectly simple. He suggests that each vehicle of this class shall be provided with a conductor armed with a bludgeon, with which he shall be compelled by law to club the occupants of the conveyance into insensibility at every third milestone on the way home. In the second class he places the motor-cycle, whose noise comes from an ingenious little component that some optimist or humorist has named the silencer. The Professor proposes to eliminate the silencer, and to replace it with a loud-speaker horn of the largest size. He maintains that if this is done the whole population would rapidly become deafened, in which case they will be insensible to any kind of noise, and no further complaints will be received.

Professor Goop Troubled

When I raised the question of the new wavelengths I found that the Professor was even more disgusted than I at the prospect. "It will mean," he said, "that one's family will give one no peace whatever in the near future. Whereas in the past only a true wireless expert could really enjoy the reception of Brussels with the beautiful treble or quadruple heterodyne that usually accompanies it, we shall now find, as we search round, that we hear everywhere music without any obbligato of this kind. As things were, if a member of your family asked what station you got, and you replied, 'Gleiwitz,' he or she was content to express polite wonder and to let it rest at that. Now they will insist upon hearing the transmission; dance music will come through; they will start fox-trotting or tangoing round the room, and they will prevent you, forcibly, if necessary, from going on to something else as you would naturally do after hearing two or three bars."

His Solution

"And what," I asked, "would you suggest instead of this present wretched scheme?" "My idea," said the Professor, "is that all European stations should use the same wavelength. This would make long-distance work delightfully easy, for if you claimed that you had tuned in Odessa no one could possibly prove that it was not there amidst the welter. The only fear that I have is that the noise produced by the loud-speaker would sound so exactly like much of our modern dance music that one's wireless den would never be free from gyrating couples. Another scheme which occurs to me is to divide up not the available wavelengths but the hours of the day between the hundred and fifty or so stations who wish to transmit. This would give each station approximately nine and a half minutes every day, and since their programmes would be short all could afford to employ the very finest talent.

Why Not?

"There would be the further great advantage that at no moment during

(*Continued on next page.*)

No. 45. **Nothing Doing!**

READERS' COMMENTS

More Power Wanted

SIR.—We have been priding ourselves, perhaps justifiably, as being the leading broadcasting nation of the Eastern hemisphere. Are we not apparently in serious danger of losing that proud position in the very near future?

We have the announcement that very shortly at least 10 German stations are going on to 10 kilowatts power. A high-power station is being built to work on 60 kilowatts, and it is announced that Koenigswusterhausen is to work on 100 kilowatts. There appears to be very little doing in this country to reply to this.

Already we have experienced the power of Hamburg and Frankfurt on what I presume has been 10 kilowatts. The strength and clarity of transmission and the ease with which these stations were found was decidedly surprising.

Other super-heterodyne users and valve users will have noticed that already German stations are coming in with such strength that there seems to be a danger of them absolutely blotting out English stations altogether.

When the other German stations take up the 10 kilowatt power it is quite evident to me that the Germans will be bidding, and bidding very successfully, to be supreme on the ether.

How long are we going to be content with our 9 stations on a miserly 1½ kilowatts as against the Germans with their 10 kilowatt stations?

Unless we want to lose our place in the sun we shall have to be up and moving. I would very much like to hear the opinions of some of your readers.—Yours faithfully,

THOMAS PAYNE.

Newcastle-upon-Tyne

"An Obsolete Component"

SIR,—Your correspondent "Progress" has voiced my own views with regard to filament rheostats in his article, "An Obsolete Component." The convenience of fixed resistors or barretters is perfectly obvious upon comparison of sets using these, and others using filament rheostats mounted upon the panel. I myself will certainly never use a variable rheostat of the panel-mounting type again.—Yours faithfully,

J. L. MATTHEWS.

Kingston.

SIR,—With regard to the article, "An Obsolete Component," published in last week's WIRELESS, I myself have not used a filament resistance of the old type for months. One does not appreciate the full benefit of fixed resistors until one has wired up several large sets. Instead of taking clumsy leads right across the set, from the L.T. terminals at the back to the resistance on the front panel, one simply inserts a fixed resistor in the natural course of the lead from the L.T. terminal to the valve socket. Another great advantage is, of course, that they render a set quite foolproof provided that the valves are not changed over.—Yours truly,

W. L. BENSON.

Norwich.

JOTTINGS BY THE WAY

(*Continued from previous page*)

the day or night would the voice of broadcasting be silent. One could therefore rely upon entertainment at any hour of the twenty-four. Or perhaps it might be even better to establish one central million-kilowatt station under the control of the League of Nations. This might be situated at the top of Mt. Blanc, which is within handy reach of Geneva. It could be kept in constant operation, and each nation could supply its due quota of the continuous programme." I feel myself though that there is a lot in this idea, though there might be a little difficulty with crystal users. This could, however, be got over by providing each purchaser of a broadcast licence with a small private relay station in his back garden.

WIRELESS WAYFARER.

I HAVE BEEN ASKED....

I have a single-valve reaction set, with plain parallel tuning, which at present gives me excellent reception of the Bournemouth station. I see that with the new alterations of wavelength, 6BM will go down to 306 metres, and I should be glad if you will tell me how I can best alter my set to get down to this wavelength, as at present it only goes down to about 350 metres. I am loth to alter the set to any marked extent, since it functions excellently at present.

There is a very simple solution to your difficulty, which we think you will find effective, and this is to connect a variable condenser between your aerial lead-in and the aerial terminal of your receiver. A condenser in series reduces the effect of the capacity of the aerial, and will allow you to go lower. Possibly a variable condenser will not be necessary, and a fixed one of .0001 will serve. This must, however, be determined by experiment.

Which would you advise, an ordinary outside aerial, or a frame aerial, for employment with a neutralised receiver with two H.F. stages?

My experience is that it is difficult to employ a frame aerial with the average neutralised receiver, with two H.F. stages, since on rotating the frame the set often has to be re-neutralised, due to interaction between the frame and the tuned circuits in the actual set. It is best, therefore, in most cases to employ an ordinary outside aerial, or one of small indoor type, rather than a frame.

I have a 3-valve "All Concert" set which sometimes refuses to oscillate, and is absolutely dead, and at others it will function perfectly well for two or three minutes, and then all sound fades away. Where can I look for the trouble?

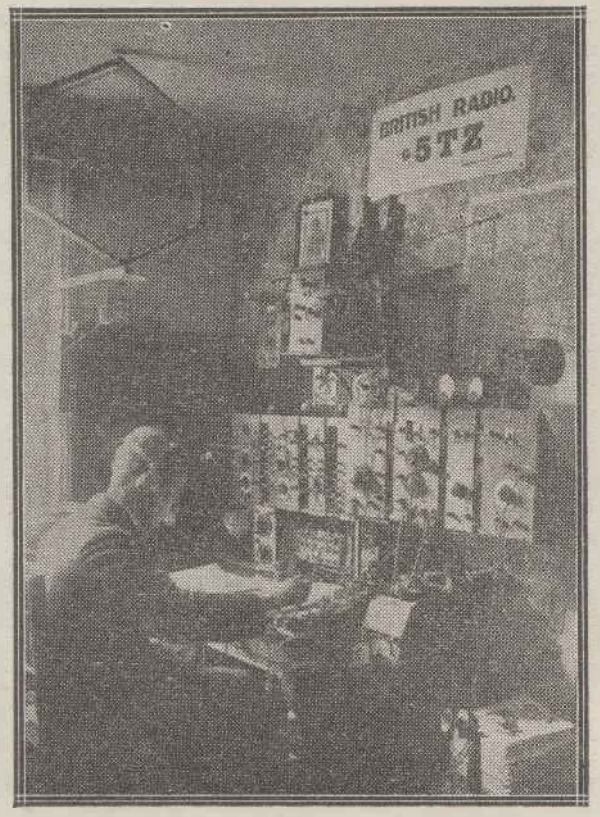
It is difficult to give any definite diagnosis of the fault in your set, but attention should be paid to the following points:—

(1) An intermittent break in the primary winding of the L.F. transformer might give rise to the trouble, and a fault of this type is difficult to locate, although, in some cases, the well-known telephones and dry-cell test will tell, no clicks being heard when testing across the primary winding. On the other hand, a break in the secondary winding might give rise to the difficulty, the grid of the note magnifier becoming charged negatively, thus preventing the set from functioning. With an intermittent break in the primary winding, between the periods of good and no reception, it usually happens that crackling is heard. Substitution here is the best test.

(2) Substitute new ones for all flex leads in the receiver, and also for the leads to the loud-speaker, whilst employing another instrument in this latter position, if available, since an intermittent break in the loud-speaker windings will cause trouble of the type you are experiencing.

