GETTING [illegible]ER POWER FROM BATTERIES

A NEW "THREE" FOR THE REGIONALS

Amateur Wireless

and Radiovision

Every Thursday 3d

Vol. XX. No. 524 Satur[illegible], June 25, 1932

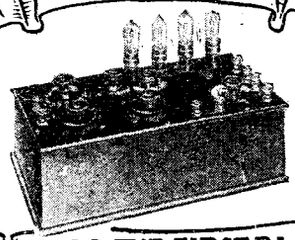
The NEW REGIONAL THREE

IDEAL FOR ALL THE REGIONAL CENTRES

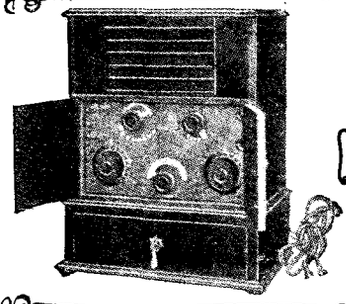
Registered at the G.P.O. as a Newspaper

10 YEARS ACHIEVEMENT IN RADIO 1922 - 1932

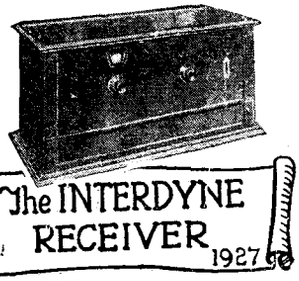
SETS



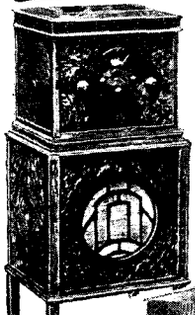
1922 THE FIRST R.I. POPULAR 4 VALVE RECEIVER



1923 The "LYRIAN"
The first combined receiver and loudspeaker.



The INTERDYNE RECEIVER 1927



The MADRIGAL
1929. The first all-electric transportable receiver to operate without aerial, frame aerial or earth.

The STENODE Receiver
1932
The receiver of the future for the critical listener of to-day.

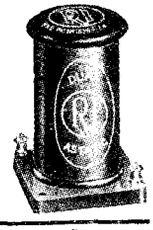
Veterans of radio cannot fail to review, with a renewed enthusiasm, the cavalcade of radio which we have briefly expressed in this page, showing those R.I. components and sets which, in a series of remarkable advances since 1922, have brought set building and reception to the high pitch of efficiency to which the modern experimenter and listener is accustomed to-day.

R.I. Research and fertility in production continues. It sets the standard of perfection by which the public now judge radio. R.I. create nothing but the best and most reliable—you cannot play with electricity—and as Radio Electrical Engineers of 30 years standing with 10 years specialised experience of what is best for public and experimenting use, R.I. still stand first as Britain's manufacturers of finest Radio products.

TUNERS CHOKES

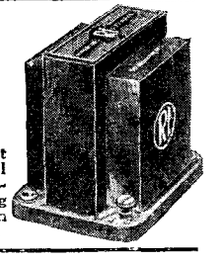
The R.I. PERMANENT MINERAL DETECTOR
Produced in 1926, the most amazingly successful component in early radio.

The R.I. DUALASTATIC CHOKE
1929
The H.F. choke that ensures absolute uniformity of choking over the whole band of broadcasting wavelengths.

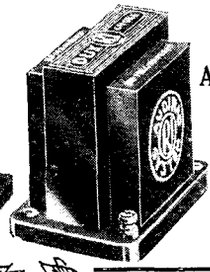


The R.I. RETROACTIVE TUNER
1925
The first tuner with an efficient variable reaction. An outstanding development of early radio.

The R.I. HYPER-CORE CHOKE
1930
The first commercial choke employing nickel iron alloy core.



The R.I. "ANTINODAL" SHORT WAVE COIL UNIT
1932
Short wave coil unit, 12 to 80 metres, incorporating entirely new features. To be released this month.

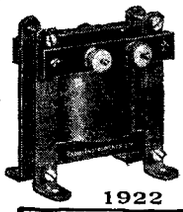


The DUX AUDIRAD
1932
A revolution in radio practice—a combined H.F. and L.F. Choke.

Your Copy of the latest R.I. Catalogue Awaits You—

Ask Your Radio Dealer or Us to Give You a Copy!

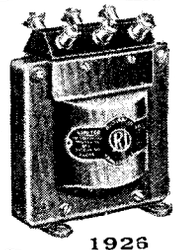
1922 1932



1922

FAMOUS R.I. INTERVALVE Transformer
The L.F. transformer that made transatlantic reception possible for the early experimenter.

The First MULTI RATIO Transformer
The transformer that met a real need among experimenters requiring to obtain best results with a selection of different valves.



1926

1927

The First STRAIGHT LINE Transformer
Besides other advantages gave a greater step-up in amplification than had hitherto been available.

The HYPERMU
1929
The first L.F. transformer with NICK-ALLOY Core. Still acknowledged the world's best.

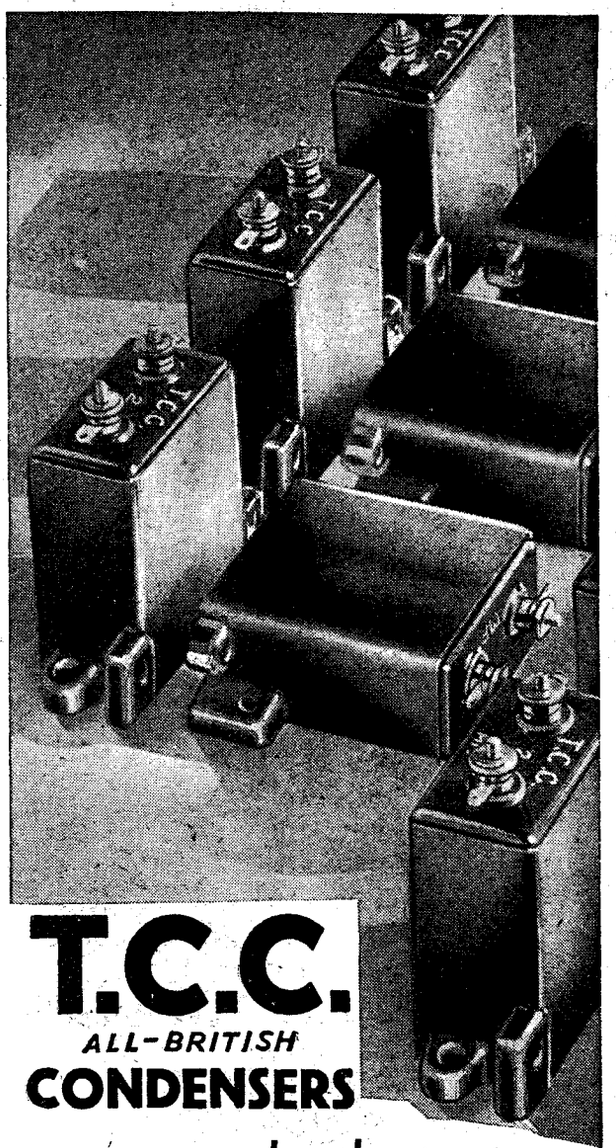
1928

The PENTAMU
The first transformer designed to secure the fullest advantages from the pentode valve.

The PARAFEED
The world's smallest and greatest amplification unit for parallel feed coupling.

1931

The 'DUX'
1931
Designed to give the constructor the best possible results for the lowest cost. "The transformer for the million."



T.C.C.

ALL-BRITISH

CONDENSERS

—initials that are your safeguard

YEARS of unfailing service have won for T.C.C. Condensers a reputation second to none. In every specification — in every set, where unquestioned reliability is demanded, there will you find T.C.C. Condensers. When you want a condenser—for any purpose — "by-passing," smoothing, decoupling etc., insist on "the condenser in the green case"—in the knowledge that T.C.C. stand 'four-square' behind their every product.

A group of 2 mfd. Non-inductive type 50 condensers are shown above. These condensers are particularly suitable for sub-chassis or base-board wiring by reason of their double-mounting brackets. Price 3/10 each—other capacities in this type from .005 to 2 mfd.

Working Voltage - - 200 D.C.

The Telegraph Condenser Co., Ltd., Wales Farm Road, N. Acton

♡710

We couldn't have put it better

Extract from the June issue of "Modern Wireless"

"A new condition is upon us. At one time the superiority of the moving-coil loudspeaker over all other types was freely acknowledged, but the price difference was great.

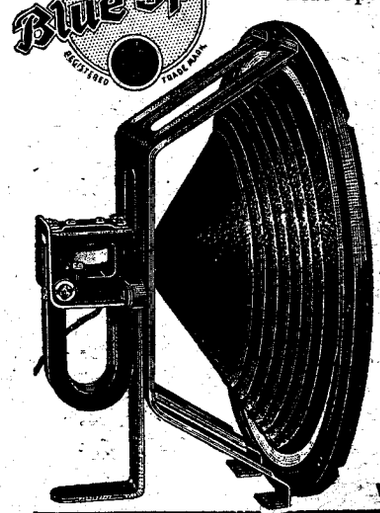
Nowadays, however, this price gulf is closing up—indeed, it can be said to have closed up so that the moving-coil faces the electro-magnetic principle on equal price terms.

A direct comparison can now be fairly made between the two. And when this is done, the moving-coil does not, in general, stand out as vastly superior as might have been expected.

For one thing, the other types have been greatly improved, and, for another in price-paring the moving-coil some makes have lost greatly in quality.

BLUE SPOT 100U gives a performance equal to a good Moving-coil speaker. Its remarkable sensitivity ensures *perfect reproduction for the full musical range* and the difficult bass notes especially are made as clear and full and rich as can be desired. This perfection in the lower register is not obtained at the expense of the treble which is clear and liquid in tone with every note given its true value.

Blue Spot 100U is sensitive even to very small inputs and is particularly suited for all battery sets. It can be used with normal or Pentode valves—no matching transformer being required.



100U

Price complete mounted to chassis

39/6

BRITISH MADE

Write for Catalogue No. A.W. 39U

THE BRITISH BLUE SPOT COMPANY LTD

BLUE SPOT HOUSE · 94/96 ROSOMAN STREET · ROSEBERY AVENUE · LONDON E.C.1

No. 254. Vol. XX. JUNE 25, 1932

Amateur Wireless & Radiovision

BRITAIN'S LEADING RADIO WEEKLY
FOR CONSTRUCTOR, LISTENER & EXPERIMENTER

EDITOR: BERNARD E. JONES. TECHNICAL EDITOR: J. H. REYNER, B.Sc., A.M.I.E.E. RESEARCH CONSULTANT: W. JAMES. ASSISTANT EDITOR: H. CORBISHLEY.

NEWS & GOSSIP OF THE WEEK

FOR YOUR REGIONAL

NO matter whether you are in the Regional reception area of Brookmans Park, Slaithwaite or Falkirk, you will be interested in the Regional three-valver described on pages 1040-1042 this week. It is everything you want a Regional three-valver to be—selective, easy to tune, and amazingly cheap and economical.

ANONYMITY CARRIED TOO FAR!

B.B.C.'s Dislike of Personal Publicity

THERE is a move among "the big noises" at Broadcasting House to put a stop to personal publicity, and the latest idea is to exclude the names of producers from the published programmes. Those of us who remember the failure of the experiment to avoid publishing the personnel of broadcast plays will not be surprised to see this latest anti-publicity stunt fail—as, indeed, it deserves to. Surely the B.B.C. must realise by now that in the entertainment business names have a special value? Just as the theatre public knows what to expect from a Cochran show, so listeners have grown to expect certain types of shows from the broadcast producers. This craze for anonymity is being carried too far.

IMPROVED SUNDAY BROADCASTING

EVERYONE is commenting on the improvement in the B.B.C.'s Sunday programmes, now that the midday extension has come into force. We hear that to cope with the extension the B.B.C. has had to re-shuffle its engineering shifts, and fresh hands have been taken on. The extra cost entailed is more than offset by the goodwill which is therefore being built up.

TRUTH ABOUT SPONSORED PROGRAMMES

The Charter Permits Them

FEW listeners realise that the present charter under which the B.B.C. works definitely takes into account the possibility of sponsored programmes, there being a clause to the effect that programmes may be paid for by outside interests, with or without microphone acknowledgment, so long as the B.B.C. does not itself accept any remuneration. There is reason for thinking that the B.B.C. fears it may be called upon by the Treasury to make further financial sacrifices, but, as a high official points out, "There are many reasons why the sponsored programme idea is not acceptable to the authorities at Portland Place, and you can take it that broadcasting in this country will continue on a public-service basis."

DANCE MUSIC IN THE HOLIDAYS

DURING August, some of the leading dance bands will be absent from the microphone, including Ambrose and Henry Hall. The remaining regular bands will fill the gaps, with the addition of one or two extra bands. A word about Maurice Winnick. His band is not content to churn out only the popular numbers of the day, and some idea of the esteem in which this band is held by the B.B.C. may be gained from the fact that when he moved from the Piccadilly to the Carlton

The B.B.C. Dance Orchestra, conducted by Henry Hall, in a new role! A jolly scene at the Theatrical Garden Party, when the B.B.C. "boys" appeared in public for the first time

NEWS · & · GOSSIP · OF THE · WEEK —*Continued*

the microphone followed, so that his broadcasts might continue.

TOO GOOD TO BE TRUE?

AFTER the highly successful trans-atlantic relay of the American "Broadway" programme, a listener wrote to the B.B.C. asking how the broadcast had been faked! He thought records must have been used in Broadcasting House, because the transmission was so clear. A well-deserved compliment to the trans-atlantic 'phone!

NEW TELEVISION BROADCASTS

FOR the new series of experimental television transmissions from Broadcasting House the time of 11 p.m. has now been decided upon. Four broadcasts per week will be given, and the Baird system is to be used. B.B.C. officials will be entirely responsible for these broadcasts, from the technical and programme ends.

BETTER TRANS-ATLANTIC RELAYS

Plans to Overcome Time Discrepancy

NOW the series of programme interchanges with Columbia is ended, the B.B.C. is arranging a new series with N.B.C., to be started in the autumn. It is considered that the Columbia programmes were too late for most British listeners—11 p.m.—and too early for American listeners. So in the autumn relays special times will be set aside on each side of the Atlantic for these trans-atlantic programmes. If, for example, the N.B.C. wants to relay at 9 p.m. American time, we shall have to put up a programme at 2 a.m. in the morning, and similar concessions will be made for us.

GET READY FOR SEVEN METRES!

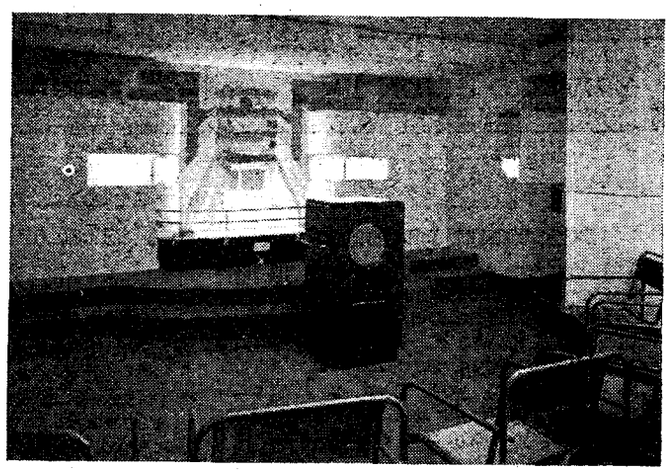
"Secret" Tests Now in Progress

MARCONI engineers who have been assembling the seven-metre transmitter on the seventh floor of Broadcasting House have now completed their work, and by the time these notes are read it is very probable that signals will have gone from the half-wave aerial on the top of Broadcasting House. These early broadcasts are being kept secret, and it will be several weeks before the public is officially informed of the experiments.

FOR NORTH WALES, INDEED YES!

DURING a recent car tour, Messrs. Appleton and Liveing, Station Directors of West and North Regionals respectively, have been inquiring into the needs of listeners in the ill-served districts of North Wales. They find that North Regional is well heard in many towns and villages in North Wales, and so, pending the opening of Washford Cross, it has been decided to include some programmes in the Welsh tongue to be broadcast from North Regional.

THE B.B.C.'S OWN RECEIVER



One of the two special listening rooms at Broadcasting House. A loud-speaker and amplifier in the futurist cabinet in the centre are fed from a receiver in the control room

EMPIRE STATIONS MAKING PROGRESS

To Use Steel Masts After All

AN influential engineer at the B.B.C. tells us that good progress is being made with the Empire stations in course of erection at Daventry. The station building will be ready to receive the plant later in the summer. Work has already begun on the masts, which are to be of the metal tubular type, 60 to 80 feet high, and not wooden as originally intended. Talking of construction—the roof will be on the station building at Washford Cross by September, so even bad weather will not delay the final installation.

AN INTERESTING OUTSIDE BROADCAST

A Naval Service

ON August 7 the B.B.C. will relay a service from the Naval Church in Chatham Dockyard. Last year the service was cut out at the last moment, because the responsibility for the land lines was shared by the Post Office, who took the lines up to the dockyard wall, and the navy, who arranged things inside. This co-operation did not work, and so this year the Admiralty has given the Post Office engineers the password, and P.O. men will run the lines right through the dockyard into the church.

THAT SEARCHING QUESTION!

"Yes, I think a wireless set justifies every penny of the licence."
"How much is the licence."
"Er . . . . I don't know. I haven't one!"