(3) Substitute new ones for the grid condenser and grid leak of the detector valve.

(4) Overhaul your aerial and earth system.



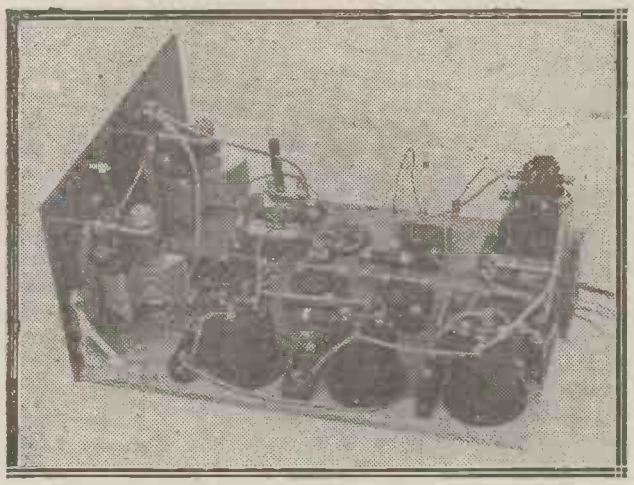
Mr. Walter Sherratt (5TZ) of Cowes, who was one of the first to establish two-way communication with GHH of Mosul, Mesopotamia, is here seen at his transmitter. Note the ingenious mounting of his frame aerial.

I have recently constructed a 6-valve supersonic-heterodyne set employing the Tropadyne arrangement, and can only obtain a bubbling sound from it which is particularly loud, almost a roar, when the frame and oscillator condensers are adjusted towards their minimum settings. Can you tell me where to look for the fault?

I have observed similar symptoms with a receiver of the type you mention when one frame lead has been disconnected. Test your frame, therefore, for continuity, paying special attention to the leads from it to the receiver, more especially if these are of flex. The telephones and dry-cell test should allow you to discover a fault if present here. The grid coil of the Tropadyne oscillator should also be tested in a similar manner, whilst you should try the effect of substituting another for the grid leak of the combined oscillator and first detector.

What is the difference between a neutrodyne and a supersonic-heterodyne receiver, and which is the easier to work?

Neutrodyne and supersonic-heterodyne receivers are both solutions to a common problem—namely, that of obtaining stable high-frequency amplification upon the usual broadcast wavelengths. The former sets utilise a special method of overcoming the tendency towards self-oscillation, due to the internal plate to grid capacity of the valve, whilst the latter type of receiver employs a frequency-changing arrangement which steps up the wavelength of the received signal to such a value that reasonably stable high-frequency amplification may be obtained without neutralising arrangements such as are employed in the former type receiver. Which is the simplest to handle depends largely upon the design, but generally, with the super-het. there are only two tuning controls as against two or more with most neutrodyne receivers. It does not necessarily follow, however, that the neutrodyne set will be more difficult to tune, since, if suitable precautions are adopted, the tuning controls of the neutrodyne set can be made to give practically identical readings, thus simplifying searching to a marked extent.



The Five-Valve Superheterodyne In Use

By JOHN UNDERDOWN

A Home-Made Oscillator-Coupler—Fixed Resistors—Valves—Operating Notes.

LAST week I gave all the main constructional details for the "Simple Five-Valve Superheterodyne Receiver," but, owing to lack of space, the construction of the plug-in oscillator-coupler was omitted. This may be desired by those who wish to make their own instead of purchasing one. It has been designed to plug into an ordinary valve socket, in order that at some future date oscillator-couplers for other wavelength ranges may be tried.

The Oscillator-Coupler

The oscillator-coupler which covers the lower broadcast range is wound on a 2-inch diameter ebonite tube, which may conveniently be about 2½ inches long. Starting at a quarter of an inch from one end of the tube, the grid coil is first wound on, and this should consist of 60 turns of 30 D.S.C. wire. The plate or reaction coil is started at one quarter of an inch from the finish of the grid coil, and consists of 35 turns of the same gauge wire, tappings being taken at 25, 30 and 35 turns from the beginning of the winding. It is a good plan to take the three tappings out to three terminals, in order that the size of the reaction coil may be varied with ease. This allows of a number of different types of valves being employed in the combined oscillator-detector position.

The Base Connections

The sketch of Fig. 1 illustrates the method of connecting the windings of the oscillator coupler to a valve base, which plugs into the L2 L3 valve holder. Here the base of an old valve may be suitably attached to a strip of wood, which can be screwed into the bottom of the oscillator former, or alternatively valve-legs may be mounted on an ebonite strip, which may be screwed into the same position. The valve base is shown as it would be seen looking down through the oscillator-coupler former, the "grid" and "plate" legs being indicated by G and P respectively. The lower end of the grid coil, or beginning of the winding, is connected to the grid pin, whilst the plate pin is connected to the other end of the same winding. The beginning of the plate coil is connected to the right-hand filament pin, whilst from the left-hand filament pin a flex lead is taken to one of the tappings, the best for the particular valve in use being determined by experiment.

Fixed Resistors

The choice of suitable fixed resistors for the valves employed is a further matter which calls for attention, and very simple calculations give the desired information. From the voltage of the accumulator the filament voltage, at which the given valve or valves work, should be subtracted. The resulting figure should be divided by the current taken by the valve or valves, which the resistor will control, when the value of the resistor in ohms is obtained. If the reader is not quite clear here, a numerical example is given in "I Have Been Asked" in last week's issue.

With the valves indicated in last week's article, I used 5-ohm fixed resistors throughout, and these, although slightly in excess, as far as resistance is concerned, of the calculated resistances, were found to give satisfactory working. The valves are slightly under-run, which, providing the desired results are obtained, is good policy. This may be done with 5- to 6-volt type valves, but it is not advisable with 2-volt types, since there is not the same margin of voltage variation to play with, and when employing 2-volt valves I use no fixed resistors at all, these being shorted, and the valves run direct from a 2-volt accumulator.

STATIONS HEARD

Among the many stations picked up with the Five-Valve Superheterodyne the following were identified on the loud-speaker in the course of a short search:—

Cardiff	Belfast
London	Newcastle
Madrid	Münster
Manchester	Glasgow
Oslo	Berlin
Hamburg	Brussels
Dublin	Frankfurt

Ecole Superieure

Valves

Since writing last week's article I have had the opportunity of trying a set of Cossor valves in the set, and found them satisfactory in operation. For V1 I used a "Point One" detector or L.F. type, for V2 and V3 two "Point One" H.F. types, for V4 a further detector or L.F. type, and for the note magnifier a "Stentor Two." The voltages indicated last week were found to be satisfactory. Where, from the point of view of filament current consumption, it is desired to use 3-volt .06-ampere valves, H.F. or general-purpose types should be used for the oscillator and second detector, whilst for the intermediate amplifiers such types as the D.E.3b, etc., should be employed. For the note magnifier I would recommend a small power valve of 3-volt type.

Operating the Receiver

Having obtained suitable valves for the receiver, carried out preliminary tests, and having applied the necessary H.T. voltages, the method of operating the receiver is as follows:—First connect the flex lead of the oscillator-coupler to the middle tapping, that is the 30-turn tapping, which, if this component is purchased from Messrs. Peto-Scott, will be the middle tapping socket, and set the balancing condenser C2 so that the moving vanes are approximately equally engaged with each set of fixed vanes.

Now with the frame condenser set at some intermediate value, for example, on the 5 scale, that is with the figure 5 showing through the hole above the condenser, proceed to rotate the oscillator condenser C3. When the

(*Continued on next page.*)

THE FIVE-VALVE SUPER IN USE
(Continued)

oscillator circuit is tuned to the same wavelength as the frame circuit a click will be heard, indicating that the oscillator has ceased to oscillate. When this happens try the effect of slightly altering the setting of the balancing condenser, behind the panel, until a condition is obtained when on rotating C3 about the point previously obtained no appreciable clicks are heard. When this occurs the nodal point on the oscillator grid circuit has been correctly determined, and searching can now be tried.