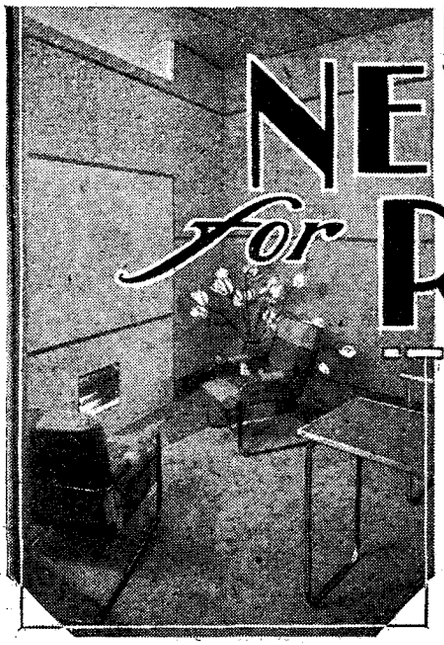
ENGLISH AS SHE IS SPOKE!

More Trials for Our Announcers

DURING the past six months the number of words of which the pronunciation the B.B.C. announcers were in doubt has been surprisingly small, only twenty words being submitted to the Pronunciation Committee meeting on June 24. Included in the list are such words as hygienic, hysterics, oboe, rentier, robot, prophesy and stanchion. Make a note, for your next spelling bee!

MORE SONGS FROM THE SHOWS

SO popular have the "Songs from the Shows" entertainments by John Watt proved during the last few months that a new series is to be done in September. The idea will be slightly different, for John Watt tells us that he intends to devote each programme to the shows of one theatre. We shall have a Daly's night, a Gaiety night and so on—quite a brainwave, John!



AT THE B.B.C.

NEW STUDIOS for RADIO PLAYS

The new Broadcasting House studios are coming into use for radio plays and, owing to the large number of rooms available and their special acoustic characteristics, better effects are being obtained, as explained by our Special Commissioner

"SEVERAL of the studios are not yet decorated," said a radio play official to me at Broadcasting House last week.

"We are using them, though. We cannot wait for the decorators to finish. Rehearsals of forthcoming radio plays have to go on. We work weeks ahead.

"As a matter of fact, considerable thought is being given to the question of decorating the rest of the studios, many of which will be used for radio-play work. What a time of it we had at Savoy Hill! Studios were constantly being redecorated to fit in with new ideas. Here we want to go slow and get a suitable layout at the start.

"In some of the new productions rooms we hope to get something of outstanding interest; a feature such as the U-shaped table in the 8B debate studio, for instance. Something of the kind would be very suitable in the 6C and 7C radio-play speech rooms."

I asked what studios were at present available for radio plays and what difference they make. He explained that in the studios which are already decorated the furnishings are particularly suitable for plays and that in the B.B.C.'s opinion the flat and rather futurist background is conducive to concentration on "mike" work.

He explained the acoustic question to me. It all seems to come down to a matter of reverberation time. That is the professional name for echo, with reference to studio design! Some of the studios, such as the concert hall, have a long reverberation time (1.75 seconds in the case of the concert hall) while others, such as some of the talks studios, are for all practical purposes absolutely "dead." There is no echo.

He showed me a list which has been made out of the reverberation times of all the new studios and we discussed the rooms for radio-play use. 6 A is the large productions studio and the main one for radio-play work. It is the same size as the BB studio which Henry Hall regularly uses. It has a reverberation time of just under a second, 0.85 seconds to be exact.

This large studio will not be used if only two or three characters in a radio play are talking together. Either the 6B or 7B studios will be used for this work. These have about a third the cubic capacity of the large studio and the reverberation time is just over half a second. These are not designed for music but piano music can quite well be given in either of these studios on the sixth floor.

The radio-play man said that there were seven studios in Broadcasting House which are labelled "dead" on the reverberation time list and which, with care, can be used for radio plays.

These no-echo studios are 3C, the news studios, the C studios on the sixth and seventh floors, and the D studios on the same floor.

When I said that I thought it would be awkward to give vent to artistic talent in an artificially treated room with no echo at all, the radio-play officials implied that the staff artistes were getting their nerves steeled to this kind of thing!

The advantage from a radio-play point of view is that when speech is going on in a non-echo studio, it is easy to judge what artificial echo must be introduced into the transmission (via the echo room) to create any kind of effect from talking in a padded cell to speech in the open air. Also, if there is a perfectly flat background, the man at the "effects" control can regulate the strength of the faked noises to a nicety.

Three of the usual talks studios which can also be used for radio plays are very nicely graded in their amount of echo. 3 B, the normal talks studio, has an echo of 0.35 seconds. 3 C is absolutely dead, while 3A, which is sometimes used for the Children's Hour, has an echo period of just over half a second. The gramophone effects studios which are in frequent use in radio-plays are, of course, untreated acoustically.

This question of introducing echo and effects noises on speech originating in special radio-plays studios brought up the matter of the new dramatic control rooms, which the radio-play officials fully explained to me.

Most dramatic productions need at least four or five studios, such as the effects room, the studio for incidental music,

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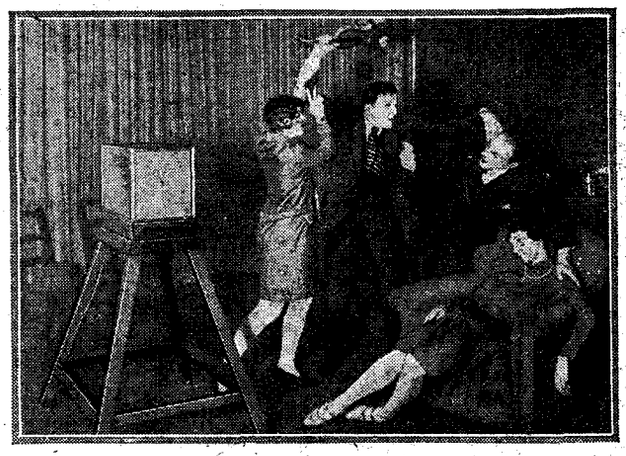
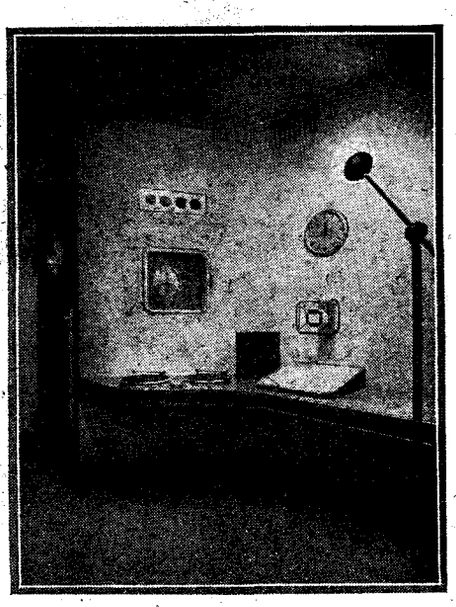




These two photographs provide an interesting comparison between the old studios and the new; the one above was taken during the performance of *Grey Ash* at Savoy Hill

WHY NOT USE A WAVEMETER?

Percy W. Harris points out its many advantages

WHY is it, I wonder, that so few amateurs possess wavemeters? It is not as if they were difficult or expensive to make, or that they require expert handling. On the contrary, they make the identification of a station, the calibration of a set, the testing of the wavelength of the coils, and similar tasks much simpler. I have found that visitors to my laboratory

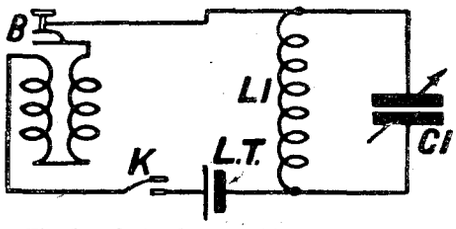


Fig. 1. A simple type of buzzer wavemeter

invariably show great interest in the wavemeters I use, and generally ask all kinds of questions about them.

At the request of one of my recent visitors and in response to a number of letters on the same subject, I propose devoting my notes this week to consideration of what we may call a fundamental wavemeter circuit.

Simply defined, a wavemeter may be called a device which enables you to find the wavelength of the station you are receiving by reference to the calibration of the wavemeter's dial reading. It should also enable you to adjust the receiver to a particular wavelength desired when, for example, you know that a particular station is on a certain wavelength and you want to pick it up.

A wavemeter can take many forms—some very elaborate—the three chief varieties being buzzer wavemeters, heterodyne wavemeters, and absorption wavemeters. The buzzer wavemeter consists essentially of a tuned circuit consisting of a coil and condenser (see Fig. 1) across which is shunted a battery and a buzzer. I can tell you right away that the arrangement shown in Fig. 1 is by no means satisfactory, but it is a good starting point for our discussion, as I want to show you why certain arrangements are bad. The oscillatory circuit L1—B1 will have a tuning range depending on the values used, but a single coil and a condenser of .0005 microfarad maximum will more than cover the medium waveband, while the substitution of a bigger coil will enable the same condenser to tune over the long-wave band with plenty to spare.

Now consider the buzzer B, the key K, and the battery L.T. When the key is closed the battery current will have a pass through the coil L1 across the buzzer contacts, through the magnet and back to the battery. The current passing through the buzzer magnet will naturally attract the armature, but as soon as it is attracted the circuit is broken and the armature flies

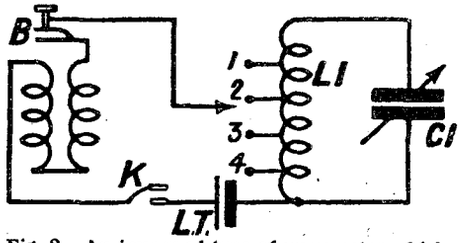


Fig. 2. An improved type of wavemeter which will provide sharper tuning

back again, only to be drawn down once more when the circuit is re-made. The buzzer will thus justify its name and you will notice if you examine the gap that there is a tiny spark there. If you think for a moment you will realise that a single dry cell, giving 1½ volts, can scarcely produce what is really a high-voltage spark unaided, and you find that the spark is really caused by the "extra current" generated by the sudden collapse of the strong magnetic field set up by the electromagnet. The voltage so produced is high enough to jump the gap of the contact breaker and the violent electrical disturbance so caused gives what we might roughly term a "jerk" to the inductance L1 and its associate condenser C1 causing a radio-frequency oscillation to be set up in this circuit at its natural period which is determined by the setting of the condenser C1.

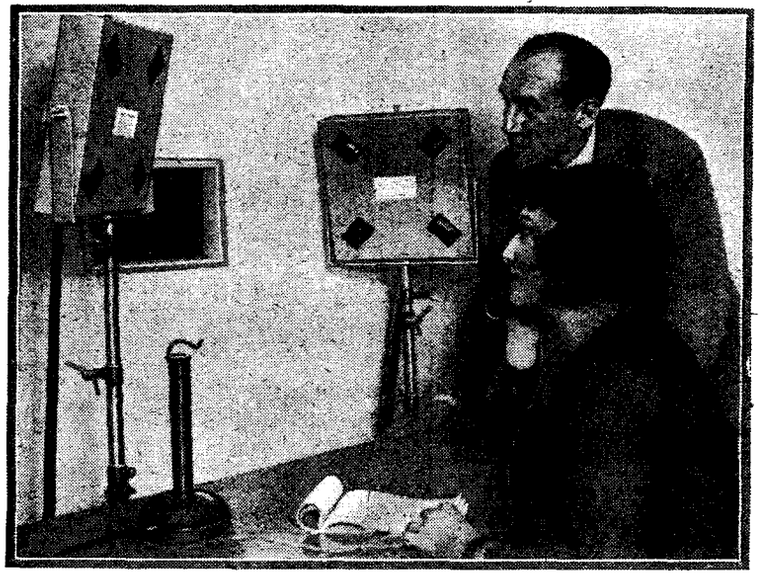
This being so, it will radiate a train of waves for each interruption of the buzzer and if we place the wavemeter near a receiving set we can tune in this buzz whenever our receiver is tuned to the same frequency as that of circuit L1—C1.

Once a wavemeter has been constructed and calibrated the setting of the condenser will always be the same for the same wavelength no matter with what set it is used. The circuit in Fig. 1, however, is unsatisfactory owing to the flatness of the tuning, it being impossible to get readings that are at all sharp. The reason for this is that the battery, key and buzzer being shunted across the whole of the coil L1 introduce a very considerable damping effect.

In Fig. 2 we see a modification of the circuit of Fig. 1 by the use of a tapped coil with four tappings, 1, 2, 3, and 4 as shown, the rest of the circuit remains the same. An immediate improvement is found by tapping the buzzer down the coil, the lower down we place our tapping the sharper the tuning will become. A further improvement, and a marked one, will be found when we take particular pains in the construction of the coil, which to be good should be of a low-loss construction, using on the medium band a fairly thick wire and spaced turns. Such a coil tuned by a good air-dielectric condenser with a tapping two-thirds of the way down will be found to give amazingly sharp tuning.

As both wavebands are required, two coils will be needed, and it is preferable to have quite separate coils made interchangeable rather than one of the dual-range variety.

The buzzer must be a good one, and for satisfactory working it should be placed in a felt-lined box so as to muffle the noise.



WIRED TELEVISION AND PHONE

This new apparatus, recently demonstrated in Paris, enables a subscriber to see an image of the correspondent at the other end of the line during a conversation

"NEW STUDIOS FOR RADIO PLAYS"

(*Continued from preceding page*)

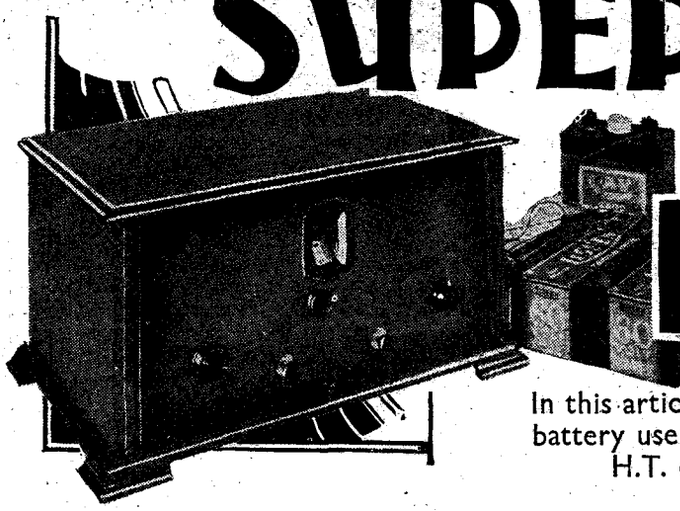
a studio for the principals, and so on.

Arrangements are made at these D.C. panels by which the producers at rehearsals can address the actors in each studio. Most of the studios throughout the building are fitted with green cue lights, controlled from the D.C. rooms.

A new Broadcasting House idea, and a very useful one, I think, is that when the dramatic control potentiometer is faded right out (that is when no output is required from that particular studio), it automatically switches on the "playback" loud-speakers in the studio, so that the performers can hear the other section of the play as it is being broadcast.

This gives them additional warning for cues as well as the green signal light.

SUPER POWER from BATTERIES



In this article J. H. REYNER shows how it is possible for the battery user to obtain plenty of volume with the minimum of H.T. current and consequently low-running costs

THE wireless constructor who is limited to dry batteries for his high-tension supply is severely handicapped in the power output which he can obtain. If he requires really good quality it is essential that he should have something of the order of a ½-watt and preferably even more. Reference to the list of 2-volt power valves shows that this cannot be obtained without considerable expenditure of anode current.

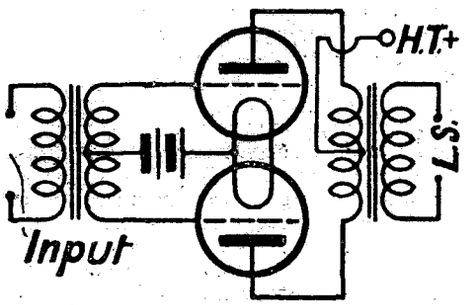


Fig. 1. An ordinary push-pull circuit

No single valve will give as much as ½-watt and those which deliver 300 or 400 milliwatts require an anode current of the order of 20 milliamperes, so that in order to obtain the output required two such valves would have to be used in parallel or push-pull, and the total drain on the H.T. battery would be of the order of 50 milliamperes which is much too great for practical working.

Moreover, these figures are all for voltages of 150 on the anode, whereas the average user prefers to use 100 or, at the most 120, under which conditions the power output is reduced to nearly one-half.

Pentode Advantages

The use of a pentode improves matters, but here again an output of between 200 and 300 milliwatts is all that can be obtained if one limits the high-tension voltage in the manner just described. On the face of it, there seems to be no convenient method by which the battery-user can obtain a reasonable power output. With a little trouble, however, this can be done, and the method about to be described is worth a trial by those who are seeking really good quality.

The principle used is the modification of the well-known push-pull circuit, which is shown in Fig. 1. The secondary of the transformer is centre-tapped so that an increase in voltage on the top grid is accompanied by an equal decrease of voltage on the bottom grid. The two valves, therefore, are working under normal conditions except that when the anode current on one is increasing, that on the other is decreasing. The two effects combine in the anode circuit and add up so that we obtain twice the power output that we should from one valve alone.

Reducing Anode Current

At first sight, this does not seem to help us much. There are certain advantages of the push-pull system, but we still have twice the anode current of either valve by itself which is the very thing we want to avoid. Owing to the push-pull action, however, it is possible, with certain precautions, to over-bias each of the valves so that they work much lower on the characteristics than normally. This reduces the anode current and at the same time extends the possible grid swing, so that we obtain an increase in the possible power output with a decrease in the anode current. Carried to the limit this enables us to obtain nearly twice as much power output from each valve with something less than one-half the normal anode current.