Searching

If now, starting with the frame condenser at minimum capacity, this condenser is advanced by, for example, 5 degrees at the time, and the oscillator is rotated through 30 or 40 degrees, also starting with minimum capacity, the local station should be

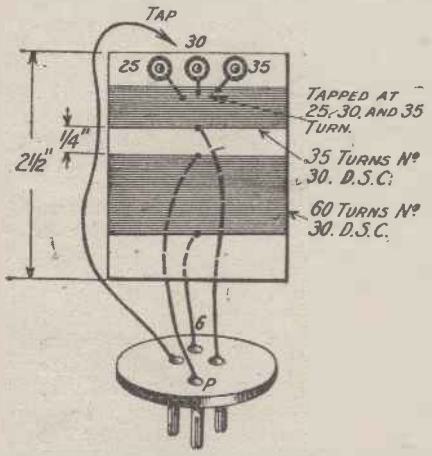


Fig. 1.—An oscillator-coupler is quite easily made with the aid of this sketch.

picked up. During preliminary experiments the potentiometer should be set so that the long-wave side is not oscillating, which position will probably be with the pointer at about 12 o'clock, that is, directly upwards. By advancing the frame condenser by several degrees at a time, and swinging the oscillator condenser as previously indicated, no difficulty should be experienced in receiving the local programme, and, once obtained, the setting of the potentiometer may be adjusted to give maximum signal strength.

The Balancing Condenser

Further experiments may now be carried out with the balancing condenser setting, when it will be found that slight alteration from the correct nodal adjustment will render the set more sensitive. Slight clicks will be obtained when this is done, but these

(*Continued on page* 99.)

The problem of standardisation has received considerable attention in America, and a new type of base has recently been adopted.

CAN WE STANDARDISE OUR VALVES?

By J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.
Joint Editor

Mr. Reyner commences his consideration of the effect of the type of valve used upon selectivity by discussing the important question of the possibility of standardising upon a limited number of types

THE mention of the word standardisation will cause some people to beam with pleasure, while it may have exactly the opposite effect upon others. The manufacturer, as a rule, welcomes any attempt at standardisation, since it enables him to reduce his production costs, which in turn allows of a reduction of price, and this ultimately means a more popular article and greater sales.

Mixed Feelings

The experimenter views standardisation with mixed feelings. In the case of a well-established science like the ordinary electrical industry there is a considerable preponderance of argument in favour of standardisation. Even so, the number of different types of plug-in sockets and fittings which are encountered in ordinary electric lighting and heating practice is surprising. Only the other day I bought an electric toaster and electric iron. The plug fitting for the latter was missing, and the salesman himself immediately took it for granted that it required a special plug and looked all over the shop for the correct article. When by trial the two fittings were found to be interchangeable, we were both considerably surprised.

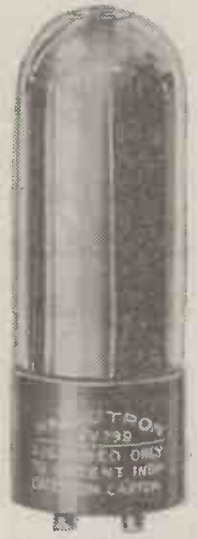
For and Against

The condition of the ordinary electrical industry, however, is reasonably stable, and there is an increasing tendency towards the use of standard fittings. In America every electrical fitting is interchangeable, standardisation having been carried almost to the limit in that country. It is when one is dealing with a rapidly changing science that the question of the advisability or otherwise of such a process has to be considered.

The average experimenter will claim that standardisation ties one's hands. If the proportions and the design of various components are fixed, then progress must necessarily be impeded. There is undoubtedly a great deal of truth in this, and it is obvious that while the science is in a state of development, no definite and complete standardisation is possible.

What is Possible

It is a practical proposition, however, to standardise certain components, at any rate for a limited period. If certain lines of research or development indicate that some deviation from the standard is desirable, then it must be recognised that such alterations are permissible in due time. Provided, however, that attempts are made to utilise the standardised components as far as possible, then the position of the manufacturer becomes considerably more straightforward and this results in a cheapening of the price of the various commodities.



This is the standard .06 ampere American valve on the old type of base.

A Great Need

The standardisation of valves is almost the greatest need in the radio industry of to-day. All modern design is based upon the characteristics of the valves with which the various circuits are to be employed. We are rapidly approaching a state of considerable accuracy and precision in the design, and, given a certain type of valve, it is possible to produce the best circuit to work with that given type.

In America there is practically only one type of valve, which is a low-impedance power valve somewhat similar to our quarter-ampere, five- to six-volt type. Comparatively recently there have been several special last-stage valves developed for use with particular types of loud-speaker, or to handle exceptionally large volume, but for high-frequency work, detection, or low-frequency amplification, this same more or less standard pattern of valve is generally employed.

Several Types Needed

Is this a desirable state of affairs? Could we design a circuit to obtain the best results, using one pattern of valve only? If so, why in so many receivers

(*Continued on page 94.*)

The American .06 ampere valve is here seen with the new base with longer pins

Can We Standardise Our Valves?—*continued*

do we specify high-impedance valves, for the high-frequency stages? As a matter of fact, there is a definite demand for more than one pattern of valve. In a high-frequency amplifying circuit we have two considerations to be borne in mind. In the first place, we have the question of the amplification obtainable from the valve, and in the second case we have to consider the "damping" introduced by the valve into the tuned circuits associated with it.

Opposing Considerations

I shall discuss these points in greater detail in another article, but it will suffice to observe at present that the consideration of amplification requires a valve of a fairly low impedance, while in order to obtain the best selectivity we require a valve of a high impedance.

We have to strike a compromise, therefore, between these two requirements, but there is considerable uncertainty as to what value of impedance is the most suitable.

One of the standard British valves of the low-impedance power type.

For many circuits a valve having an impedance between 20,000 and 30,000 ohms with an amplification factor of the order of 20 is used with satisfactory results.

There are already several types of valve which comply with these requirements. On the other hand, there are quite a large number of valves having an impedance of the order stated, but with amplification factors of only 10 or 12. We also have valves of considerably higher impedance even up to 60,000 or 70,000 ohms, with amplification factors no greater than 20, if as much. One naturally asks, are all these different types of valves necessary? Would not one single type having the approximate characteristics just mentioned be suitable as a standard valve for high-frequency amplification?

I propose later on in this article to investigate the problem of high-frequency valves in a little greater detail and to try to arrive at some value for the best impedance of a valve for high-frequency circuits. It is on this high-frequency side that there is considerable variety, and probably any standardisation would be in the direction of reducing the number of different patterns of high-impedance valves. Before actually discussing this problem, however, it is interesting to develop the idea of standardisation a little further in order to see whether it is a practical proposition from other points of view.

Low-Frequency Requirements

For low-frequency amplification we already have some very satisfactory valves. There would appear to be a reasonable demand for the valve usually known as the general-purpose type, having an impedance of the order of 15,000 ohms with an amplification factor of about 10 to 12. This valve is suitable for the first stage of a low-frequency amplifier, and also in certain cases where a valve of average performance is required.

For the second stage we have the well-known power valve class, having an impedance of the order of 7,000 or 8,000 ohms with an amplification factor of about 7. This class of valve is often utilised as well for the first stage, followed by a transformer of higher step-up than would be the case if the higher impedance valve were used.

Special Types

I do not propose to discuss the types of valve required for special purposes. There is the loud-speaker type of valve specially designed to handle a large volume having a very low impedance of 3,000 to 4,000 ohms only, with a correspondingly low amplification factor. At the other end of the scale we have the various high-impedance valves having an impedance in the neighbourhood of 70,000 to 100,000 ohms or even more, with a high amplification factor of 35 to 40. There are special uses for this class of valve, notably in the latest methods of utilising resistance-capacity coupling.

For the great majority of circuits, however, we could manage very well if we had the three types of valves which have just been discussed. These are:—

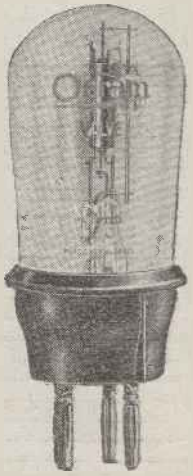
(1) A high impedance valve having an impedance of the order of 20,000 to 30,000 ohms with an amplification factor of the order of 20. This valve is useful for high-frequency amplifiers and as a detector valve.

(2) A low-impedance valve having an impedance of the order of 7,000 ohms with an amplification factor of the order of 7. This is a general low-frequency valve for use as required in low-frequency stages.

(3) A medium impedance valve having an impedance of the order of 15,000 ohms with an amplification factor of 10 or 12. It would be useful as a general-purpose type of valve for use where one of average characteristics was required. It could be used with advantage in the first stage of a low-frequency amplifier if desired, and there is generally a fair demand for this type.

Advantages of Standardising

The advantage arising from the standardisation of valves, even to this extent, would be enormous. There are something like 100 different types of valves on the market to-day. They all go by different names, and their nomenclature is not by any means similar. It requires a very considerable familiarity with the subject to know offhand the characteristics of any particular make of valve without reference to some handbook or other. If these three types of valves became used, they could be known as the H.F., the G.P. and the L.F. types respectively, and it would only be necessary to use a valve of the required type, irrespective of the manufacturer. The present hopeless muddle would be very considerably reduced by such proceedings.



This is one of the British equivalents of the American UV199 type.

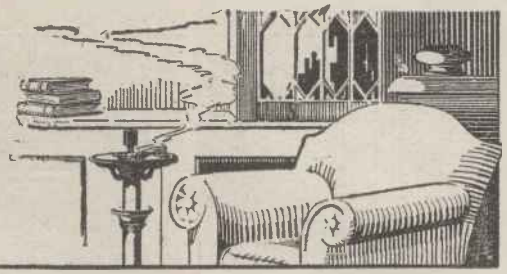
Filament Rating

There is another aspect of the question which is almost of equal importance, and that is the filament voltage which is to be used. We have

(*Continued on page* 107.)

From my Armchair

BY EARL RUSSELL.



In these columns Lord Russell expresses each week his own personal views on matters of interest to "Wireless" readers.

Hilversum

I have been listening to this station lately, and it certainly comes in very well on the loud-speaker on three valves. I have also been looking up some other long-wave friends whom I have neglected recently, such as the Eiffel Tower and Königswusterhausen. They were a pleasant change from the dominant and all-pervading Daventry, but the Dutchman has very long intervals, and talks a good deal.

Slate Pencils

I seem to have misled some correspondents into thinking this too easy, when I lately described a method of using high tension from D.C. mains. In fact, the slate pencils have to be treated with colloidal metal until they will conduct about 3 milliamps at 100 volts, and then to be rubbed with graphite to get a finally suitable conductivity. The length should be such as to give a drop of from 20 to 40 volts per inch, the lower figure being better.

Oscillating Circuits

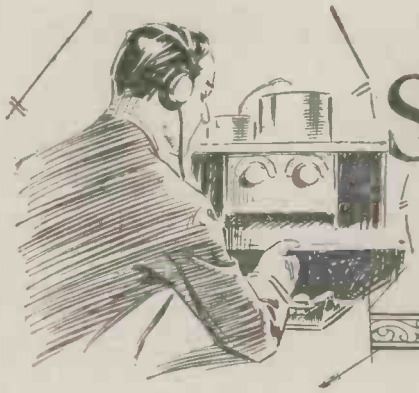
A simple solenoid coil in parallel with a suitable condenser should oscillate. I am being annoyed by one that doesn't, and in addition to that the grid of the valve to which it is connected pays no attention to the bias from the potentiometer. The only explanation I can think of at the moment is that it is held down by being very closely coupled to too long an aerial. It may also have been too heavily damped by an earth shield with which I surrounded it. Anyhow, at present it will do none of the things it ought to do in the way of tuning, as a result of which I am getting about a 2½-valve effect from a 4-valve receiver, and as I expect a 5-valve effect this must be remedied.

Prices

I do not think the amateur has very much to complain of in the prices of components these days. Variable condensers can be bought at prices from about 7s. 6d. to 21s. or over, but the more expensive ones are generally worth the money. I remember very well a couple of years ago paying 90s. for a so-called universal tuner which does not tune very satisfactorily, whereas now one can buy a certain tuner for 39s. 6d. or one of another make for, I think, 27s. 6d., and either of them will do their job. Ebonite panels—I mean those made of real ebonite—are quite a reasonable price, and so are transformers and other smaller components. Valves, it is true, and particularly D.E. valves, are still expensive, and I think a reduction there will come with the increased demand and the increased competition, but still they are nothing to what they were a year or two ago.

Higher Mathematics

When I went to Oxford the classics engrossed me and my mathematics perished. In all modern physical science this leaves one very much stranded, and when I listened to a paper at the British Association, and the lecturer threw complicated formulæ upon the screen, remarking airily, "This is, of course, the familiar equation of so-and-so," I felt rather out of it, my only consolation being that half the audience knew even less. But I have a number of learned friends who gaze upon a new mathematical equation with the same rapt admiration which the audience at Christie's bestowed upon the Romney that was sold the other day.



SHORT-WAVE *Notes & News*

AT last the United States amateur stations have commenced to make themselves heard before midnight once more. WIZ has for some time been getting stronger, and may now be heard on fairly good nights by 10.30 p.m. Probably by the time this appears in print he will be audible at a still earlier hour. About half-an-hour after he is first heard the amateurs gradually begin to appear. The first are generally U-1AAO and U-1CH, both of whom have always been remarkably strong in this country.

Reports, Please

WIZ is crystal-controlled and his wavelength is officially given as 43.02 metres. From measurements at the writer's station, as well as from readings taken on various official wavelength stations, however, his wavelength seems to be nearer to 43.75 metres. We should be glad to hear if this discrepancy has been noticed by any listeners in connection with WIZ or any other American stations, since it seems just possible that there is a difference in the standards of wavelength being used in this country and in America. In any case, .73 of a metre seems rather a large difference!

More Crystals

Quite a number of European stations are now employing crystal control, although as yet it has apparently not "caught on" to any extent in this country. Several British stations have quartz crystals at work in the experimental stage, however, and great things may be expected when they all come "on the air" in earnest. May some of the French stations and other owners of "raw" notes be put to shame at hearing them!

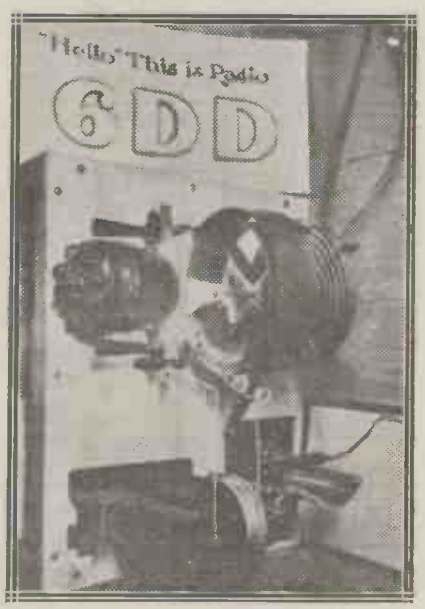
"RAW A.C."

The writer recently heard an ingenious, though probably quite correct, suggestion in connection with the Frenchman's apparent love of unrectified A.C. It was simply that, as is well known, nearly all the French transmitters are unlicensed, and consequently their sets have to be "portable," and even "disguisable." A favourite plan is to build the transmitter in a washstand, or even in a portmanteau, and after it has been in use even for a short time it is completely packed up and hidden. Obviously the addition of such luxuries as rectifiers would lead to unnecessary complications, so they are dispensed with!

Ireland

Mr. E. Megaw, GI-6MU, who, it will be remembered, took his transmitter and receiver to Canada with him some time ago, met with a stroke of bad luck and had to undergo an operation almost as soon as he arrived in Montreal. He is at present progressing well, however, if not completely recovered, and we shall probably hear his familiar signals again shortly. 2IT has already worked all continents, as well as 5NJ, and both have their WAC (worked all continents) certificates. When are we going to hear some really "DX" signals from somewhere off this earth? Several transmitters are anxiously waiting for the day, and I am sure they would not hesitate to call any such station. We have not heard very much of 6YW lately, but he is doubtless devising a scheme for repeating all his DX work on one watt!

AN AMERICAN "HAM"



The transmitting gear used by U-6DD, a prominent amateur in California.

More Commercials

Still more commercial stations continue to flood the 35-45 metre band. At present there appear to be about seven of them between 36 and 42 metres, effectively blotting out any weak signals in that band. If they are going to work continuously during the twenty-four hours there does not seem to be much hope of future work on these waves. Perhaps, however, they will dive lower still. Let us hope they will not come to the surface again!

GLQ is a newcomer amongst these, and is at present working with a note that would put any amateur to shame. It is rather difficult to tell whether it is meant to be C.W. or spark, and it shakes all over the place. Meanwhile Nauen and other German stations are turning out beautiful crystal-controlled notes which are, in comparison, quite a pleasure to listen to. The other British station, which causes serious interference is GBM (Oxford), which also has a "nanny-goat-on-a-tin-roof" note, and spreads over three or four metres on occasions. Why cannot our own commercials turn out something more respectable?

Keying Methods

Where it is impossible to use crystal control, certain stations are carrying out experiments to produce as good a note as is humanly possible by taking great care of the method of keying, etc. The favourite method at present seems to be to break the circuit of the gridleak, but unless the circuit is carefully adjusted this results in an unpleasant howl when the key is up. This state of affairs may often be remedied by shunting the key with a condenser of the order of .25. This is charged up by the grid current, and discharges with a very slow "ticking" effect, which does not have time to make itself heard between the dots and dashes.

Curing "Chirp"

Many of those who are forced to obtain their H.T. from dry cells seem

(*Continued on page* 98.)