I do not propose to explain in the present article the method in more detail than this, but rather to give practical particulars as to how the system may be tried out. In the first instance, some actual practical data arrived at as a result of experiments with various types of valves will be of interest.

The circuit finally adopted is shown in Fig. 2. Two Mazda Pen220A valves are used. With these valves and using only 100 volts H.T., it is possible to obtain 600 or 700 milliwatts output with only 2 or 3 milliamperes H.T. consumption, while if the voltage can be increased to 120, the output rises to approximately 1 watt, with only 4-5 milliamperes H.T. consumption.

The circuit will be seen to be a normal push-pull arrangement, the only difference being that the bias is increased. With the valves specified the bias should be 15 volts for 120 volts H.T. and 12½ volts for 100 volts H.T.

These values are distinctly in excess of the normal values for this class of valve, but they are the values which enable this peculiar action to be obtained.

Matched Valves

It is rather important, in a system such as this, that the valves should be matched. The average reader has no facilities for selecting such valves, but fortunately the fact that the valves are pentodes enables one to match them to some extent by adjustment of the voltage on the auxiliary grid. With the circuit arranged as shown, place a milliammeter in the anode lead of the valve A at the point shown. Place each of the valves in this socket in turn and, with the screen connected to the full H.T. potential, note the anode currents obtained

Take the valve which has the least anode current and place this in the other socket.

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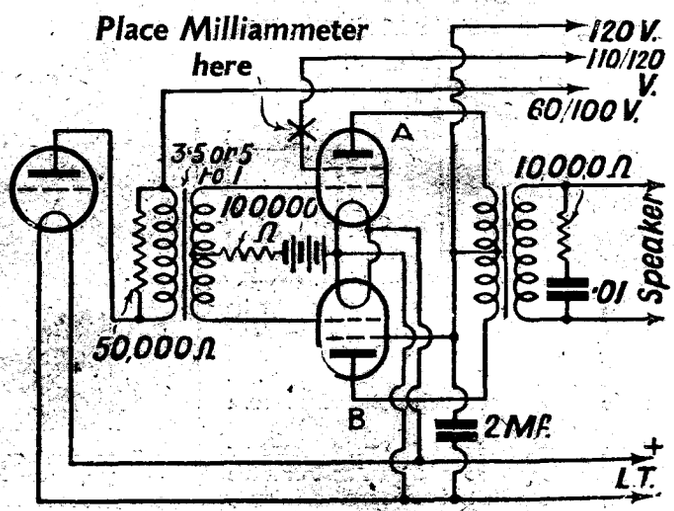


Fig. 2. This circuit is a modification of the first, employing pentode valves and capable of a large output

WHAT IT IS FOR

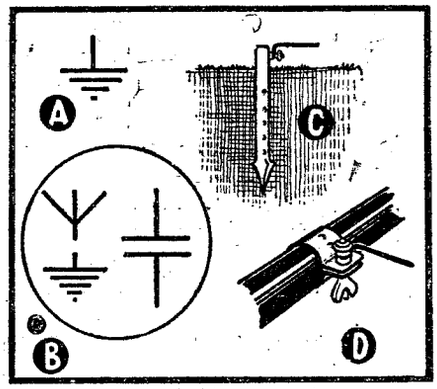
THE EARTH CONNECTION

WAY back in 1896 Marconi first showed the importance of the earth connection. He earthed one side of the Hertzian oscillator then in use, and elevated the other, thereby obtaining a much greater range than had previously been possible.

I wonder how many readers know that there are two distinct types of aerial—one acting as a capacity and the other as an inductance? The ordinary aerial in use to-day belongs to the capacity type, because the aerial wire is one plate of a condenser. What makes the other plate? The earth. And the intervening air is the dielectric.

Looked at in this way, you see the earth connection in its true importance—as one of two plates in a condenser. It would be quite possible to make a condenser type of aerial with two large metal plates, one erected high above the ground, and the other a few feet above the ground. Or we could make use of the normal type of aerial wire, and fit up an earth screen, comprising several wires placed a few feet above the ground, insulated from earth and parallel with the aerial wires.

I mention this because it has been found that the earth, contrary to the usual assumption, is not a perfect conductor of wireless energy, and no matter how good the earth connection may be the resistance of the earth connection will be several ohms.



At A is the symbol for the earth connection. At B you will see how the aerial and earth are considered as the two plates of a condenser, with the intervening air as the dielectric. At C is a common form of earth contact—a buried spike or tube. At D is an alternative earth contact—a main water pipe

Most listeners will make an earth connection to either a water pipe or to a spike or plate buried in the ground. Such a connection is satisfactory if losses are kept down to a minimum.

What are the usual losses? Resistances losses, traceable to (1) high-resistance earth lead, (2) inadequate area of contact, and (3) high-resistance contact.

The remedies for these three losses are, in order, (1) to use the thickest possible gauge of wire in the connection of the set to the earth point—certainly not less than the thickness of the aerial wire, (2) make sure that a *main* water pipe connection is utilised, or in the event of a buried connection make sure that a large surface of metal is exposed to the earth, and (3) see that the soil around the earth plate or spike is kept moist, as dry earth has a high resistance.

Bearing these points in mind there is no reason why an inefficient earth connection should be endured. Remember always that the earth is one plate of a condenser, and then you will not concentrate on the elevated plate—the aerial—to the exclusion of the other plate—the earth. HOTSPOT.

"GETTING SUPER POWER FROM BATTERIES"

(*Continued from preceding page*)

Re-insert the other valve in socket A and reduce the screen potential until this takes the same current. The two valves are now matched up as regards anode current and the same value of grid bias will be satisfactory.

Note that a 100,000-ohm resistance is included in the grid-bias lead. This is to avoid any self oscillation which might be set up in the circuit. In some cases a stopper resistance such as this is included in each grid lead, but the use of one resistance only in the common grid-bias return is quite sufficient.

Step-down ratio for various impedances with two Pen 220A valves.

Speaker Impedance	*Transformer ratio*
10	66
20	40
40	30
60	25
1,000	7
2,000	4·5
3,000	3·5
5,000	2·7
10,000	2

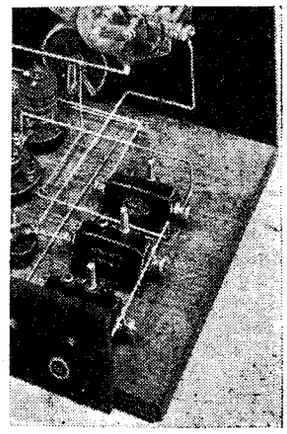
A good output transformer is necessary and this must be so arranged as to match the pentodes to the loud-speaker in use. The average impedance of the pentodes under the special conditions of this circuit is a little higher than usual and the optimum load is about 40,000 ohms (across the two valves in series). The attached table gives suitable transformer ratios in which due allowance is made for this fact.

The customary correcting device consisting of a condenser and resistance in series should be shunted across the speaker terminals. The actual values depend upon the loud-speaker and the taste of the user, but those shown on the diagram are generally satisfactory.

The first valve in the circuit may be a detector or an L.F. amplifier as required, the connections being quite standard and requiring no comment. The 50,000-ohm resistance across the primary of the transformer is important, however. Its function is to protect the pentode valves in the event of the first valve being removed. If this is done, the sudden breaking of the anode current through the primary of the transformer will set up a very large voltage and cause such a surge of current in the pentodes as to wreck them entirely. The 50,000-ohm resistance checks this surge and prevents damage.

FOLLOWING THE LAYOUT

Follow the blueprint most carefully when making up a set in which plug-in



coils are used, especially for short-wave working. The distances between the sockets are most important. They control the couplings between the coils.

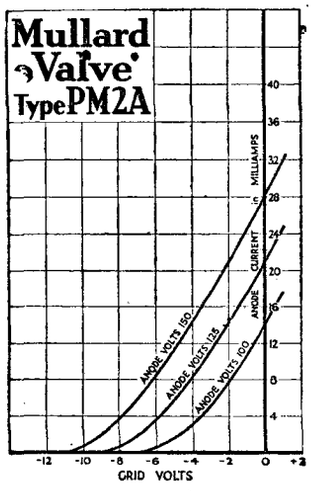
Ray Covillier and his Hawaiian Revellers provide an amusing kind of light music which is a contrast to the ordinary popular dance band. They will be heard in the Scottish programme on July 9.

A new series of gramophone recitals under the title of "Discs" will be given for West Regional listeners starting on July 9. The records on this occasion will be chosen by E. R. Appleton and Andrew P. Yates. They will choose the records they would like to have with them if they were shipwrecked on a desert island!

Mr. J. Inglis Ker, will give a talk on July 6 in the "Scotland Out of Doors" series, which will be entitled "Scotland for the Motorist."

The Abbey Players, newly returned from America, make a welcome reappearance before the Belfast microphone on July 4.

IT IS ABSOLUTELY TRUE . . . .



OPERATING DATA

Max. Filament Voltage	- 2.0 volts
Filament Current -	- 0.2 amp.
Max. Anode Voltage	- 150 volts

Characteristics

(At Anode Volts 100; Grid Volts Zero)

Anode Impedance	- 3,600 ohms
Amplification Factor	- 12.5
Mutual Conductance	- 3.5mA/volt

——the best we can say for this valve, the Mullard P.M. 2A, is that it is far and away the most popular power valve on the market. Thousands are in use every day and thousands are sold weekly.

The P.M. 2A is designed for use in a 2-valve receiver or a 3-valve receiver with one L.F. stage, bearing in mind the volume required for the average sized room and the importance of battery and accumulator economy.

PRICE 8/9

MADE IN ENGLAND

The following Mullard Valves are specified for the new Regional Three Receiver described in this issue:—

P.M. 1 HL. P.M. 2 DX. P.M. 2 A.

Mullard

THE · MASTER · VALVE

Advt.: The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C. 2.

ARKS

On Your Wavelength!

WHAT A BOON!

RECENTLY, I have been making a stay in a little village ten miles from the nearest town—in the very depths of the country in fact. But for wireless the inhabitants would have hardly any kind of entertainment available, the only interludes being a weekly visit by a portable movie plant and a yearly one by a travelling circus. In the circumstances, it wasn't surprising to find that a very large proportion of homes had wireless sets and, my word, didn't they just appreciate the benefits of broadcasting! This village is in the West country and by far the best received of the home stations is 5XX, or the Midland National, to give it its up-to-date name. This goes a long way to prove the truth of what I have always maintained, namely, that 5XX would be capable of giving fine service to the whole country if its power were put up to 100 kilowatts, or perhaps 200. There would then be no need of any other stations to radiate the National programmes. I am quite sure that some such scheme will have to be adopted eventually for there won't be room on the medium waveband for all the high-power stations now in existence, plus those that will shortly come into operation. In a few years, countries will have to reduce the numbers of their stations—one does not need to be a prophet to see that—and we can very easily do so by having a real big fellow on the long waves.

REAL CONTROL

I HAVE referred before now to the way in which the ether is policed in America. That country, of course, has the advantage of a central control authority which can impose its commands upon the 500 or so broadcasting stations that are in operation. Up to the present, the Federal Radio Board has allotted wavelengths with a 10-kilocycle separation and has allowed stations to wobble (provided that it was not done too often) by half a kilocycle. Anybody who deviated by more than this received a straight-from-the-shoulder warning, and if it occurred again his licence might be suspended, and probably was. Now the regulations have been tightened up and by the time that this note appears in print stations will not be allowed to stray by more than 50 cycles from their allotted frequency. In this way heterodynes between stations are made practically impossible. In Europe we have but a 9-kilocycle separation (and that largely on paper only). There is no particular limit to the amount of wobble allowed and the official black list prints only the names of those stations which deviate by more than 1,900 cycles, or thirty-eight times the amount allowed in the States. If only the countries of Europe would really get together at the Madrid Conference we could very soon put an end to all this heterodyning, interfering, and wavelength-wandering business.

IS IT EPOCH-MAKING?

FROM America comes news of an entirely new system of tuning wireless sets. Hitherto, two systems have been used. The oldest is that which makes use of a variometer. You don't often see these components nowadays, but at one time they were considered the very last word. In the variometer the inductance value of the tuning coils is actually varied, since one part of the windings of each is mounted on a ball-shaped former which rotates inside the other. The second system is, of course, the fixed-inductance-cum-variable-capacity method, employed in nearly all sets to-day. Both of these systems have distinct drawbacks under modern conditions of crowded wavebands.

Since the variometer is pretty well out of date, you needn't bother to consider it, but you know what happens in the set with variable-tuning capacity. First of all, even though you use straight-line frequency or log mid-line condensers, the tuning always seems much sharper at the top of the waveband covered by the circuit than it does at the bottom, whilst signal strength falls in just the opposite way. Secondly—and this is very important—a sensitive set may tend to become unstable near the bottom of the waveband covered owing to the small amount of parallel capacity then in use. Thirdly, owing to its small parallel capacity and to the lack of damping that is a consequence, atmospheric interference may be much worse when you are listening to, say, Nuremberg on 239 metres than when Prague on 489 metres is coming in. The new method of tuning, it is claimed, does away with all these drawbacks and brings in addition many advantages. It is known as permeability tuning.

THE NEW TUNING

AND what exactly does that mean? If you care to make a little experiment you can very soon see how it works. Tune your set to, say, the London National and then leave the variable condensers alone. Take a poker or any other piece of iron and move this gradually into the field of the tuning coil. You will find that as you do so the tuning is completely altered. You may, in fact, be able, without touching the condensers, to get rid of the London National and to tune in some other station on a higher wavelength. The strength of the other station, though, is likely to be rather poor owing to the heavy losses introduced by eddy currents set up in the iron core which you are inserting into the coil. Iron cores for high-frequency coils and transformers were very popular some years ago in France, in spite of their relative inefficiency. One reason for their popularity was that coils using them could be made extraordinarily compact. In permeability tuning a remarkably clever method has been found of retaining the effects produced by an iron core whilst at the same time getting rid of eddy-current losses. The introduction of an iron core does not actually vary the inductance value of the coil. What it does is to vary the permeability of its field and therefore to alter the resonant frequency.

HOW IT IS DONE

THIS has been accomplished in a rather wonderful way. First of all, it is known that iron can be pulverised so finely that the resulting dust will actually float in air. Experiments showed that iron reduced to particles averaging 1/2,500 part of an inch in diameter, could be used satisfactorily for permeability tuning and a means was found of surrounding each of these with an insulating layer about 1/5,000-inch in thickness. To make the core the iron particles are blended with bakelite and moulded into cylindrical shape. Owing to the minute size of the particles and to the fact that each is insulated from the other, eddy-current losses are reduced to something quite negligible. Further, the core can be so shaped that constant selectivity and constant efficiency are obtainable over the whole waveband covered.

FUTURE POSSIBILITIES

ANOTHER enormously important advantage is that coils can be ganged for tuning purposes with the greatest of ease and that their physical size can be made astonishingly small. Permeability coils no bigger than an ordinary cotton reel have been constructed with a high-frequency resistance no greater than that of coils 4 inches in diameter. Since no ganged condenser is required, there is a great saving of space and a further saving results from the fact that single coils can be used instead of H.F. transformers. I am bold enough to predict that in the future we shall see very wonderful results with this new method of tuning and from what I have read about it, I believe that it does represent something like a revolution in wireless reception.

WHAT IS TO BE DONE?

IT is but cold comfort to the fellow whose loud-speaker is humming like a hive of bees to tell him that all will be well once the regional grid scheme is completed and he is taken over to standardised A.C. He naturally wants the bird in the hand rather than the problematical two in the bush. Much can be done in many cases by using a smoothing circuit of chokes and condensers between the mains and the set, but even this may fail. The best advice, I think, to D.C.-ites is to make inquiries in the district before installing an all-mains set. If you find that those who have them receive every programme with a kind of R.A.F. Pageant background (or it may even be foreground) then pin your faith to

On Your Wavelength! (continued)

batteries. You can make the most effective use of the mains by using accumulator batteries and charging these yourself when they need it.

LARGE AND SMALL

IT'S the small things that count, as Newton might have said when he invented the Infinitesimal Calculus. At all events, they cannot be ignored in wireless. For instance, the current in the grid circuit of a thermionic valve is a comparatively insignificant quantity, but it plays a large part in rectifying the signals. Then again, capacity coupling between the valve electrodes is only to be measured in micro-microfarads, but it hampered the development of H.F. amplification for a long time before it could be successfully tackled, first by the neutrodyne and then by the screen-grid valve. Even now, it isn't altogether gone. There is always a certain residual capacity feed-back inside a screen-grid valve, which is apt to loom large at times.

SCREEN-GRID CURRENT

OF course, the screening grid in a screen-grid valve always takes a small amount of current. It is bound to do so since it carries a high positive voltage and stands in the path of the electron stream flowing from the filament to the plate. Like the ordinary grid current, this can also be made to serve a useful purpose. For instance, if a high resistance is inserted between the S.G. and H.T. positive, it is possible to obtain an "automatic" regulation of signal strength very similar to that secured by using a variable-mu valve.

An increase in signal strength produces a larger S.G. current, and this, in turn, increases the potential drop across the series resistance. In other words, the effective bias on the screen-grid is lowered and the efficiency of the valve falls off. Similarly a reduction in signal strength increases the positive bias on the screening-grid so that the efficiency of the valve automatically rises. This helps to maintain the output from the set at a constant level, irrespective of fading or other fluctuations in the incoming signal.