See 2LO at work

One of the most interesting features of the great Radio Exhibition, which opens at Olympia on September 4, will be, without doubt, the reproduction of the 2LO Studio. During the run of the Exhibition, frequent broadcasting will be done by the B.B.C. from this studio, so that you may actually see your favourite artists before the Microphone.

For the first time in the history of British Radio, it has been possible to arrange an exhibition that will be *complete*. No British manufacturer of standing but will be represented, so that within the New Hall, Olympia, will be found everything that is worth while in Radio.

All lovers of wireless should set aside at least one day for a visit. Each exhibit will have something of interest for them —something new—distinctive or novel. The great strike demonstrated the fact quite plainly that wireless—simplified as it is—is still the eighth wonder of the world. You cannot afford to be absent from its first really complete manifestation.

THE NATIONAL

RADIO EXHIBITION

SEP. 4 to SEP. 18

NEW HALL
OLYMPIA

10.30. A.M. TO 10. P.M.
ADMISSION INCLUSIVE 1/6

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THE Efesca Regenerative Aerial Tuning Coil has an inductance equal to a whole range of plug-in type coils, from No. 30 to No. 300; thus by using a .0005 Variable Condenser in parallel, all wave lengths are covered from 200 metres to 2,600 metres.

The Coil is tapped at calculated points so that the inductance, with reference to the capacity in use, may be varied by a simple turn of the switch, enabling the desideratum of maximum inductance with minimum capacity to be far more easily secured than is possible with fixed coils.

Reaction is effected by employing a rotor, rotating within a separately wound section of the aerial coil, so that efficient and easily controlled regenerative effect is obtained over the whole wave band. Price 35/-

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Tune-in with Efesca Headphones!

SHORT-WAVE NOTES AND NEWS

(*Continued from page 96*)

to think that the most efficient, or, at any rate, economical method of keying is in the H.T. lead. This is quite good, but there is too often a prolonged "chirp," mainly owing to the fact that if rather a high voltage is employed, the valve filament will "dim" quite appreciably when the key is pressed. These chirpy effects can nearly always be cured by shunting the key with a fairly high resistance (of the order of 20,000 ohms) which, while not producing any appreciable "spacing-wave" effect, serves to keep the valve oscillating, thus minimising the tendency to chirp. Incidentally, this method of keying practically eliminates key-thumps, and considerably increases the peace of mind of the local broadcast listeners!

Checking the Note

It is always a good plan for the transmitting amateur to listen to a harmonic of his own transmission, in order to get an idea of what the note will sound like at a distance. The writer always does this; the one disadvantage is that the receiver needs to be de-tuned, and the station with whom one is working tuned in again at the end of each transmission. If the dial reading at which he is coming in is carefully noted, however, this does not really matter very much.

"Ultra-Short" Waves

The Americans are apparently continuing their exploration of the wavelengths below 5 metres, and are meeting with quite a fair measure of success. Distances up to 120 miles have been covered. It will certainly be a great thing for amateur radio if these waves are found to be practicable. Incredible as it may seem, when working on a kilocycle basis there is room for more stations between 1 metre and 2 metres than between 2 metres and 30,000 metres! Below 1 metre we should probably reach such a state of affairs that it would be practically impossible for one station to interfere with another! The trouble would start when we tried to emit a steady wave, and crystal control would truly be a nightmare, when one considers the thickness of crystals used for 90-metre work.

PROTECT YOUR EARTHING SWITCH!

Few people who incorporate outdoor earthing switches in their aerial systems take the trouble to protect them from the weather. The metal fittings of such switches are bound to deteriorate in time, but their useful life can be greatly prolonged if they are shielded from direct rainfall. In any case, it is advisable to protect the switch from rain, since in wet weather moisture may collect on the insulating base and short-circuit the aerial and earth contacts, causing a serious reduction in signal strength.

Protection is afforded by "roofing in" the switch with a small piece of ply wood, sheet of zinc or painted metal nailed above it.

P. H. W.

STANDARDISING PANEL SIZES

At a recent meeting of ebonite manufacturers the following standard panel sizes were agreed upon. We understand, also, that cabinet makers are giving their co-operation in this standardisation:—

Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
6	6	7	21	9	15
6	8	7	24	9	18
6	12			9	24
		8	10	9	30
7	10	8	12	9	36
7	12	8	16		
7	14			10	12
7	18	9	6		
		9	12	12	12

Thickness.

Area of Panel.	*Thickness.*
Up to 54 square inches ...	$\frac{3}{16}$ in.
Above 54 square inches ...	$\frac{1}{4}$ in.

THE FIVE-VALVE SUPER IN USE

(Continued from page 91)

form a useful indication, when tuning for other stations, showing that the two circuits are in resonance. When clicks are heard, therefore, if the oscillator condenser is rotated through a few degrees from either side of this point, stations should be heard if transmitting upon the wavelength to which the set is tuned. In practice it will be found, as with all "superhets," that each station is heard upon two settings of the oscillator condenser, and that which is best and most free from interference should be chosen.

The Oscillator-coupler Adjustment

When once the set is functioning correctly the effect of varying the position of the tapping on the oscillator plate coil should be noted, thus allowing the oscillator to be worked at its best.

The Frame

In last week's issue I indicated that I employed a "Success" frame aerial, which is mounted on the lid of the case. A frame receives best when pointing towards the desired station, and it will be found in practice that two stations which cannot be separated by adjustment of the tuning condensers may be heard independently when the frame is suitably oriented.

Some idea of the results obtainable has been given, and in a future issue I intend to give particulars of the set's behaviour in several different localities.

REPAIRING A BURNT-OUT VALVE

It often happens that a valve burns out in the middle of a programme, and a replacement is not available immediately. It is not generally known that sometimes a valve may be "repaired" in a few minutes by the following method:—Connect two wires, one from each filament pin on the valve, to an accumulator of voltage slightly higher than that normally used for reception. Then place the valve in such a position as to bring the broken ends of the filament nearest together. (It should be mentioned at this point that valves can only be repaired which have but a *small break* in the filament.) Give the bulb several sharp taps until the two parts of the filament touch each other. The current will, if you are in luck, weld the two parts into a single firm filament again. The writer has repaired a certain valve several times by this method. This valve is operated normally at 4.5 volts on the filament. To repair it, 6 volts were used. The experiment is worth trying, since it may result in an otherwise useless valve becoming of service again.

A. P.

CLOSE-FITTING CONDENSER DIALS

A large number of condensers made with one hole fixing are fitted with a bush at the point of attachment which is long enough for a panel considerably thicker than the usual ¼ in. This means that when the condenser is mounted on the panel the dial stands away from the latter a certain amount. The gap between the panel and the dial spoils the appearance of a set, and also makes it a more difficult matter to take accurate readings from the scale.

A Remedy

This defect can be remedied in a very simple manner. When mounting the condenser on the panel, place one or more washers on the fixing bush before putting it into the hole in the panel. The thickness of washers to use will depend on the thickness of the panel and on the length of the bush, but they should be so adjusted that the end of the bush projects through the panel sufficiently for the securing nut to have a "full thread."

Another Method

If washers with the requisite size of hole are not available, spare nuts can usually be obtained, and one of these put on the bush before it is inserted in the hole will generally be found just about right. The dial should then be locked on the spindle in such a position that it is as close as possible to the panel, but so that it can be turned through its full travel without scraping.

A. V. D. H.

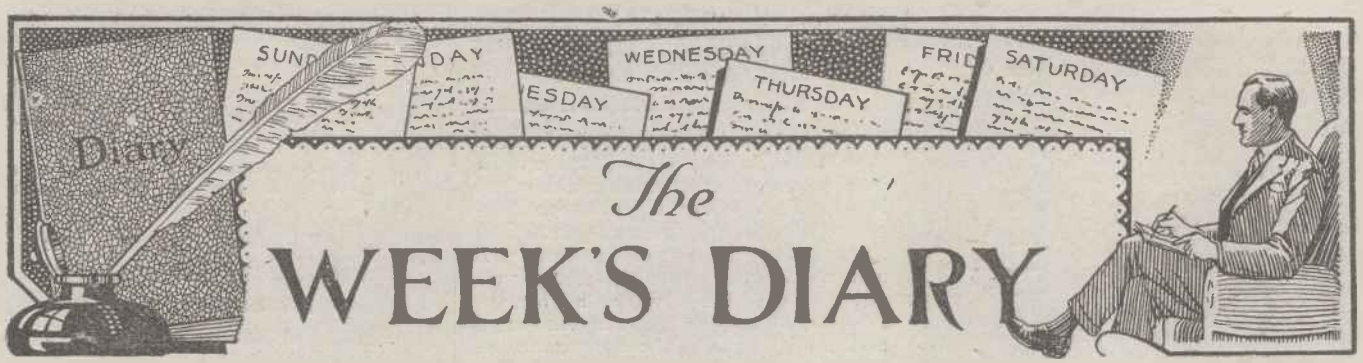
MAKING YOUR OWN WANDER-PLUGS

A neat wander-plug can be made from a valve pin, nut and washer, and half an inch of ebonite rod without much trouble.

Drill a small hole to a depth of about a quarter of an inch in one end of the ebonite rod, thread the nut and washer over the shank of the valve pin, and screw the latter into the ebonite. If the size of drill has been chosen correctly the pin will cut its own thread as it goes and will fit tightly. Connection to the resulting plug can be made on clamping the end of a piece of flex between the ebonite "handle" and the washer by screwing down the nut.

If necessary, the two "legs" of the valve pin can be forced apart to make the plug a good fit in the H.T. battery socket. One advantage of this plug is that the nut and washer cannot possibly be lost once the valve pin has been screwed tightly into the ebonite.

P. H. W.



The WEEK'S DIARY

I HAVE no doubt whatever that my readers are unanimous in their feelings with regard to the reduction in valve prices. This has come at just the right time, although some people have felt that prices *could* have been reduced long ago. Most enthusiasts now realise that the bright-emitter is obsolete, and that it does not pay in the long run to use them. A few more substantial cuts in the prices of dull-emitter power valves will popularise them still more.

* * *

AS a matter of fact, instead of treating power valves as a common-sense type of valve, incorporating the improvements which follow one another as a matter of course, many people still seem to regard them as something rather uncanny, or even magic. Some days back I was working a straight two-valve set (detector and one L.F.) on the local station, with about 150 volts on the plate of the note-magnifier and two loud-speakers, and, it is true, obtaining a volume of sound that was little short of tremendous. A friend who came in at the time remarked: "I see you're one of those who believe in noise! How many valves—four?" When I opened the lid of the set and showed him two, he seemed extremely surprised, but after a few seconds exclaimed: "Power valves! Of course, that explains everything!" Probably it does in a way, but it is strange that they should be regarded in that light.

* * *

THE Exhibition will, I am confident, have a "boosting" effect upon trade this year that can only be equalled by the Motor Show. The public will have a real chance of seeing for themselves the huge strides that have been made in radio during the last year, and, of course, huge numbers of new components and receivers will be on show. Several of the Radio Press "Star Sets" will be on view there, including the "Elstree Six," the "Solodyne," the "Night Hawk," and many others.

Incidentally, WIRELESS will, I hear, have details of the Exhibition that will not be surpassed by the official guide itself! Look out for the Exhibition numbers, everybody!

* * *

MY suggestion last week about holding a "purity night" at the local radio societies has, I am glad to say, met with a large amount of support. Several secretaries hold the opinion that purity of reproduction is probably the most neglected feature of their activities. Nowadays it is mere child's play to obtain great volume, but by no means so simple to secure really good and faithful loud-speaker reproduction. Why not convince the non-radio public that the loud-speaker is *not* a kind of particularly raucous gramophone, but that it will give quality every bit as good as can be obtained on headphones? That is the way to increase membership.

* * *

I WAS very sorry to hear of the death of Mr. C. S. Baynton (better known as 2KO), of Birmingham. He was a real pioneer in amateur work, especially transmission, and the first public speech "broadcast" in Great Britain was made from his experimental station by Sir David Davis, then Lord Mayor of Birmingham. He will be remembered by many.

WITH the new wavelength arrangement, when several stations are "superimposed" on the same wavelength, quartz crystal control will be absolutely essential if the European mess is to be cleared up properly. In fact, I predict that the time is not very far distant when any station that is not quartz-controlled will be hopelessly obsolete. I hear quite unofficially that the B.B.C. has been controlling some of the relay stations by means of tuning-forks, a method almost, if not quite, as good.

* * *

A LITTLE controversy has sprung up lately in connection with the "artificial audiences" which the B.B.C. sometimes employs in the studio. Some people feel that this does give a more natural effect to the jokes cracked by comedians, in particular, while others say that it is dangerously like instructing the wireless audience in the art of when to laugh! I must confess that I like to hear the pleasant background; it gives the same effect as the "noises off" before the broadcast performance at the theatre.

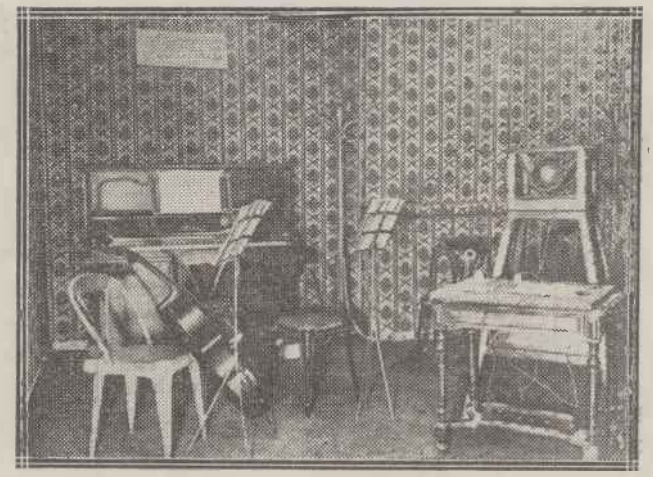
* * *

BROADCASTING seems to be in rather a precarious state in South Africa just now. A private broadcasting company in Johannesburg has lost more than £4,000 in the past year, and the Durban municipal station records a loss of nearly £9,000. A conference is being held to discuss either nationalisation or a Government subsidy. It seems rather a peculiar state of affairs when one considers the phenomenal success of private companies in America.

* * *

IT probably is not generally realised that the B.B.C., in the course of their searching for prospective entertainers, give something like 700 auditions weekly at Savoy Hill. All applicants have been granted a hearing up till the present, but so great are the numbers becoming that they will in future demand credentials instead of granting auditions automatically.

RADIO-LYONS.



The microphone used in the Radio-Lyons studio is very similar in appearance to that employed by the British stations.

The Week's Diary—*continued*

THE new time schedule to be enforced at 2LO (details of which appear on the "Notes and News" page this week) seems to me to be a great improvement over the present arrangement. The chief improvement, in my opinion, is the transferring of the musical recitals from 7.25 to 9.45 p.m. Too many people are unable to listen as early as 7.25 p.m., and those unfortunates who, like myself, are often unable to listen-in at all until 9.30 or after, have hitherto had to put up with almost incessant dance music.

* * *

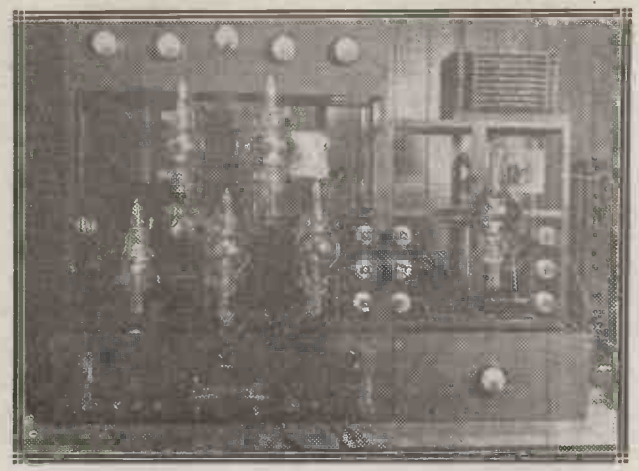
THOSE who wish to visit the Berlin exhibition should be pleased to hear that the journey from London may be accomplished in about 22 hours, and the return fare is less than £10 second class. The Foreign Department of the Exhibition undertakes to engage rooms on behalf of manufacturers and traders, and also to see that the language difficulty does not stand in the way! But do not forget our own Exhibition, held at the same time!

THERE is a very curious conflict in Holland at present in connection with the broadcasting service. The Hilversum station has hitherto belonged to a private enterprise and has been intended to advertise amateur activities. This method turned out to be unprofitable, and it was decided to close the station down; thereupon a listeners' committee collected subscriptions among the amateurs to keep the station going.

These subscriptions, however, only suffice to provide the programmes, and the organisation still has to pay all the technical expenses. This situation obviously cannot last long, and the listeners' committee has urged the Government to settle the matter by law, but no Bill has as yet been passed.

The matter is now, however, rather urgent in view of the International Radio Conference in 1927, for unless Holland at once claims a definite wavelength or wavelengths in the bands allowed by Geneva, it will be unable to claim any useful wavelength at all. Politics and religion are involved now in the business, which certainly does not seem to be improving.