PARASITIC OSCILLATION

SOME of the high-slope detectors which are being used to-day have a nasty habit of breaking into a parasitic oscillation. When the reaction control is brought up, the receiver goes into an oscillation which is not the proper one and this either has the affect of making the set go "dead" or of causing a growl or whistle if the low-frequency stage is inclined to be unstable. I had this trouble not so long ago and found that with one type of valve the circuit was quite O.K., while with a similar type of another manufacture this awkward parasitic oscillation appeared and completely spoilt the reception. The circuit used was quite a normal one, therefore I could find no reasonable explanation for some time. I could, of course, be satisfied with the set with the valve which actually did work, but somehow I felt that I should like to get to the bottom of the difficulty and spent some time worrying over the cause.

A POINT TO WATCH

EVENTUALLY, I found this to be due to a long cathode lead (the valve was an A.C. valve), and I shortened this lead to about 2 inches which completely cured the trouble. As far as I could make out the inductance of the relatively long lead in the grid circuit was tuning with the self capacities of the circuit to some very short wavelength, and there happened to be a corresponding tune somewhere in the anode circuit which was sufficient to enable self-oscillation to be maintained in view of the high efficiency of the valve. By keeping the cathode lead as short as possible I was able to cure the fault although I can quite believe that a long grid lead would cause just the same amount of trouble. It rather goes to show that with the improved valves of to-day it is necessary to pay particular attention to the layout of one's receiver, and not to take anything for granted.

A HOME-MADE IDEA

AS a matter of interest, I have just converted a plain radiogram switch myself, so that it now does switch the H.F. stages on and off as required. You can very easily do it for yourself if you can find a switch with a fairly long end to its spindle. On to this you fix a short metal arm. You then mount two contact leaves of an old jack on a small block in a suitable position. The leaves are so arranged that when the switch knob is turned to the "Radio" position, the aforementioned lever presses them together and makes contact between their points. On turning the knob to the "Off" or the "Gram" positions, contact is broken. The making and breaking of the contact between the leaves, of course, switches the filaments of the H.F. valves on or off.

A LONG-STANDING GRIEVANCE

THOUGH we get far more of the desirable echo effect nowadays than we used to from broadcasting studios, there are still times when one feels as if a soloist or a singer were performing in a padded cell. I don't know how readers feel on the point, but I simply cannot listen with any pleasure to quite a number of the broadcast vocal and instrumental turns, simply and solely because the absence of studio resonances makes reception sound so dead and unnatural. You notice all the difference in the world when an item is broadcast from the big studio or from a concert-hall or a theatre. The difference to me between items accompanied by sufficient (but not too much) echo is just that between a "flat" photograph and a stereoscopic view. The B.B.C. has a wonderful outfit of appliances for providing echo effects, but at the present time, for some unknown reason, it appears to be making rather less use of them than it did. Certainly the padded-cell effect has been very noticeable lately when soloists have been performing before the microphone.

THERMION.

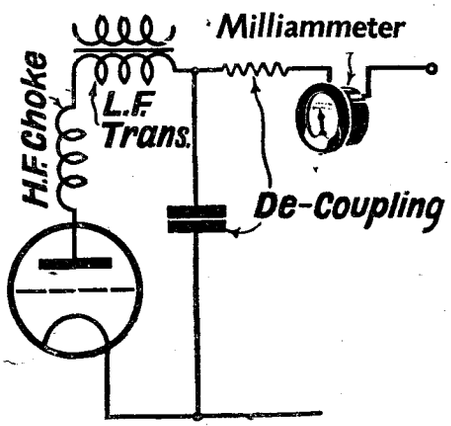
The Bournville Male Voice Choir makes its first appearance before the Midland Regional microphone on June 26.

PERSONALITIES IN THE WEEK'S PROGRAMMES

Get Your Ganging Right!

All constructors with sets incorporating gang condensers should read this practical advice by ALAN HUNTER, who shows how to obtain a visual indication of tuning adjustments

BEFORE you can hope to get the best out of a modern set with ganged tuning you must adjust the individual trimmers on the gang condenser. This is not always as easy as it sounds. In fact, many readers must fail to obtain the results claimed for sets described from time to time in these pages simply because there is some inaccuracy in the ganging.



This skeleton circuit shows the correct position for the insertion of a low-reading milliammeter to ensure correct ganging. Note the meter is connected to the high-tension-positive end of the detector circuit

I do not wish to imply that ganging-up a set is a job only to be tackled by the expert. Even the novice, under certain conditions, may well and truly gang up a set, as I hope to show.

The first thing that strikes me is that tests of tuning-condenser adjustments carried out by ear—by noting how much louder or softer the signal is heard on making an adjustment—are likely to be misleading. The ear is too accommodating to detect the minute differences that nevertheless are very important in ganged tuning.

How, then, shall we ensure accurate ganging? I suggest that a visual indication, as given by a meter, is the best method. Anyway, it is the method adopted in testing out all the ganged sets published in this journal.

What you need is a milliammeter, preferably one reading from 0 to 5 milliamperes and this is inserted in the anode circuit of the detector valve, as near the high-tension supply end of the circuit as possible.

Such a meter virtually converts the detector into a valve voltmeter, though, of course, the readings are in milliamperes and not in volts. For our purpose the absolute readings are not important, since the idea is to obtain some indication of the *relative* effect on the detector anode current of various gang-condenser settings.

It is obvious that when the gang condenser is accurately adjusted the maximum detector-current change will be obtained. In practice it will be found that the milliammeter will read the standing anode current when no signal is being received, but that as soon as a carrier wave is impressed on the grid of the detector, the anode current will *decrease*. The stronger the signal the greater the needle deflection.

Unless the detector is hopelessly overloaded, the needle will remain quite steady, even when the carrier wave is modulated. So you can tune in a broadcast programme and get a steady needle deflection in the detector milliammeter.

Test Each Section

As each section of the gang condenser is correctly adjusted the effect on the needle of the meter can be noted. The idea is to adjust each trimmer in turn until the maximum deflection is obtained.

This process should be systematically carried out. Tune in some signal at about the middle of the scale, and then adjust the first trimmer, at the same time rotating the gang condenser as a whole. Get the maximum needle deflection for the first trimmer and then start on the second trimmer.

Again move the condenser dial in conjunction with the trimmer, and again see that the maximum deflection is obtained. The process is repeated for the third trimmer, assuming a three-gang condenser is in use, and a still further deflection will probably be obtained.

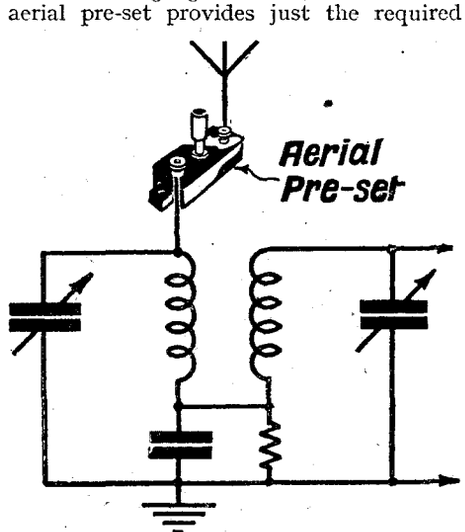
That, in brief, is the procedure, but there are one or two points to bear in mind. If the signal on which tests are made is a local, or a very strong foreigner, take care to reduce the input so that detector overloading is avoided, otherwise a steady detector-current reading cannot be obtained on the milliammeter.

Often in gang-condenser sets, such as three-valve band-pass sets with two aerial-tuning circuits and an inter-valve tuning circuit, there is an aerial pre-set condenser.

This should not be regarded as a volume control, even though it is possible to decrease the volume by reducing the signal input to the band-pass-tuning circuit. Rather, this condenser should be looked upon as an aerial-load adjustment, enabling a final correction of gang tuning to be made.

After all the trimmer adjustments have been visibly checked up as described, it is most instructive to adjust the aerial pre-set condenser. It will often be found that a greater deflection is obtained when the condenser's setting is *reduced*, showing that a reduction in the signal input does not necessarily mean a reduction in volume output, for the greater the deflection of the needle the greater is the signal handed on by the detector to the power stage.

Often in gang-condenser circuits the aerial pre-set provides just the required adjustment in the aerial tuning. A reduction in the aerial load has the effect of reducing the capacity across the first section of the gang condenser, and once the correct load condition for ganging has been found the pre-set should not be altered.



The aerial pre-set in this circuit of a band-pass input to a high-frequency stage is used for adjusting the aerial load, and not for varying the volume

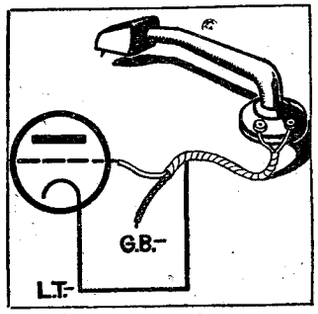
Volume should be controlled by some other means, such as a screen-grid potentiometer. There is no doubt that many ganged sets fail because the pre-set is wrongly used—adjusted as a volume control, thereby upsetting the ganging.

USEFUL RADIO-GRAM HINTS AND TIPS

Here are some suggestions for improving radio-gramophones, controlling volume, changing the tone, facilitating switching and so on.

Earthing the Leads

IT is general practice nowadays to use metal braided wire for the pick-up connections. This is a safeguard against interference. In some cases it is sufficient to have the braided wire for the grid and bias leads, but in other cases it is a good plan to earth the outer covering. Where aluminium sheathed wire is used, a soldered connection cannot be made, but some ordinary copper wire can be

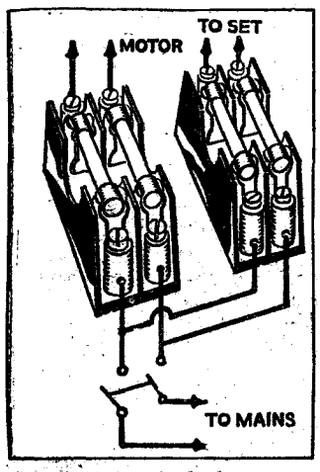


Earthing the shielded pick-up wiring

bound round the outer covering and connected to earth or negative L.T. Where the motor-board is covered with metal foil, as described in another hint on this page, both the metal braiding of the pick-up leads and the baseboard foil can be connected together and to earth, if necessary.

Safety First !

WHEN operating the turntable motor and the set unit of a radio-gram. from the mains, it is advisable to have separate fuses for each side. The accompanying diagram shows two sets of miniature fuse blocks, connected to a two-pole single-throw switch, and the



Fuses in each mains lead to gramophone motor and amplifier

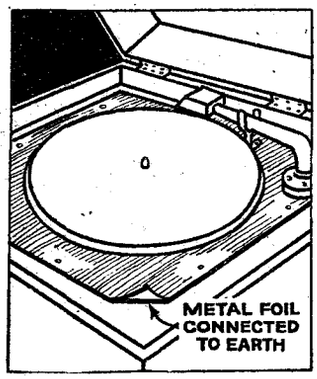
arrangement provides adequate protection. The switch can be of the ordinary spring-loaded make-and-break type, one pole being in each circuit of the mains. There is a fuse in each mains lead, both to the motor and to the set. The fuses and all this part of the wiring should be kept well away from the set connections, for otherwise you may get induction between the mains and the low-frequency side of the radio-gram amplifier.

Fitting a Volume Control

DO not fit the volume control on the baseboard, for otherwise you will have to lift the cabinet top each time you want to make an adjustment. The proper place for the control is at the front or side of the cabinet. Many makes of pick-up make a rattling noise while playing and the lid must be kept shut to prevent this being heard. If the volume control is mounted on the front of the cabinet there will be no temptation to leave the lid open.

Cutting out Hum

IT is sometimes not easy to prevent an electric gramophone motor from causing a hum or ripple to be heard in the gramophone reproduction and this is due to induction between the

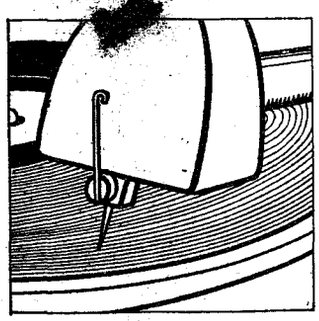


Preventing turntable interference with the gramophone amplifier

winding in the pick-up head and some part of the gramophone motor. Whilst small D.C. motors can have large fixed condensers shunted across the brushes to cut out any motor interference, A.C. motors are not so easily dealt with. The easiest plan is to screen the motor drive from the pick-up. A layer of thin metal foil should be cut, allowing a generous appearance around all fixing holes for the motor, and lightly tacked to the motor-board. Take care that it does not short-circuit any mains connections. The pick-up can be screwed down to the foil and board. The wires should pass straight through the foil. Occasionally more complete freedom from hum can be obtained by earthing the foil, taking a short flex lead to the earth terminal of the set. In other cases it is best left disconnected.

Changing the Needle

A HALF turn or so is all that is usually needed on the tiny thumbscrew which grips the needle in the pick-up armature. To save tiresome fiddling, a small extension piece can be fixed to the head of the thumbscrew, so that it can be used as a trigger to clamp the needle.



A useful idea for facilitating needle changing

A piece of wire an inch or so in length and linked at the end for convenience, can be attached to the thumbscrew by a spot of solder. The extension should be as light as possible, for it must be remembered that it is part of the vibrating sound system.

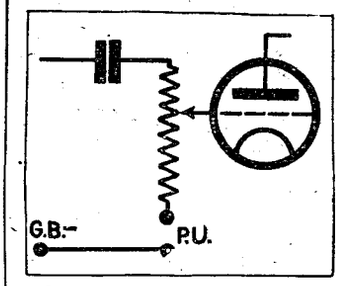
If it is too weighty it will affect the tone and probably cause a buzzing noise.

Changing from Radio to Gramophone

THE normal two-way radio-gramophone switch changes suddenly from radio to gramophone reproduction, but it is often more convenient to have a gradual fade. There are many ways of achieving this, one of the simplest being shown in the accompanying diagram. Here the winding of the volume control and fader potentiometer, in series with the pick-up, is used as the grid leak of the resistance-capacity stage following the detector.

As the slider of the potentiometer is moved from one end of the winding to the other, the radio reproduction will be faded out and the pick-up brought into circuit and *vice-versa*. In approximately the mid position of a potentiometer the volume will be at minimum.

For this reason you must use a high-resistance potentiometer, so that a complete fade-out is assured. It is this type of fader control which the B.B.C. engineers use for fading from one "effects" gramophone to another in the control room.



Connections for a fader control

This system of fading can be modified for use in the detector stage, but as it stands is not suitable as negative bias is applied to the grid which would upset the rectifying action.

Positioning the Needle Cups

FIT the "waste" needle cup immediately beneath the pick-up head when it is swung away from the turntable so that used needles can drop straight into it. A flush-fitting type of needle container is best here, so that the waste needles will drop straight in and not get caught under any component on the motorboard.

Cutting Out Turntable Slip

THERE are a number of large rubber discs available for putting on the gramophone turntable, in order to prevent record slip. A good emergency device of this nature, though, is a large-sized cork table mat. A small hole can be cut in it for the turntable spindle and it will provide a resilient and non-slip bed for the record.

A Limit to Volume

A VOLUME control which gives easy regulation may, perhaps, be of a type which does not cut the volume down sufficiently. In this event an additional resistance may be shunted across the pick-up to reduce the voltage output. Too high a value should not be used or the tone will be changed. Quite a high value of resistance shunted across the pick-up, though, will make a difference to the voltage output, and will enable a lower volume to be obtained on the minimum position of the normal volume control.

Our Broadcast Critic TALKS ABOUT RADIO DRAMA

G. H. ELLIOT
the well-known coon singer

THERE is all the difference in the world between a microphone play and a play adapted for the microphone. However well a play may be adapted, however well its various effects may come through, there is nothing quite like a play that takes full advantage of the possibilities of wireless transmission and being written for that purpose alone.

The Squirrel's Cage was easily the best microphone play I have heard. I point to it as being an example to copy for future use. The whole production left a deep impression on me because it dealt with a single theme in such a way as to produce a single thought in my mind.

I imagine anyone, listening to this play, realised that every line of it was intended to portray the monotony of a man's life. Even if one missed some of the lines the interludes surely were strong enough to convince the listener that Henry Wilson's existence was one of routine as was his father's before. Had Henry listened to his aunt he might have lived instead of merely existing.

Did you notice the monotony of the musical prelude? Three notes only; three miserable, almost morbid notes, repeated *ad nauseam*. Did you notice the insistent repetition of the speaking chorus in the interludes? Everything cut on the square; a narrow life; a man who wore blinkers all his days.

I cannot visualise that play on the stage at all; such effects would be unreal if you had scenery in front of you. No; it was a microphone play, a play that demanded your ears and *just enough* imagination, a play that wanted no scenery, no lighting—nothing but sounds.

I should like to congratulate the author, Mr. Tyrone Guthrie, on having set an example in microphone plays. I did not hear the production in 1929, but I am sure that the recent presentation must have been far in advance of the earlier one.

◆ ◆ ◆

The last of the "Songs from the Shows" was an attractive *finale* to an attractive series. I am still of one opinion regarding the value in the musical sense of the older songs compared with the newer. We have gone to America for our style in the latest songs and we have, of course, suffered accordingly. We have imported a musically impossible type of singing, faulty to the last degree; we have imported American speech that disgusts every cultured being; we have imported a monotonous rhythm that has turned the best of us almost sick. Personally, I have no use for anything that comes from America in the artistic line. Whil[illegible] were true to our English idiom we w[illegible]ood songs and we sang them well.