WAVE-TRAP.



A general view of the transmitting apparatus in use at the Edinburgh relay station.

NEXT WEEK
FIRST SPECIAL EXHIBITION NUMBER

RECEIVING WITHOUT AN H.T. BATTERY

At one time there was quite a vogue for special valve circuits which would operate with a very small high-tension battery, or even without any at all. It is probably not generally realised, however, that a receiver which is designed to work with a high-tension battery will usually function quite passably without it, the "high-tension" supply being only that furnished by the low-tension battery.

Some Results

Strong signals are, of course, essential to the satisfactory working of this arrangement. The writer, using a short indoor aerial at a distance of 1½ miles from the aerial of the London station, obtains signals in this way which are about equal in strength to those received on the same aerial system with a crystal receiver.

In order to try the experiment, make sure first of all that the high-tension negative terminal of the receiver is connected to the low-tension positive. Then remove the leads to the high-tension battery and short the H.T. receiver terminals with a piece of wire. It will be found that almost any type of valve will give signals in this way, though the dull-emitter type of small power valve will usually be found to be the best.

A. V. D. H.

□ □ □

An Interesting Question

I am constructing a 6-valve receiver, employing ¼-ampere type valves, and I should like to run the set, both H.T. and L.T., from my 230-volt direct current mains. I particularly desire to keep the set as at present, that is, with valves wired up with filaments in parallel, since occasionally I take it away for demonstration purposes, when ordinary H.T. and L.T. batteries are used. I understand how to obtain H.T. from the mains, but I am in doubt regarding the low tension side. Can you advise me?

I would strongly advise you to drop the project of obtaining the low-tension supply from your direct-current mains, since this course will be rather costly. Six valves, each taking one quarter of an ampere, give a total filament current consumption of 1½ amperes, and this at 230 volts gives a load of 345 watts, or, in other words, about one-third of a unit will be taken per hour. Assuming that this current is taken from the lighting supply and that the local rate is sixpence per unit, one hour's running would cost 2d. Working 5 hours a day, therefore, to take an average figure, the cost is 10d. A comparatively small accumulator, which may be charged in series with the house lighting system, and which will cost a negligible amount to maintain, is, I think, in your case to be preferred.

All communications regarding advertisements should be addressed to:

The Advertisement Manager,
"WIRELESS,"
Bush House, Strand, London, W.C.2

Telephone: City 9911.

COUPON.
QUESTIONS AND ANSWERS.
This coupon must be accompanied by a P.O. for 2/6 for each question, and a stamped addressed envelope when sending queries to the Radio Press Information Dept. for a postal reply.
"WIRELESS." Vol. V. No. 3.

COMPONENTS WE HAVE TRIED

Conducted by the "Wireless" Laboratories, Elstree.

Plugs and Sockets

FROM Messrs. J. J. Eastick & Sons, of Bunhill Row, E.C., we have received some sample plugs and sockets for our examination and report.

The plugs consist of a threaded piece of brass with a collar at the top, the brass being tapered off at the bottom end to form a plug, this plug being split in order to ensure a good fit. A hole is drilled through the centre of the threaded portion of the component, and another hole is also drilled through the side, thus allowing a piece of flexible wire to be inserted through the centre of the plug and brought out at the far end of the threaded portion, and so forming the necessary connection. An insulated covering is provided which fixes over the threaded portion.

The plugs can be used singly or a connecting bar can be utilised if required, enabling the accessories to be used as twin plugs, triple plugs, or as multiple plugs up to eight-way.

The sockets consist of a piece of threaded brass with a hole drilled through the centre into which the plug makes contact. These may be fitted through a panel, and secured by means of a fastening at the rear.

Both the plugs and sockets are well manufactured, pleasing in appearance, and should prove exceedingly useful.

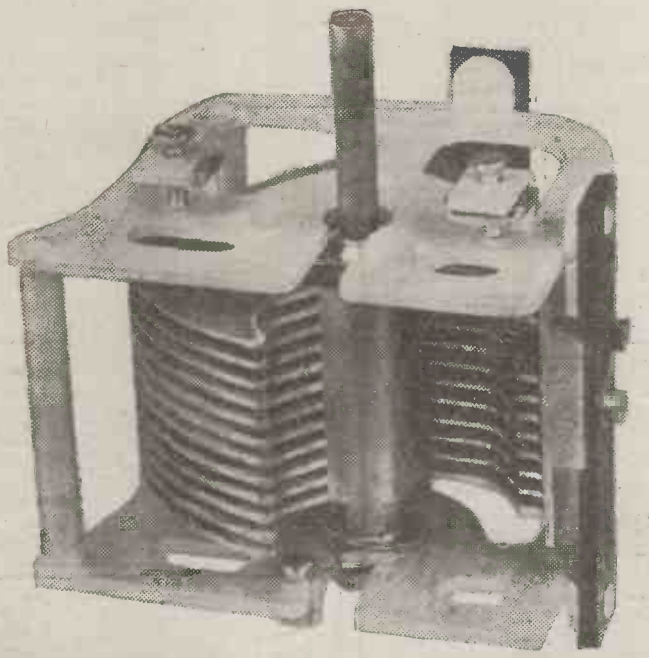
Cleartron Di-Kast Condenser

AN interesting component has been sent to us for test in the Cleartron Di-Kast Condenser. This is an attempt to produce on an economical scale a real precision condenser. The stator and rotor plates are each die-cast in one piece and subsequently assembled in a suitable skeleton framework. A spring connection is taken from the moving plates, and soldering tags are provided for the actual contact.

Two-hole fixing is provided for, a drilling template being supplied; but the instrument is somewhat difficult to fit and was not as rigid, when in position, as it should be. The rated capacity of the sample submitted was .0005, and on test this figure was found to be substantially correct, the actual figure being .00055.

An Observation. — The component is well finished, but in our opinion its value is somewhat reduced by the bearing which is provided. This is in the form of a spring washer of special construction, and while this gives a smooth and easy motion, it is possible, by exerting pressure upon the plates, to produce end play with consequent variation of the capacity. This feature is not consistent with the rest of the production, and, with the other good points in the condenser, we should like to see this bearing made more rigid.

This criticism, however, is of minor importance, and is only inspired by the fact that the remainder of the workmanship is of excellent quality. For ordinary use we have no hesitation in recommending this condenser.



The fixed and moving plates of the Cleartron variable condenser are die-cast in one piece.

Cleartron "Micro Station Selector"

WITH the Cleartron Di-Kast Condenser we were supplied with a micro station selector. This is a slow-motion dial, the adjusting knob causing a rotation of the spindle through a reduction mechanism which moves the condenser spindle, and at the same time operates a pointer operating over a scale reading from 0 to 100.

The finish of the job is good, and the dial in operation was found to be free from backlash and smooth in action. The reduction mechanism is ingenious and simple. It consists of a wheel 3 in. in diameter provided with a rubber tyre, and engaging with this is a small roller to which the actual operating knob is fixed. The whole is enclosed in a metal case so protecting it from damage, dust, dirt, etc., and we can recommend this component to our readers.

"Ebonart"

MESSRS. REDFERNS have submitted to us some samples of their "Ebonart" panels for wireless apparatus. This material is similar in appearance to ordinary ebonite, and, in fact, appears to be a high-grade form of this commodity.

Result of Test.

On test it was found to be exceedingly good. It was easy to work without being in any way "cheesy." It did not soften too easily with heat, a point which should render it less liable to warp due to changes in temperature. It was also very strong from a mechanical point of view.

A sample of mahogany finished material proved less strong than the pure more homogeneous black sample, but otherwise it was in every way equal to the first.

This material is the best we have tested for some considerable time, and we can recommend it.

Ebonart is being marketed in three finishes, namely, black polished surface, mahogany polished surface, and fine S.B. matt.

Etherplus Filament Rheostat

MESSRS. M. and A. Wolff have sent us for test and report a sample of the Etherplus Velvet Contact Rheostat.

This component is of the one-hole fixing variety and is fitted with a black engraved dial and pointer knob.

The resistance element is wound upon a fibre strip, which latter is held secure by attaching to a metal frame. Terminals and soldering tags are provided for connections, while a phosphor bronze contact arm gives a smooth and easy control.

The general appearance is good, while the construction is such that it is not necessary to dissemble the component for fitting to the panel.

AMATEUR TRANSMITTING NOTES

QRA's Found

G-5LH: F. Thompson, 16, Stratford Grove, Heaton, Newcastle.

G-5LU: D. T. Blunden and F. Scruby, 8, Penrith Road, Basingstoke.

G-6TY: K. D. F. Townend, 3, Winthorpe Street, Grove Lane, Headingley, Leeds.