I listened to G. H. Elliott, the Chocolate-coloured Coon, whom I can remember from my boyhood. He sings just as well, if not better, than he ever did; apparently he dances as well also. He is a good example of what I am talking about. Did you notice how he sustained notes and held them through the accompanying change of chords in the orchestra? How many of the adenoidal singers of these days could hold any note longer than six seconds? I maintain that these old songs needed singing.

Look at the list in the programme of the last of the "Songs from the Shows": Anona Winn, Olive Groves, Reginald Purdell, George Baker, Leonard Gowings, Phyllis Dare. Why were they asked? Simply because those songs needed singers. Do you think we should employ them for modern dance-refrains? Of course not; we employ adenoidals—singers who know nothing of their art. I see that several press critics are loud in their condemnation of the decadence both in music and singers. It is time to banish the American style and re-form our own English idiom.

◆ ◆ ◆

I listened with considerable enjoyment to the third "Miscellany." The first two I did not enjoy nearly so much; you may remember I asked that morbidity should be avoided. The third "Miscellany" was entirely devoid of that unwanted quality. It turned out to be an hour of nonsense. Some of it was very clever nonsense, too.

The point about it that appealed to me was that there was some extraordinarily good reciting. I am a lover of English and always enjoy a good speaking voice. I should like one of these transmissions—a particularly smart one with some telling satire—to be transmitted to the U.S.A.

◆ ◆ ◆

Of course, you heard A. J. Alan? Well, did "Mrs. James" murder her husband or not? I have never thought there is any justification for the theory of reincarnation, but if there is, then all I can say is that A. J. A. must be the reincarnation of the originator of the Arabian Nights entertainments. That is the question: Did A. J. Alan (in a previous existence) originate those stories?

◆ ◆ ◆

I expect you heard the merry Tattoo. You can *have* a tattoo so far as I am concerned. Very noisy; indistinct at times; made bad broadcasting; needed to be seen. Never again for me!

◆ ◆ ◆

Did you hear the fourth "Hazard"? I thought Commander Stoker presented his story very convincingly. I imagine this series is going to have a run, especially if handled as well as in this case. The speaker who can rivet his hearers' attention in that way *is a speaker who takes no hazard*. He is a sure thing.

◆ ◆ ◆

One or two vaudeville turns attracted me. Nosmo King and Partner gave the best turn I have heard from them so far. That was because they did not speak so loudly. Even so, a little more restraint will bring their points over better. It is useless to bawl at a microphone.

◆ ◆ ◆

Jenny Howard was really good. I point to her as the type of broadcaster greatly needed in vaudeville. She played to the listeners, not the studio audience. Good broadcasting; good for Jenny!

WHITAKER-WILSON.

PROGRAMME POINTERS

The transmission of "The Squirrel's Cage" proved that wireless plays need to be written specially for the microphone to be really successful. I offer the suggestion that less money be spent upon relaying plays from outside sources, or even upon adapting plays originally produced at London theatres, and that the play department shall concentrate on getting good plays written. The new effects from Broadcasting House are far in advance of anything ever sent out from Savoy Hill. My suggestion is that the B.B.C. shall make a speciality of these effects, even to the extent of publishing a complete list of those they have already in stock, so to speak, as well as setting about adding to them. It should be possible to produce any effect, no matter what it is. If a full list were published, and playwrights were encouraged to produce work specially for the microphone, I am sure wireless plays would become increasingly popular. They will never be as acceptable as they might be until authors realise that it is necessary to select a theme and rigidly adhere to it. The success of "The Squirrel's Cage" was due entirely to the development of a single theme. I suggest that money be spent on special plays written for broadcasting alone. Money spent on relays has often been wasted.

The NEW REGI

An economical and easily constructed three-valver which will give fine reception with the

REGIONAL reception calls for a set of a rather special type. The three-valver described here and illustrated by the accompanying photographs is just what you need.

There are no "frills" about it. It is a straightforward three-valver, easy to control, selective in tuning and capable of giving quite a fair output. It is economical to work and so simple to tune that it can be worked by the non-technical members of the family.

A Regional set must fit in with the special demands of the B.B.C. Regional scheme and for local reception, at least, it is wasteful to use a set of any other type. In the old days a set of this kind would have been known as a "local station" receiver, but owing to the much greater field strength of the Regional stations at Brookmans Park, Slaithwaite, and Westbrook, such a set nowadays must be capable of dealing with a considerable voltage input without overloading the detector.

Simple Tuning

There is no need for high-frequency amplification because the detector, followed by two good low-frequency stages, is quite capable of receiving the local transmission and the leading foreign stations. By cutting out the high-frequency amplification, tuning is very simple. There is no ganging to be done, there is only one main tuning control. The reaction adjustment is not critical.

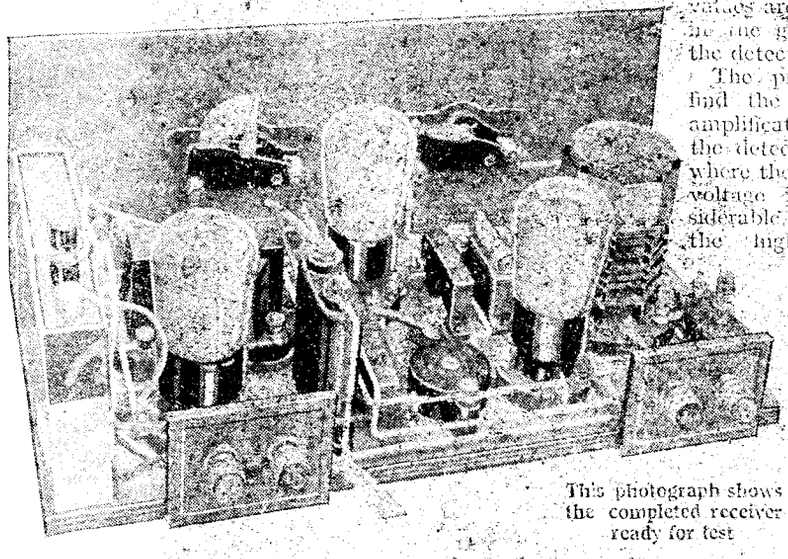
Inside the set, too, the construction is facilitated. There is only one tuning coil, for example. In a set of this type there is no special point in having power-grid detection. The ordinary leaky-grid idea works quite well enough, and conventional values are to be found in the grid circuit of the detector here.

The problem is to find the best kind of amplification to follow the detector in a set where the initial signal voltage is quite considerable, but where the high-tension demands must be kept within bounds.

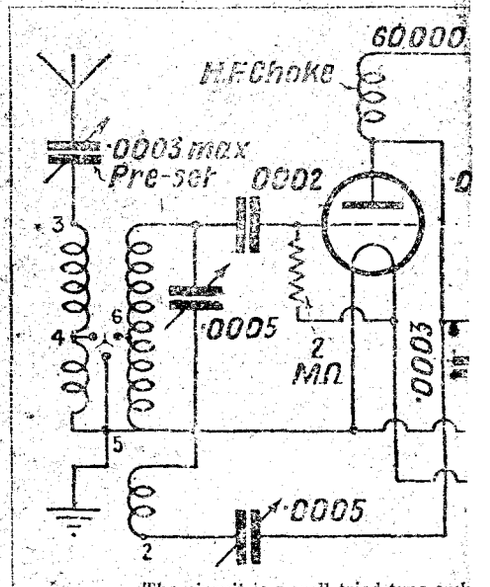
If transformer-coupled amplification followed the detector, then the stage after this first L.F. valve would have to carry quite a considerable grid swing and would have to give an output of the kind necessitating 200 or 300 volts high-tension. This kind of supply is not economical, nor is it easily possible where batteries are used. The maximum voltage must be in the neighbourhood of 120 and so the final output stage must be designed with this potential in mind.

Easy Construction

The question is answered in this Regional three-valver by using an intermediate stage of resistance coupling. The resistance-coupled stage follows the detector. The arrangement can easily be seen in the circuit diagram. If you do not want to bother yourself with technicalities, then



This photograph shows the completed receiver ready for test



The circuit is a well-tried type emb

COMPONENTS FOR "THE NEW REGIONAL THREE"

Three-ply panel 12 in. by 5 in. and seven-ply baseboard 12 in. by 6 in. (Camco, Peto-Scott).

Two .0005-mfd. bakelite variable dielectric condensers (Lissen, Polar, Telsen, Utility).

Three-point shorting switch (Bulgin "Junior," Lissen, Readi-Rad, Wearite, Tunewell).

Filament switch (Bulgin "Junior," Lissen, Readi-Rad, Wearite, Tunewell).

Three 4-pin valve holders (W.B., Lissen, Telsen, Lotus, Clix, Wearite, Junit, Benjamin).

Dual-range aerial coil (Lotus).

.0002-mfd., .0003-mfd. and .006-mfd. fixed condenser (Telsen, Lissen, Dubilier, T.C.C., Formo, Ormond, Graham-Farish).

2-megohm grid leak (Lissen, Dubilier, Graham-Farish, Telsen).

½-megohm grid leak with wire ends (Lissen, Dubilier).

.0003-mfd. maximum pre-set series aerial condenser (Sovereign, type "J", Formo, Ormona, R.I.).

High-frequency choke (Lewcos, type M.C., Lissen, Lotus, Telsen, Wearite, Climax, Varley, Igranic, Tunewell).

Low-frequency transformer (Lissen "Torex" Telsen, Lotus, Igranic, Varley, Ferranti, R.I., Climax).

1-mfd. fixed condenser (Dubilier, Lissen, T.C.C., Telsen, Sovereign).

ONAL·THREE

Regional Service areas of main stations. This set gives very pure tone and is easy to control

study the set layout and the photographs, and see for yourself how the parts are arranged.

The layout is so simple. On the front of the set (a wooden panel is used) there are only two condenser knobs and two switches. The right-hand switch, looking at the set from the front, is the on-off control, while that on the left is the wave-change switch.

The left-hand condenser is the aerial-tuning control, while the reaction condenser is on the right.

The baseboard layout is just as simple, the grid-bias battery is in clips on the right-hand side, so that there are no long trailing wires. The aerial and earth and speaker connections are taken to terminal blocks at the back of the baseboard, while two groups of twisted flex connect up with the accumulator and high-tension battery or mains unit.

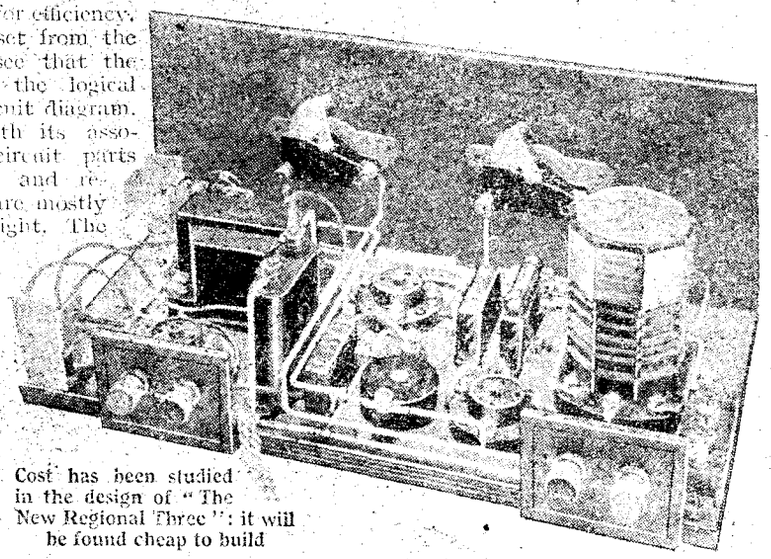
The set is very compact, but the parts are not so crowded together that there is any difficulty in wiring. The short leads, of course, make for efficiency. Looking at the set from the back you will see that the layout follows the logical order of the circuit diagram. The detector with its associated tuning circuit parts (coil, condenser, and reaction control) are mostly grouped on the right. The series aerial condenser, which is of the pre-set variety, is on the right edge of the baseboard, quite close up to the aerial terminal.

On the other side of the detector-valve holder are the resistance-coupling anode resistance and condenser, while close up to the valve holder of the resistance-coupled stage are the anti-motor-boating condenser and resistance for the power valve. The power-valve holder, coupling transformer, and the grid-bias battery for both low-frequency stages, are all grouped together on the left-hand side of the set, while the output speaker terminals are right up against the valve holder.

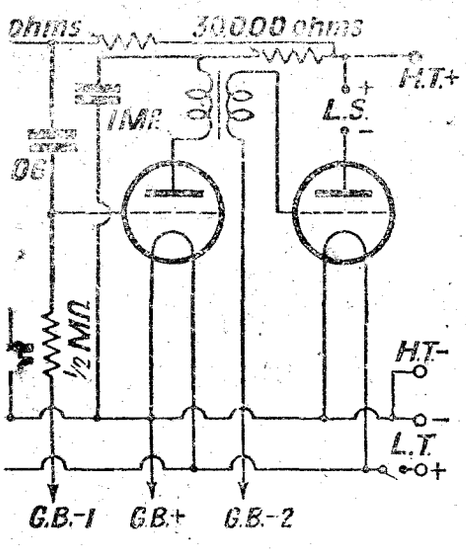
Cheap to Build

All these points you can quite easily see from the wiring diagram. This you should note is a small scale reproduction of the full-size blueprint of this set. The layout shows the salient features, but when you come to the constructional work you will realise what an advantage it is to have the full-size print. From it you can obtain the exact drilling centres, while the wiring is given as nearly as possible in its exact position. These are numbered to show the best order of wiring.

It should be unnecessary to stress the fact that the set is cheap. A brief glance at the list of components makes this point obvious. The efficiency is in no way reduced by the use of inexpensive parts. The tuning, tone and general finish reach a most satisfactory standard. In the components list a number of alternatives are given which can be used if the first-mentioned parts are not available. The set illustrated by the photographs was



Cost has been studied in the design of "The New Regional Three": it will be found cheap to build



odying detector and two L.F. stages

COMPONENTS (Continued)

Two terminal blocks (Sovereign, Junit).
Four terminals marked Aerial, Earth, L.S. +, L.S. —, (Belling-Lee, Clix, Eelex).
Two spaghetti resistances, one 60,000 ohms and one 30,000 ohms (Tunewell, Bulgin, Lewcos, Igranic, Varley, Lissen, Readi-rad, Telsen).
Connecting wire (Glazite).
Two yards thin flex (Lewcoflex).
Five wander plugs marked H.T.—, H.T.+, G.B.+, G.B.—1, G.B. -2 (Belling-Lee, Clix, Eelex).
Two spade terminals marked L.T.+, L.T.— (Belling-Lee, Clix, Eelex).
Pair of grid bias clips (Bulgin).

ACCESSORIES

120 H.T. battery (Ever Ready, Lissen, Pertrix, Drydex).

9-volt G.B. battery (Ever Ready, Lissen, Pertrix, Drydex).

2-volt accumulator (Exide, Lissen, Ever Ready, C.A.V., Pertrix, Fuller).

Mains unit (Atlas AC244, Ekco, Tannoy, Lissen, Regentone).

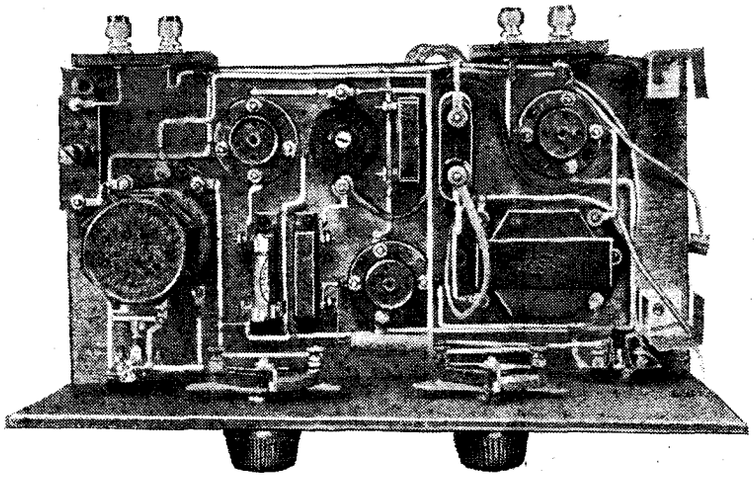
Loud-speaker (R. & A., type 40, Blue Spot, Rola, Ormond, W.B., Lissen).

"THE 'NEW REGIONAL THREE'"

(Continued from preceding page)

actually built from the first-mentioned selection of parts.

Get your copy of the full-size blueprint when ordering the components. The print costs only 1s., post free, and can be obtained from the Blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4.



This plan view shows clearly the disposition of the parts and connections which are given in detail in the layout diagram below

The placing of the parts is quite obvious from the print and wiring diagram. Both the tuning and reaction condensers have the same value. They are both .0005-microfarad components. The grid condenser and leak have values of .0002-microfarad and 2 megohms respectively. The anode coupling resistance is a 60,000-ohms job, while the coupling condenser has a value of .006-microfarad. A 1-microfarad condenser is used for decoupling in the filter circuit in series with the primary of the transformer. A 30,000-ohms resistance is put in series with this winding. Flexible resistances are used at two points in the set. These are very convenient to wire and take up so little space.

As a wooden panel is used, there is no complicated drilling to be done. Plywood is used both for panel and baseboard. It is advisable to mark out the drilling centres, using the blueprint as a template. Don't forget when drilling the condenser and switch holes, that there must be three small holes along the lower edge for the fixing screws. In order to save time in mounting the baseboard parts, prick the screwholes through from the full-size print.

That is not quite the end of the story, though, so far as the baseboard mounting is concerned. You must be careful to get the parts the right way round. The coil has the terminals numbered 1, 2, and 3 towards the rear edge of the baseboard. Make sure that the valve holders are the right way round with the anode sockets in the directions shown. If you get them the wrong way round, you will find the wiring unduly complicated.

The G. and G.B. terminals of the low-frequency transformer face the rear edge of the baseboard.

When you start the wiring you can, if you prefer, delay the mounting of the panel until some of the baseboard wiring has been completed. The purpose of this is to give extra space in which to wield the soldering iron. As the set is compact it is worth while taking the little extra trouble involved in soldering.

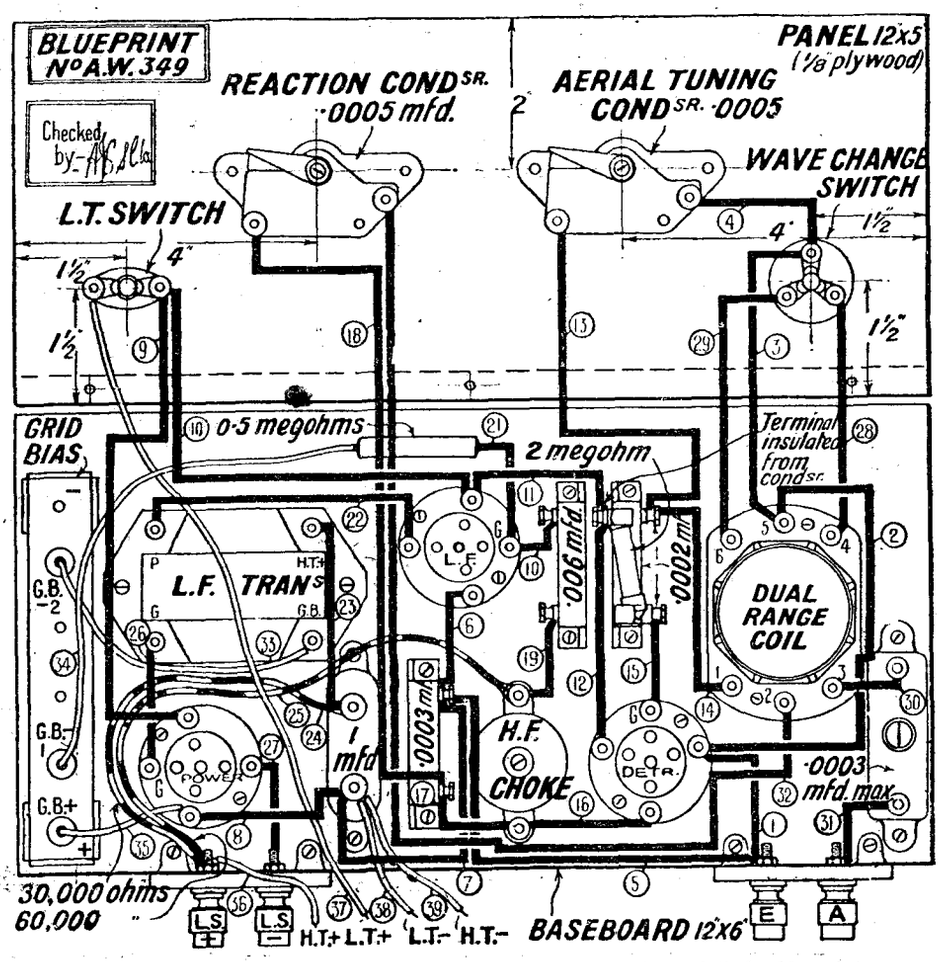
The point-to-point system could quite well be used, but would look a little untidy. If the point-to-point system is used, then quite a number of the shorter wires will not need insulated covering. The photographs show the set wired on the square-corner system and you can see how neat it looks.

The battery flexes and the three short leads to the grid-bias battery are joined on at their respective positions. Soldering is a great aid because in the case of the G.B.—1 connection, for instance, the set end of the flex is soldered direct to the short projecting wire on the grid leak of the resistance-coupled stage. The high-tension and low-tension battery flexes can be twisted each into separate groups when appropriate spade tags and wander plugs have been attached.

The rest of the construction is obvious from the blueprint and the only point to stress is the necessity of keeping the wiring nearly spaced. Interaction may otherwise result, which will cause whistling or howling when the set is worked with the normal operating voltage.

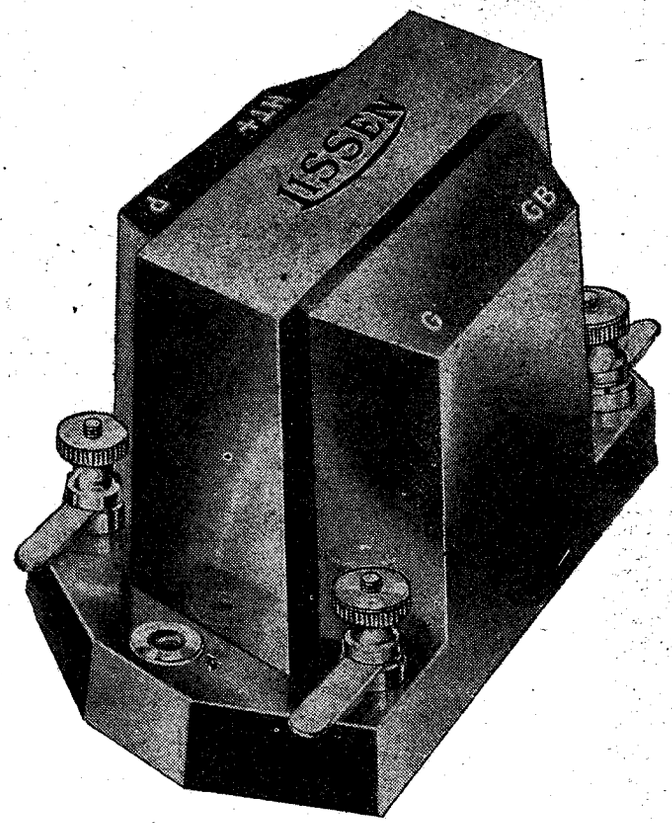
In next week's issue, details will be given of a first test of this three-valver and hints and tips will be given for getting the best out of it for Regional reception.

On July 5 one of the most thrilling plays of the year will be given in the National programme and repeated for Regional listeners on July 6. It is called *Flags on the Matterhorn*.



The layout and wiring diagram of the "New Regional Three." A full-size blueprint is available, price 1/-

SPECIFIED — in a hundred circuits!



This week in the "New Regional Three"

WHY do all the circuit designers specify the Lissen Torex Transformer? Because they know they cannot get any other transformer which gives such even amplification over all audible frequencies at anything like this price—because it makes a big cut in the cost of a receiver without sacrifice of quality—because it is a well-finished, well-designed component that is worthy of inclusion in any set.

The Lissen Torex is a high-grade silicon steel core transformer; its moulded bakelite case hermetically seals and completely insulates the windings. Atmospheric moisture cannot penetrate, therefore it never breaks down. PRICE **5/6**

LISSEN 'TOREX' L.F. TRANSFORMER

Also specified in the "New Regional 3"

Lissen Bakelite Dielectric Variable Condensers **2/6**

Lissen 2 megohm Grid Leak **1/-**

Lissen ½ megohm Grid Leak with wire ends **1/-**

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THE PICK OF THE MONTH'S RECORDS

A GUIDE TO THE BEST OF THE LATEST RELEASES.

The records reviewed below are a careful selection of the best of the recent issues. It will be noted that criticism is chiefly devoted to the treatment of the music and quality of recording rather than the actual composition.

ORCHESTRAL RECORDS

The Cat and the Fiddle—Selection, 4s. **H.M.V. C2379**
Here is an exceptionally clean performance by the New Mayfair Orchestra. The music, as such, is of no great quality, but is sufficiently of modern trend, to attract many people.

Simple Aveu and **Sizilietta,** 2s. 6d. **COL DB791**
These two old favourites by the excellent "Bohemians" are rendered with a judicious modern flavour. Everybody is bound to like this record

Pan and the Wood Goblins and **Black Eyes,** 1s. 6d. **WIN 5472**
The Commodore Orchestra and organ at their attractive best in two good numbers. I like the first immensely.

Sunshine Susie—Selection, 1s. 6d. **STERNO 911**
A bright performance of several of the best numbers by Bert Maddison's Orchestra.

Hungarian Rhapsody No. 2, 2s. 6d. **PANA 9003**
A twelve-inch record by the Milan Scala Orchestra. The performance is good in parts, and the tempo is not a little unorthodox here and there. (Surface noise is pronounced.)

Aisha—Indian Intermezzo and **A Night in Madrid,** 2s. 6d. **PANA 9004**
The first is a jolly, likeable tune, admirably played. The second (by Glinka) is not so good. But the Melotone International Orchestra is always worth hearing.

Norwegian Dance (Op. 35, Grieg) and **Marche Grotèsque (Op. 32 No. 1, Sinding),** 1s. 6d. **WIN 5487**
A very good performance by Colombo and his orchestra. The recording is round and full.

Poem (Fibich) and **Sanctuary of the Heart,** 1s. 6d. **WIN 5482**
Another generous contribution by the Commodore Orchestra, with the organ much in evidence. The real cinema, this.

Barn Dance and **The Veleta,** 1s. 6d. **WIN 5485**
Scala Salon Orchestra bring back—admirably—these splendid old dances.

March Rhapsody (German), 4s. **H.M.V. C2411**
The L.S.O. strive bravely with this composition, which, I think, does not do German justice. It is a difficult piece to follow and has an annoying characteristic of promising something good, and then—falling away.

BAND RECORDS

Coronation Bells and **Bells Across the Meadow,** 1s. 6d. **WIN 5479**
The Scots Guards Band are good in these unsophisticated pieces.

Carmen—Selection, 1s. 6d. **WIN 5490**
A fair performance, on the whole. I detected one or two passages which betray lack of preparation.

DANCE RECORDS

In the Bushes at the Bottom of the Garden and **There's a Ring Around the Moon,** 2s. 6d. **H.M.V. B6154**
Two fox-trots by Ray Noble's Orchestra. The first is an amusing vocal, the second a more orthodox, but uninteresting number.

By the Sycamore Tree and **An Evening in Caroline,** 2s. 6d. **H.M.V. B6160**
Played here in the one-hundred-per-cent American style by Paul Whiteman's Band. If you are of this school, you'll like this.

Dixieland, 2s. 6d. **H.M.V. B6163**
Here you are, all the old ragtime favourites as modern dance music. Ambrose and his Band go for it with great gusto.

Whispering and **Dinah,** 1s. 6d. **WIN 5468**
A very fair performance by Jock MacDermott's Covent Garden Band. Good xylophone playing in the first. Vocals poor.

Songs That are Old Live For Ever and **It Seems All a Dream, But It's True,** 1s. 6d. **WIN 5473**
Two good numbers by the above band.

Let's Drift Away on Dreamers' Bay and **Good Night, Little Girl,** 1s. 6d. **STERNO 907**
Sparkling performances by Bertini's Band. Here the vocals are good, as dance vocals go.

Delusions and **The Lady of My Dreams,** 1s. 3d. **IMP. 2674**
Clever playing with modern effects.

How Long Will It Last? and **All of Me,** 2s. 6d. **BRUNS 1278**
Two "out-of-the-rut" performances.

The Night Was Made For Love and **Try to Forget,** 2s. 6d. **BRUNS 1274**
These are very attractively played by Abe Lyman and Orchestra.

INSTRUMENTAL RECORDS

Suite Bergamasque (Debussy), 8s. **COL DX337-8**
Here is a work of extraordinary delicacy. This pianoforte performance by Walter Giesieking is notable for the beauty of touch and the life-like recording.

Concerto No. 1 in G Minor, Op. 26 (Bruch), 18s. **H.M.V. DB1611-3**
A violin concerto (Menuhin and the London Symphony Orchestra). The composition is interesting; there are movements of extraordinary beauty. The *adagio* movement on the second record should be heard.

Naila Waltz (Delibes) and **Polonaise Mignon,** 4s. **H.M.V. C2397**
A most attractive, artistic novelty. This organ and piano "duet," by Edith and Kevin Buckley, is fascinating and brilliantly executed. I imagine almost anybody will like this.

Songs Without Words, Op. 38 No. 6 and **Op. 19 No. 1** (Mendelssohn), 2s. 6d. **H.M.V. B4162**
Mark Hambourg shines brightly in these.

VOCAL RECORDS

The Hills of Home and **Tired Hands,** 4s. **H.M.V. C2375**
Two very, very delightful songs by Essie Ackland.

Gracie Fields Medley, 4s. **H.M.V. C2378**
The title tells the story. They are all there—*Ramona, Because I Love You, Charmaine,* and so on. A positive feast for her admirers!

The Gondoliers—Vocal Selections, 2s. **CRYSTALATE Z122**
Most of the solos are well sung. The record would have been vastly improved with greater choral strength.

Absent and **Sympathy,** 1s. 6d. **WIN 5481**

Auf Wiedersehn, My Dear and **Snuggled on Your Shoulder,** 1s. 3d. **IMP 2684**
Two attractive light numbers well sung by Morton Downey.

Danny Boy and **Mother Machree,** 1s. 6d. **FILMO 459**
Sung by Peter O'Flyn in authentic Irish style.

With All My Love and Kisses and **Tell Me with a Love Song,** 1s. 6d. **ZONO 6122**
I suppose Sam Browne can sing this type of song better than anybody else. If you like the titles, hear this.

Plaisir d'Amour and **Clair de la Lune,** 6s. **H.M.V. DB1625**
The best "song" record for a long time, and worth every penny of its price. Yvonne Printemps (with a harpsichord accompaniment) gives two utterly charming old songs with a sweetness and clarity too rarely heard. I ask everybody to hear this beautiful record.

MISCELLANEOUS RECORDS

Old Songs Never Die, 2s. **CRYS Z123**
This medley by Jack Payne's Band is just an ordinary affair.

Ham and Eggs and **Yea! Mos' Emfrantically,** 1s. 6d. **STERNO 921**
I don't like doing it, but I can only say this is a kind of "Alexander and Mose" turn. If you like that sort of thing, you will probably enjoy this.

Perry Werry Winkle and **Old Man Bluebeard,** 1s. 3d. **IMP 2685**
Two typical Sarony numbers, sung by—himself. There is nothing outstanding in either, but they are amusing.

Gooseberry Pie and **Two Little Girls in Blue,** 1s. 6d. **PANA 25199**
The gastronomic ditty is quite amusingly sung by Bradley Kincaird to a guitar. The second old thing is miscast; it was probably chosen as an excuse for putting over the word "blue" *à la* Lill-billy.

The Waltz that has made You Mine and **La Petite Madelon,** 1s. 6d. **WIN 5483**
Accordeons again. Anyway, the Cosmopolitan Band put over these good tunes splendidly.

"RECORDER."

SETS OF DISTINCTION

The LOTUS SUITCASE PORTABLE

Makers: Lotus Radio Ltd.

Price: 12 Guineas

NOW is the right time of year to study the enticing advertisements for portable wireless sets—and if you want music wherever you go there is much to be said for the suitcase type of portable exemplified by the Lotus model illustrated on this page. One must admit the utility of the suitcase radio set; for general tidiness and ease of transport the portables are so obviously necessary.

What do you get in a typical suitcase portable, such as the Lotus model under review? Firstly, a four-valve chassis, comprising a screen-grid stage, a detector and two stages of low-frequency amplification. Next, a loud-speaker of the balanced-armature type. Thirdly, a frame aerial capable of tuning on medium and long waves, enabling you to dispense entirely with the outside aerial and earth. Fourthly, and certainly not least among the items, the complete power supply, comprising high- and low-tension batteries and grid bias.

A Compact Receiver

When you remember that all this is contained within a suitcase of dimensions that make for easy handling, the inherent attraction of the portable wireless set is obvious. Well, you can obtain all this—a complete wireless receiving station—for the modest sum of 12 guineas, for that is the all-in price of the Lotus.

In its general design the Lotus portable follows convention. There is the usual divisioning of the main part of the case into compartments for the set chassis, the valves, and the batteries. Then, in the lid, which is of course hinged to the case, are accommodated the loud-speaker and frame aerials.

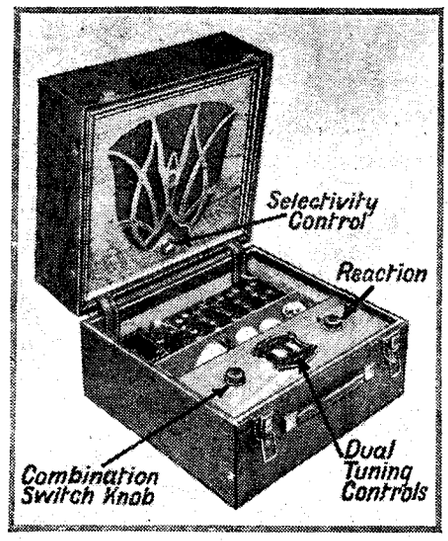
Controls are very simply laid out on the top of the set. Centrally mounted are two thumb-operated tuning discs, for the frame aerial and inter-valve tuning. These tuning controls are marked in wavelengths, and the inter-valve tuning gives the more accurate indication.