KC-MI1: Riga Radiofons, Latvia.

SMRG: Gosta Siljeholm, Kristianstad, Sweden.

I-1GN: Ing. E. Gnusetta, Via Donizetti 45, Milan.

BZ-SQ1B: Radio Club of Brazil, Rio de Janeiro.

D-7XF: E. Hyllested, 80, Osterbrogade, Copenhagen.

CH-2AW: Otto Toelle Franke, Casilla 1201, Valparaiso, Chile.

PR-4RL: M. C. Fernandez, 13, Olimpo Avenue, Santurce, P.R.

PR-4WW: J. J. Gomez, No. 1, Los Perez Ave., Santurce, P.R.

U-8CQA: B. H. Mechling, 826½, S. Main Street, Lima, Ohio.

U-8EB: R. M. Blair, 3930 Ivanhoe Avenue, Norwood, Ohio.

M-1N: Ing. M. Medina, Avenida Santa Cruz 13, Mexico, D.F.

R-DA8: Carlos Braggio, Belgrano 120, Bermal, Argentina.

R-DU5: P. Casademut, Guemes 2595, Mar del Plata, Argentina.

R-QA5: G. Santolalla, San Luis, Argentina.

U-1AKZ: A. Hurnanen, 62, A Street, Gardner, Mass.

THE OLD WJZ

The old home of WJZ was on the roof of the Æolian Hall, New York. It has now been moved to Bound Brook, and the old aerial is no longer used for high power transmission.

U-1OR: Bowdoin College, Brunswick, Maine.

U-2CG: C. S. Hallock, 5710, Fourth Avenue, Brooklyn, N.Y.

U-3AQE: D. Kinnier, 358, Shedaker Street, Philadelphia, Pa.

U-5LH: T. J. Murden, jun., 1446, St. Mary Street, New Orleans, La.

U-8EF: A. D. Miller, 219, Hazelett Street, N.W., Canton, Ohio.

U-8ZAE: B. P. Williams, 3442, Delaware Avenue, Pittsburgh, Pa.

U-9BHX: E. Winter, 1538, Marietta Street, Decatur, Ill.

C-1EI: T. B. Lacey, Loch Lomond Road, Marsh Bridge P.O., St. John, New Brunswick.

C-2AZ: W. Hindle, jun., 227, Anger Street, Montreal.

C-3AFP: F. A. C. Harrison, 181, Hopewell Avenue, Ottawa.

J-1AA: Dept. of Communication, Short-Wave Station, Tokio.

J-3AA: Koichi Kasahara, No. 60 5 Yamamoto, Kobe.

OE-AB: T. H. Mossig, Am Hof 13, Vienna I, Austria.

QRA's Wanted

VKP, AZ4, DX8, G-2QX, 5GL, 5KT, 5NB, 5VS, 6VH, 6KZ, 6MV, 6PV, BZ-1BH, BZ-1BI, BZ-9QA, Y-2AK, M-1J, ZCD, KGBB, BYY, UM-8ST, XYZ, XZY, G-5RD.

* * *

Readers should note that a very full and complete list of British Amateur Transmitting Stations is published in the September, 1926, issue of *Modern Wireless* (Autumn Double Number), which was on sale on September 1, price 1s. 6d.

CAN WE STANDARDISE OUR VALVES?

(Continued from page 94)

valves with filaments designed to run off practically every voltage from 1 to 6, stopping at all stations, so to speak. In America there are only two types of filament voltage in general use. There is the U.V. 201A type, which has a 5-volt filament taking ¼ ampere, and is designed to run from a 6-volt battery with a very small resistance in series. Secondly, there is the U.V. 199 type, which is the 3-volt 60-milliampere filament, designed to run off a 4-volt accumulator or off dry cells.

On the Continent the 4-volt filament seems to find more favour, and most of the valves in use there are designed to run from 4-volt accumulators, whether they are of the low-consumption type or just the usual bright-emitting filament. In this country we have all the types previously specified coupled with the 2-volt class; we have done considerable research work in this country with the idea of producing a satisfactory valve having a 2-volt filament.

The difficulties in the way are considerable, because the filament has to be very short, and it is difficult to obtain a satisfactory amount of electron emission. The problem is being overcome by the manufacturers, and we have at present 2-volt valves of very high quality.

Is It Necessary?

The question arises as to whether we require all these different voltages? Should we not obtain satisfaction if we standardised on one voltage only? There may be objections to 6-volt accumulators. If so, what is wrong with a 4-volt valve? Nearly every type of valve that is at present provided with a 6-volt filament could be made up with a 4-volt filament. The exception to this would possibly be the case of the very low-impedance, last-stage power valve, where very considerable electron emission is required, but there is no doubt that this would be overcome in time.

Whether the same could be said of the 2-volt filament is somewhat doubtful. The difficulty in obtaining the emission with the ordinary class of valve is quite considerable, and to obtain the very heavy emission required for these low-impedance valves with only a 2-volt filament is a very considerable problem.

The question is whether we are satisfied with the present multiplicity of filament voltages? I think there will be no doubt that any standardisation, as far as characteristics are concerned, would be welcomed, and I personally feel that a standardisation of filament voltage would also be desirable.

Philippine Amateur Stations

WE have received from Mr. Albert de Lange (PI-1DL) the following list of addresses of stations in the Philippine Islands. Mr. de Lange adds that any communications for unknown Philippine amateurs may be sent through him. His address is given in the list:—

PI—1AA	William Baxter	93, Gastambide, Manila, P.I.
1AC	Cadwallader Gibson Lumber Co.	Limay, Bataan, P.I.
1AG	Jose Anguita	119, Herran, Manila, P.I.
1AH	Arsenio C. Malay	815, San Nicolas, Manila, P.I.
1AK	Arturo G. Gayetano	1238, Franco, Manila, P.I.
1AM	W. E. Martin	U.S. Navy Yard, Olongapo, P.I.
1AP	Eliodoro M. Claro	1250, Misericordia, Manila, P.I.
1AR	Fred A. da Silva	1117, Avenida Rizal, Manila, P.I.
1AT	Jose E. Jimenez	835, San Fernando, Manila, P.I.
1AU	Manuel I. Felizardo	252, Galicia, Manila, P.I.
1BI	Cadwallader Gibson Lumber Co.	Paysauan, Bataan, P.I.
1CG	Leopoldo M. Sy-Quia	262, A. Mabini, Manila, P.I.
1CW	Staff Sgt. C. W. de Remer	U.S. Army, Ft. Mills, Corregidor, P.I.
1DE	Cadwallader Gibson Lumber Co.	63, Nagtahan, Manila, P.I.
1DK	Gonzalo M. Sy-Quia	262, A. Mabini, Manila, P.I.
1DL	Al. de Lange	P.O. Box 669, Manila, P.I.
1DX	C. Taylor	U.S.S. "Finch" 9.
1FN	Commander E. Friedrick	U.S.S. "Jason," Olongapo, P.I.
1FR	Far Eastern Radio, Inc.	Manila Hotel, Manila, P.I.
1HK	Harry Kidder	Radio Los Banos, Laguna, P.I.
1HR	Lieut. H. P. Roberts (S.C.)	12th Signal Company, U.S. Army, Fort Wm. McKinley, Rizal, P.I.
1MO	Sgt. Harold Christensen	U.S. Army, Camp Stotsenburg, P.I.
1XA	N. E. Thompson	709, Colorado, Manila, P.I.
1XB	William Baxter	93, Gastambide, Manila, P.I.
3AA	Fred Johnson Elser	Box 38, Baguio, P.I.
7AC	Joseph E. Brockway	Silay-Hawaiian Sugar Central, Occidental Negros, P.I.
8HR	(Portable PI-1HR)	Zamboanga, Zamboanga, P.I.
9AB	Henry E. Neibert	U.S. Army Aviation Field, Camp Nichols, Rizal, P.I.
CD8	Borders and Margraves	

Exhibition Time is Spending Time

MANY many thousand enthusiastic members of the buying public will visit the Exhibition at Olympia which opens on the 4th of this month.

The September issue of "The Dealer" which will be published on the opening day contains every Exhibition item of interest. This special advance Show Number should be read by every retailer.

This selection from the contents proves how very necessary is a regular subscription to "The Dealer."

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Exhibitions in the Provinces.
Radio in New York.
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What to look for at the Exhibition.
Trade Personalities.

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Do not forget to renew your subscription for the season 1926-1927. Published on September 4th—the opening day of the Olympia Exhibition—the September issue of "The Dealer" will contain all the advance news of the exhibits. By sending your cheque now you will begin the new season well.

VISIT THE DEALER STAND—No. 57

The Wireless Dealer AND MANUFACTURER

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