To the left of the tuning is the combined wavelength switch and battery on-off switch. To the right is the reaction control knob—and that is all. In the lid is a loud-speaker adjustment, but this can hardly be counted as a control. Below is a subsidiary control for use with an external aerial.

The valve combination is interesting. The first valve is a screen-grid, actually a Cossor SG220, the detector is a Cossor HL210, this being followed by a Mullard PM1HL, and the power output valve is a Mullard PM2A.

These valves provide a high degree of amplification for quite a reasonable expenditure of anode current. I found the total anode current was just under 10 milliamperes, which is quite fair in view of the power available.

The anode current is to some extent cut down by limiting the maximum anode voltage to 108 volts, this being the voltage of the self contained high-tension battery. In addition there is a non-spillable accumulator and a 4½-volt grid bias battery.



Simplicity of control is a feature of the Lotus suitcase portable

The power output valve works well with the loud-speaker incorporated, and the overall tone is clear. Speech is easy to follow, and music, while lacking the real bass, is by no means lacking in overall effectiveness. As with all sets of this type, the satisfactory quality is immediately ruined if the power valve is overloaded. Consequently, when tuning in the local stations I had to turn the lid away from the direction of Brookmans Park so as to avoid over-loading.

I had no difficulty in separating the two London stations, and the general selectivity of the two tuned circuits is about average. I could not get Midland Regional clear of London Regional, but many of the adjacent foreigners tuned in during tests were clear of interference.

The range is considerable, even on the frame aerial, and in fact I cannot recommend the use of an external aerial wire unless the set is a good distance from the local. Provision is made for both aerial and earth connections, but neither should be needed under normal conditions of reception.

Selectivity Control

Should it be necessary to use an external aerial, as when listening a long way from a local station, or in an unfavourable locality, there is a thoughtful subsidiary control mounted on the lid—a series condenser that comes into circuit with the connection of the external aerial wire, preserving selectivity up to normal needs.

So far as the case is concerned, the makers have done well to use a durable kind of leatherette, which is not likely to suffer unduly in the wear and tear to which the portable type of set is subjected in its travels. And I must not forget to mention the provision of strong locks, with keys to close the set against unauthorised listeners. The handle is also strongly made, and is quite easy to grip during transport.

SET-TESTER.

Dr. J. Sutcliffe Smith is giving a talk on the history of choralism in the North on June 28.

The title of the new musical comedy by Claude Hulbert and John Watt, which is to be broadcast on June 25 (National) is to be *That's a Good Idea*, an expression which occurs frequently in the play.

WHEN SUBMITTING QUERIES

Please write concisely, giving essential particulars. **A Fee of One Shilling** (postal order), a stamped addressed envelope, and the coupon on the last page must accompany all letters. The following points should be noted.

Not more than two questions should be sent with any one letter.

The designing of apparatus or receivers cannot be undertaken.

Modifications of a straightforward nature can be made to blueprints, but we reserve to ourselves the right to determine the extent of an alteration to come within the scope of a query. Modifications to proprietary receivers and designs published by contemporary journals cannot be undertaken.

Readers' sets and components cannot be tested at this office. Readers desiring specific information upon any problem should not ask for it to be published in a forthcoming issue, as only queries of general interest are published and these only at our discretion. Queries cannot be answered by telephone or personally.

Readers ordering blueprints and requiring technical information in addition, should address a separate letter to the Query Department and conform with the rules.

MY WIRELESS DEN

Weekly hints—constructional and theoretical — by W. James.

TWO REACTION ARRANGEMENTS

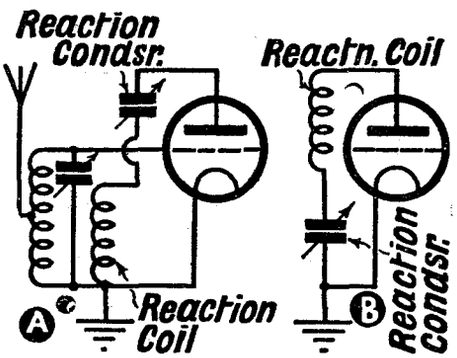
THE reaction circuit of a set includes, as a rule, a coil and condenser.

Sometimes the condenser has one of its sets of plates joined to the anode of the valve and sometimes it is the coil which is connected as shown in the sketches. Now although these two circuits look alike, and both work, there are differences that ought to be noted.

If you have a metal panel, for example, the arrangement of sketch A, with the condenser joined to the anode of the valve, cannot be used unless the condenser is insulated from the panel, a metal panel is usually earthed or has other parts fixed and in contact with it.

If, therefore, the arrangement of sketch A were used, the coil would probably be short-circuited. The arrangement of sketch B would probably be perfectly satisfactory.

In one case the condenser has one side joined to earth and in the other the coil is joined to earth. There are other differences, but the point that I wish to bring out is this: if you use a metal panel which is earthed, the arrangement of sketch A will not work, but B will.



The two reaction arrangements, A and B, referred to

WHY IT WAS UNSTABLE

I HAVE lately had the opportunity of examining quite a number of paper condensers of the so-called non-inductive type.

As a matter of fact, a set that I was testing was a bit unstable on the long waves and everything pointed to the fact that the by-pass circuits were not working properly. So I took the 1-microfarad condensers out and after a time obtained better results when some others were connected.

After opening several makes I wondered what standards the makers work to. One or two condensers were definitely non-inductive, contact being made with the whole of the ends of the foil. Other condensers had a few contact pieces let in so that the connecting tags were joined to a few points on the metal foil.

These last condensers are not definitely non-inductive, but often pass as they are better than condensers having a single contact at the ends of the electrodes. A really non-inductive condenser must cost a little more to make than other types, and so some manufacturers work to a specification that is barely satisfactory.

In some circuits a really non-inductive type is essential and should be used when stability with good magnification is desired.

GETTING IT RIGHT

SOME sets having a gang tuning condenser do not tune properly over the whole range. Thus the tuning may be accurate enough at the top end of the scale, but be poor over the bottom end.

To cure a fault like this is rather difficult. The coils may be a little out, but this would, strictly speaking, affect the tuning over the whole range. Probably the fault will be found in the gang condenser unit. Many types are accurate enough over the top half of the range, that is, the capacities are equal. But often the capacities of the sections vary a little over the lower half.

It is difficult for the makers to match the lower part correctly, with the result that in a sharp tuning circuit the results are not up to standard. This is a defect of numerous sets and if you tried the set with adjustable trimmers upon the panel the improvement would be very noticeable.

It is clear why the difficulty should be experienced over the lower part of the tuning and the least twisting of the frame will make matters worse. The fixing of a gang condenser is, therefore, a matter of importance.

TRY A "WET" CONDENSER

ELECTROLYTIC condensers of the wet type will be widely used in mains sets this year. It is curious to note that this type of condenser was first introduced, apart from reasons of space, because it was cheaper per microfarad than the paper type.

Now it is generally recognised that the electrolytic type gives less trouble than the paper type and has other advantages. Some manufacturers could tell interesting stories of banks of paper condensers that have broken down in service.

In fact, in some cases most service trouble has been due to the smoothing condensers. Electrolytic condensers, when properly used, seem to stand up very well and it is quite wrong to consider that a condenser of this type is used for cheapness. It is used because it is better for the purpose than a paper type.

REAL ANTI-MOTORBOATING

DUE to the use of by-pass condensers and filter circuits, the trouble of low-frequency howling is not experienced so much in these days. Yet there are times when the set is quite near the point of instability.

Quality is then bound to be poor, and it is sometimes difficult to locate the trouble. If you find that reversing the connections to the secondary, or primary, of the intervalve transformer makes a marked change, then there is something wrong. The use of a pentode output valve without adequate filtering may be the root of the trouble. The remedy in this case is clear.

Filter feed the loud-speaker to the plate circuit of the valve and decouple the auxiliary grid. When efficient valves are used there may be a tendency to instability, cured in some cases by connecting a grid leak of .5 megohms or less across the secondary of the coupling transformer.

A better plan is to de-couple the detector circuit, using the usual resistance of 20,000 ohms and a 2- or 4-microfarad condenser. This usually completely removes the instability.

Postcard Radio Literature

GET THESE CATALOGUES FREE.

Here "Observer" reviews the latest booklets and folders issued by well-known manufacturers. If you want copies of any or all of them FREE OF CHARGE, just send a postcard giving the index numbers of the catalogues required (shown at the end of each paragraph) to "Postcard Radio Literature," "AMATEUR WIRELESS," 58-61, Fetter Lane, E.C.4. "Observer" will see that you get all the literature you desire.

Ediswan Batteries

I HAVE just had a copy of a handy folder describing Ediswan batteries. It gives sizes, capacities, prices and tapping ranges of batteries for H.T. and grid bias and for many other little jobs, such as electric bells, cycle lamps and electric clocks. Copies of this folder can be had from many dealers, but can also be had free through my catalogue service. **784**

Choosing a Transformer

I have just had a copy of a most useful book, issued by E. Andrew Bryce & Co. This gives details of mains transformers, and L.F. and smoothing chokes. It is really surprising to see the wide range of standard transformers. The catalogue is grouped according to types and so it is quite easy to pick out a transformer for any special job. I advise all set-builders to write for a copy of this. **785**

A Rapid Valve Guide

A new copy of the Mullard Rapid Valve Guide has just come to hand and again I advise you, if you have not already been wise, to get a copy. In its 81 pages it gives a wealth of information of interest to valve users and describes practically the whole Mullard range of valves for receiver purposes. There are some useful circuits, too. OBSERVER. **786**

WE TEST FOR YOU

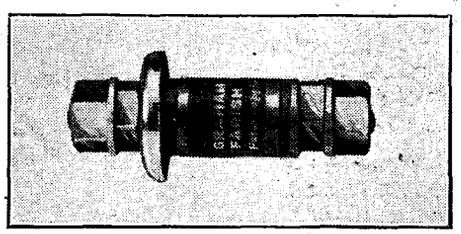
A weekly review of new components

and tests of apparatus

Conducted by J. H. REYNER, B.Sc., A.M.I.E.E.

"GARD" LIGHTNING ARRESTER

IN these days of hot and thundery weather, lightning is often in evidence. The ordinary wireless aerial is, of course, an excellent lightning conductor provided there is a quick and ready path between aerial and earth. More often than not the connection from aerial to earth is through holes in window frames or brickwork via a wireless set and back again, and lightning has a rooted objection to going round corners. It is therefore more likely to take a short cut somewhere in the event



A safety measure—the Graham-Farish "Gard" lightning arrester

of the aerial being struck and damage may result.

Messrs. Graham Farish have just placed on the market a simple little device known as the "Gard." Actually, this consists of two brass rods mounted in an insulated holder and separated by a small air gap about 1/32-inch long. One terminal of this device is connected to the aerial and the other terminal is connected to a short lead running straight down to earth. The device is fitted external to the house as already explained. There is a small hood just under the top terminal to prevent leakage due to moisture and we can imagine that in all except heavy rainstorms this will be satisfactory.

The difficulty with lightning arresters usually is that they affect the performance of the set. We measured the capacity of this device and found that it was only 4 micro-microfarads. Thus, the leakage of high-frequency current to earth would be absolutely negligible. We also immersed it in water for a period of one hour and then measured the insulation resistance. We found that this was still 7 megohms.

The "Gard" sells at 1s. 6d., and can be relied upon to do its work.

WILBURN TERMINAL BLOCK

THE Wilburn five-way terminal block is an interesting device which should prove useful to set constructors.

The instrument consists of a block of bakelite carrying five metal inserts. These have a hole running through the centre and grub screws at each end. The end of the wire is inserted in the hole at either end and is locked in position with the grub screw thus enabling the necessary circuits to be connected together in a neat and compact manner.

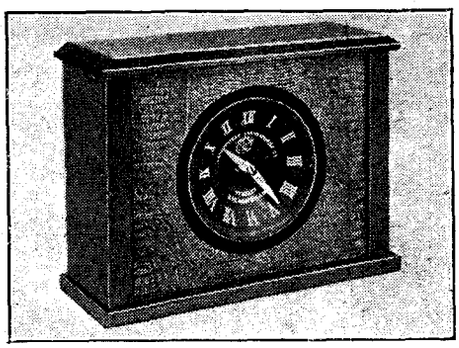
The grub screws are sunk in the moulding so that there are no exposed metal parts, while two holes are provided at the ends for fixing purposes. The overall dimensions are only 2 ¼ in. by ¾ in. by ⅝ in., so that the device is quite small and should find a variety of uses.

LANCHESTER SPEAKER

LANCHESTER loud-speakers are quite well known to our readers. This week we are reporting on their latest model, known as the B.O.B.

In this instrument a large bar-type permanent magnet is employed with a bar of soft iron as yoke. The centring device employed is interesting and possibly unique. Four slots are formed in the sides of the gap in which the coil moves and each accommodates a small steel ball. These balls are of such size that the coil is kept absolutely centrally in the gap.

The copper-plated pole piece is not fixed in any way to the magnet, but is held in contact by the magnetic force. It is positioned by means of a non-magnetic

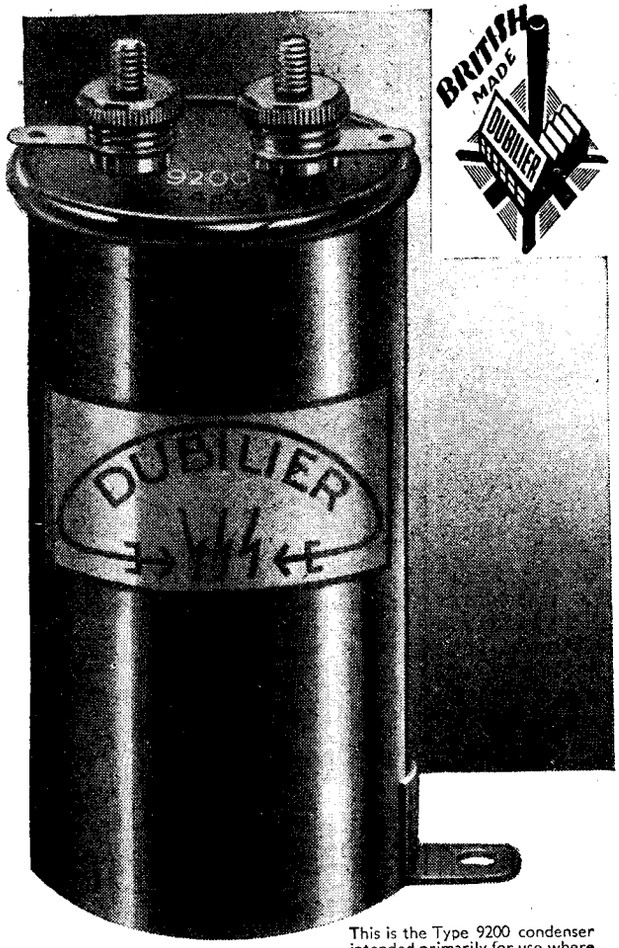


An inexpensive Lanchester speaker

collar which fits into a slot formed in the yoke.

The moving coil employed is only 9/16-in. diameter and is of the low-resistance type. The necessary input transformer can, however, be obtained with the speaker if required. A 4-in. shallow diaphragm is employed, this being suspended by a fabric surround from the small baffle which forms the front of the speaker. On the face of the diaphragm, which is finished in black, the figures of a clockface have been printed in gilt.

On test, the results were excellent for such a miniature speaker. We found it quite sensitive and suitable for use with the smallest receivers, at the same time it was quite capable of handling input up to 800 or 1,000 milliwatts.



BRITISH MADE DUBILIER

This is the Type 9200 condenser intended primarily for use where lowest radio frequency impedance is required. Ideal for by-pass purposes in H.F. circuits. Working voltage 250 D.C., tested 500 volts D.C. Capacities from .01 mf. to 2mf. Prices from 2/-

The Condensers which never let you down

are made only by

DUBILIER

E.5

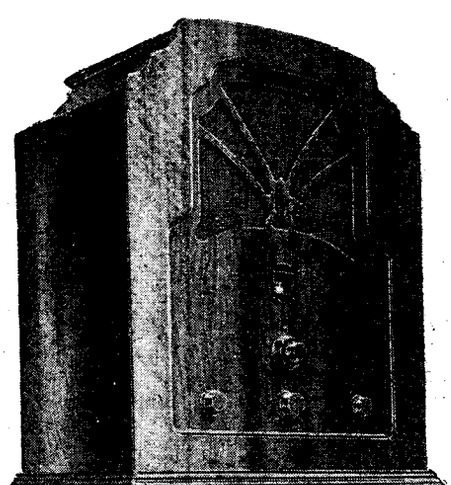
DUBILIER CONDENSER CO. (1925) LTD.
Ducon Works, Victoria Road, North Acton, W.3

"a definite advance in design technique"

These extracts are taken from a test report of the new Regentone 3-v. All-Electric Receiver made by "Amateur Wireless" (7.5.32.)

"A very definite advance in design technique. My tests show that the output can be reduced to a mere whisper without making the slightest difference to the tone. That is a remarkable achievement . . . a wide control of the output is possible. I cannot praise too highly the volume control of this set, which does indeed mark a great advance on present-day design. . . . Selectivity is good . . . clean-cut separation between adjacent foreign stations is really important. . . . Here the Regentone does unusually well in getting such adjacent giants as Langenberg, North Regional, and Prague quite free from interference. . . . There is no long wave instability . . . in the early evening this set yielded no less than 24 stations at good loudspeaker strength . . . sensitivity is well up to standard. Performance is even at all points of the scale."

Get your local dealer to arrange a demonstration. There's no obligation. Or write for full particulars and hire-purchase terms of this and other Regentone products. Mains units from 7s. 6d. down.



16 GUINEAS

including B.V.A. valves & royalties. For A.C. mains 40/60 cycles, 200/250 volts. SPECIAL 25 CYCLE MODEL 14/- EXTRA.

REGENTONE

REGENTONE LIMITED, Regentone House, 21 Bartlett's Buildings, E.C.4
Telephone: Central 8745 (3 lines)
Irish Free State Distributors: Kelly & Shiel, Ltd., 47 Fleet Street Dublin

READERS' IDEAS AND QUESTIONS

Automatic-bias By-pass Condensers

SIR,—I have a theoretical circuit showing how to add automatic bias to a receiver. In it are shown fixed condensers across each biasing resistance. These condensers are marked 1 microfarad capacity each. Whilst this information is certainly of benefit, I should like to know, in view of the set being a mains-operated one, what test-voltage or working-voltage each condenser should have? R. St. Q. (Hastings).

As the condensers in question will have only the normal biasing voltage applied across them there is really no need for them to have a very high-working voltage such as is the case for condensers used in the H.T. side of the receiver. A working voltage of about 200 volts for these bias condensers will be entirely satisfactory.—ED.

Faulty Mains Valves

SIR,—The centre tap of the heater winding of my mains transformer becomes so hot in use that the insulation around the wire burns. Furthermore, I can only receive the two local stations at very weak strength. The transformer has been returned to the makers who report that it is quite in order. The trouble still persists so I should be glad to hear what you consider is the cause of my trouble.

J. F. (Ealing).

If the transformer has really been tested by the makers and pronounced in order, it seems fairly obvious that the heater electrode in one of your mains valves is touching the cathode of the valve. This is a rare fault, so we suggest you test each valve with a battery and meter for continuity between the cathode pin and one or other of the heater pins. Continuity should not be apparent if the valve is in order. Any faulty valve should be returned to the makers with your report enclosed with it.—ED.

Best Indoor Aerial

SIR,—Not wishing to erect an outdoor aerial, I would welcome your advice with regard to the best form of indoor aerial I could arrange. I have plenty of space under the rafters of my house and can arrange for almost a direct down-lead from the trapdoor in the upstairs ceiling down to the room in which the set will be used. What I wish to know is, will there be any advantage in using several wires stretched between the rafters or will it be an advantage to zig-zag the wire backwards and forwards, several times, across the space I have available? S. J. M. (Wickham).

No advantage will be gained by using a multiplicity of wires, or a zig-zag wire arrangement, in the loft as an aerial. The vertical down-lead of an aerial usually accepts most of the energy from a station and, if you can arrange for a wire to be erected at the highest point under the rafters and then take it straight down to the receiver, we feel sure this arrangement will give you satisfactory results. If you want the very best results from such an arrangement, you should experiment with a few different sizes of loading coil in series with the down-lead so as to make the aerial more or less aperiodic for the wavelength of the station to be received. A number of wires in an aerial only increases its capacity unduly, and this generally results in unselective tuning.—ED.

BROADCASTING STATIONS

Broadcasting Stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is that of the carrier wave.

Metres	Kilocycles	Station and Call Sign	Power (Kw.)
GREAT BRITAIN			
25.53	11,751	Chelmsford (G5SW)	16.0
211.3	1,420	Newcastle	1.2
214.3	1,400	Aberdeen	1.0
242.3	1,238	Belfast	1.0
261.6	1,147	London Nat.	50.0
288.5	1,040	Swansea	0.12
288.5	1,040	Plymouth	0.12
288.5	1,040	Bournemouth	1.0
288.5	1,040	Scottish National	50.0
288.5	1,040	Newcastle (temp.)	1.0
301.5	995	North National	50.0
309.9	968	Cardiff	1.0
355.9	843	London Regional	50.0
376.4	797	Scottish Regional	50.0
398.9	752	Midland Regional	25.0
480	625	North Regional	50.0
1,554.4	193	Daventry (Nat.)	30.0
AUSTRIA			
218	1,373	Salzburg	0.5
245.9	1,220	Linz	0.5
285.2	1,052	Innsbruck	0.5
352.1	852	Graz	7.0
453.2	666	Klagenfurt	0.5
517	581	Vienna	15.0
also testing on 1,253.3 m. from 7.0 p.m. (Mon., Wed., Sat.).			
BELGIUM			
207.3	1,447	Franchimont	0.2
209	1,435	Antwerp	0.4
210.1	1,428	Liege (Seraing)	0.15
215.3	1,393	Chatelineau	0.2
215.5	1,392	Bruxelles Conference	0.2
215.5	1,392	Liege	0.1
220	1,364	Binche	0.3
230.3	1,304	Radio Wallonia	0.3
241.5	1,441.8	Liege (Exp.)	0.1
245.9	1,220	Radio Schaerbeek	0.3
269.3	1,114	Liege (Cointe)	0.4
283	1,060	Brussels (SBR)	0.5
337.8	888	Brussels (No. 2)	15.0
509.7	558.4	Brussels (No. 1)	15.0
BULGARIA			
318.8	941	Sofia (Rodno Radio)	1.0
CZECHO-SLOVAKIA			
58	5,172	Prague	0.5
249.6	1,201.8	Prague (2)	5.0
263.8	1,137	Moravska-Ostrava	11.0
279.3	1,074	Bratislava	14.0
293	1,022	Kosice	2.5
341.7	878	Brunn (Brno)	35.0
488.6	614	Prague	120.0
DENMARK			
281.2	1,067	Copenhagen	0.75
1,153	260	Kalundborg	7.5
also on 31.51 m. (9,520 Kcs.)			
ESTONIA			
298.2	1,006	Tallinn	11.0
465.8	644	Tartu	0.5
FINLAND			
289.5	1,036	Viipuri	13.0
368.1	815	Helsinki	12.0
555.5	542	Tampere	1.0
1,796	167	Lahti	54.0
FRANCE			
220	1,363.7	Béziers	0.5
232	1,295	Fécamp	10.0
236.2	1,267	Bordeaux-Sud-Ouest	2.0
249.6	1,201.8	Juan-les-Pins	0.5
254.7	1,177.2	Toulouse (PTT)	1.0
265.4	1,130	Lille (PTT)	1.3
271.4	1,105	Rennes	1.2
286	1,049.1	Montpellier	0.8
287.3	1,044	Radio Lyons	10.0
293.7	1,021.5	Limoges (PTT)	0.5
304.9	984	Bordeaux (PTT)	13.0
308.5	972	Radio Vitus	1.0
also on 43.75 m. (6,865 Kcs.)			
315	950	Marseilles	1.6
329.7	910	Poste Parisien	85.0
345.2	869	Strasbourg (PTT)	11.5
370	810	Radio LL (Paris)	1.0
also on 33m. (9090 Kcs.)			
384.4	779	Radio Toulouse	8.0
447.1	671	Paris (PTT)	0.7
465.8	644	Lyons (PTT)	1.5
568.1	528	Grenoble (PTT)	2.0
1,445.7	207.5	Eiffel Tower	13.5
1,725	174	Radio Paris	75.0
GRAND DUCHY of LUXEMBURG			
1,250	240	Luxemburg (temp.)	1.0
GERMANY			
19.737	15,200	Zeesen (DJA)	8.0
31.38	9,560	Zeesen (DJA)	8.0
217.1	1,382	Königsberg	0.9
218.5	1,373	Flensburg	0.6
219.9	1,364	Cassel	0.25
232.2	1,292	Kiel	0.25
238.9	1,256	Nürnberg	2.0
253.1	1,185	Gleiwitz	5.0
259.3	1,157	Leipzig	2.0
269.8	1,112	Bremen	0.2
276.5	1,085	Heilsberg	60.0
283.6	1,058	Magdeburg	0.5
283.6	1,058	Berlin (E)	0.5
283.6	1,058	Stettin	0.5
318.8	941	Dresden	0.25
325	923	Breslau	60.0
360.6	832	Mühlacker	60.0
372.2	806	Hamburg	1.5
389.6	770	Frankfurt	1.5
389.6	770	Leipzig (testing)	120.0
419.9	716	Berlin	1.5
453.2	662	Danzig	0.5
472.4	635	Langenberg	60.0
532.9	563	Munich	1.5
559.7	536	Kaiserslautern	1.5
559.7	536	Augsburg	0.3
566	530	Hanover	0.3
569.3	527	Freiburg	0.25
1,634.9	183.5	Norddeich	10.0
1,634.9	183.5	Zeesen	75.0
2,525	119.3	Königswusterhausen (press)	15.0
2,900	103.5	ditto	
4,000	75	ditto	
HOLLAND			
296.1	1,013	Hilversum*	8.5
1,071.4	280	Scheveningen-Haven	10.0
1,875	160	Huizen	8.5
*20 Kw. Station testing			
HUNGARY			
210	1,428	Budapest (2)	3.0
550	545	Budapest (1)	18.5
ICELAND			
1,200	250	Reykjavik	16.0
IRISH FREE STATE			
224.4	1,337	Cork (6CK)	1.2
413	725	Dublin (2RN)	1.2
shortly testing on (120 Kw.)			
ITALY			
25.4	11,810	Rome (2RO)	15.0
247.7	1,211	Trieste	10.0
274	1,095.5	Turin (Torino)	7.0
280	1,071	Bari (testing)	20.0
312.2	961	Genoa (Genova)	10.0
318.8	941	Naples (Napoli)	1.5
332.2	903	Milan	7.0
368.1	815	Bolzano	1.0
441	680	Rome (Roma)	50.0
500.8	599	Florence (Firenze)	20.0
525.4	571.1	Palermo	3.0
LATVIA			
198.5	1,510	Riga (tests)	16.0
525	572	Riga	15.0
LITHUANIA			
1,935	155	Kaunas	7.0
NORTH AFRICA			
363.3	825.3	Algiers (PTT)	16.0
416	721	Radio Maroc (Rabat) and 32.26 m. (9,300 Kcs.)	6.0
NORWAY			
235.5	1,274	Kristiansand	0.5
239.8	1,251	Stavanger	0.5
365.4	820.9	Bergen	1.0
364.1	815	Fredriksstad	0.8
495.8	604.9	Trondheim	1.2
1,083	277	Oslo	60.0
POLAND			
214.2	1,400	Warsaw (2)	1.9
235	1,283	Lodz	2.2
312.8	959	Cracow	1.5
335	896	Poznan	1.9
380.7	788	Lvov	16.0
408	734	Katowice	12.0
565	531	Wilno	16.0
1,411.8	212.5	Warsaw	120.0
PORTUGAL			
241.6	1,241.8	Oporto	0.25
282.2	1,063	Lisbon (CT1AA) also on 31.25 m.	2.0
ROMANIA			
394	761	Bucharest	12.0
RUSSIA			
348.8	860	Leningrad RV70	20.0
358	838	Moscow (Exp.)	15.0
385	779	Stalino (RV26)	15.0
389.6	770	Archangel	10.0
473.2	634	Sebastopol	10.0
502.4	597	Nijni Novgorod	10.0
644	465.8	Kazan (RV17)	10.0
720	416.6	Moscow (PTT)	20.0
824.2	364	Sverdlovsk RV5	50.0
849	353	Rostov (Don)	4.0
937.5	320	Kharkov (RV20)	25.0
1,000	300	Leningrad	100.0
1,032.6	290.5	Kiev	25.0
1,071.2	280	Tiflis	35.0
1,103	272	Moscow Popoff	75.0
1,171.5	256	Taschkent	25.0
1,250	240	Bakou	35.0
1,271.5	236	Minsk (RV10)	35.0
1,304	230	Moscow (Trades Unions) also on 50 m. (6,000 Kcs.)	165.0
1,380	217.5	Novosibirsk	100.0
1,482	203	Moscow also on 46.6 m. (6438 Kcs.)	100.0
1,600	187.5	Irkutsk	15.0
SPAIN			
252.3	1,189	Barcelona (EAJ15)	3.0
266.9	1,124.5	Valencia	8.0
348.9	860	Barcelona (EAJ1)	8.0
380.7	790	Seville (EAJ5)	1.5
411.2	730	Madrid (EAJ7)	2.0
428	701	Madrid (España)	2.0
456.6	557	San Sebastian (EAJ8)	0.6
SWEDEN			
231	1,301	Malmö	1.25
257	1,166	Hörby	10.0
307	977	Falun	0.5
321.9	932	Göteborg	10.0
435.4	689	Stockholm	55.0
541.5	554	Sundsvall	10.0
770	389	Ostersund	0.6
1,229.5	244	Boden	0.6
1,348.3	222.2	Motala also on 49.46 m. (6,065)	30.0
SWITZERLAND			
244.1	1,229	Basle	0.65
245.9	1,220	Berne	0.5
403	743	Söttens	25.0
459.4	653	Beromuenster	60.0
760	395	Geneva	1.25

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Family Two (D, Trans) WM278
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Midget Two (D.RC.) AW348

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Meridian Short-waver (D,RC, Trans) WM256
Five-advantage three (D,RC, Trans) WM257
Everybody's Radiogram (SG, D, Trans) .. WM258
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Everybody's Radiogram (with Automatic G.B.) WM262
New Economy Three (SG, D, Trans) WM263
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Everybody's Radio-gramophone AW310
Four Star 4 (SG,D, RC, Trans) AW318
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Brookman's Three-plus-one (SG,D,RC, Trans) WM233
Ether Rover (SG, D, RC, Trans) WM266
Quadradyne (2 SG, D. Pen.) WM273
Double Band-pass Four (SG, D,RC, Trans) .. WM274
Everybody's Radio Gram. (SG, D, RC,Trans) WM276
A.C Quadradyne (2 SG, D, Pen) WM279

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A.C. Britain's Super (Super-het) AW322
James Short-wave Super (Super-het) AW328
Simple Super (Super-het) AW340
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Ideal Home Super (Super-het) WM280
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A.C. "Century Super" (Super-het) AW295
" " Mains Unit (1/-) AW295A
Super 60 (Super-het) WM229
A.C. Super 60 Radio Gramophone (Super-het) WM239
A.C. Super 60 (Table Model) WM245
Super 60 (with Wearite base) WM249
Super 60 (with Lewcos base) WM251
1932 Super 60 (Super-het) WM269
1932 A.C. Super 60 (A.C. Super-het) WM272

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Super Senior (Wearite base and Lewcos coils) .. WM261

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Town and Country Four (SG,D,RC, Trans) WM282
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A-P-A Radio Unit (SG,D) WM281
Economy Gramophone Amplifier WM277

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"A.W." Selectivity Unit (6d.) AW290
A.C. Trickle Charger AW305
Amateur's Linen Speaker AW307
D.C. H.T. Unit AW312
Output Unit for Pentode Sets AW316
Short-wave Plug-in Adaptor AW326
Short-wave Super-het Adaptor AW329
Ether Searcher Radiogramophone motor board AW333
"A.W." Short-wave Adaptor AW339
Big H.T. Unit for A.C. Mains WM230
Loud-speaker Tone Control WM234
"W.M." Linen Diaphragm Loud-speaker .. WM23
Two-Minute Adaptor for Short Waves .. WM24
Super 60 A.C. Unit WM24
A Simple Mains Unit WM28
Voltage Regulator WM28
Short-wave Director (6d.) (wavemeter) WM28

Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of most of these sets can be obtained at 1s. 3d. and 4d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine." Address letters:

Amateur Wireless Blueprints Dept., 58-61 Fetter Lane London, E.C.4.

Amateur Wireless FEE 1/-

INFORMATION BUREAU COUPON

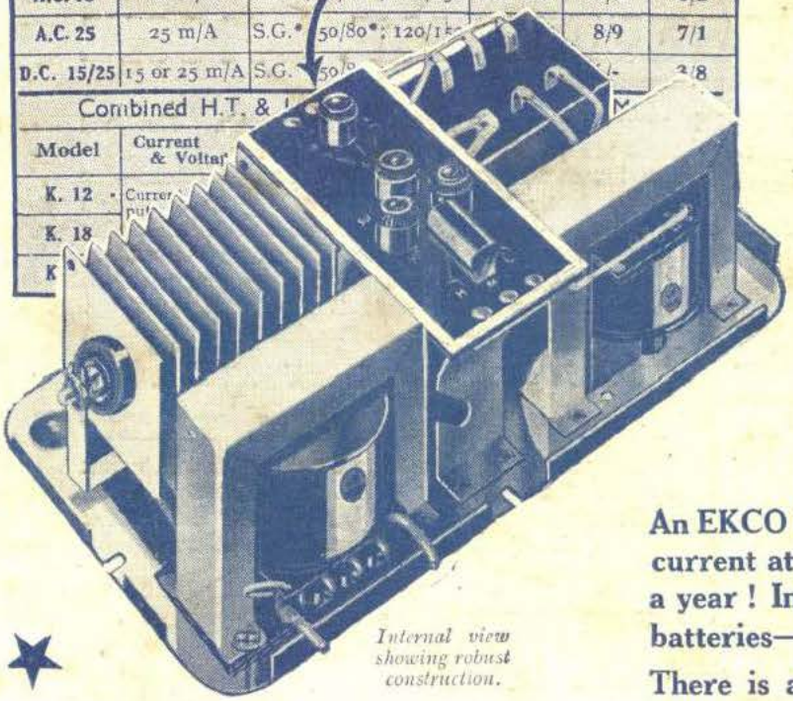
Available until Saturday JULY 2, 1932

EKCO H.T. UNITS

Model	Current Output	Voltage Tappings	Price	EASY PAYMENTS Initial Payment	11 Monthly Payments of
A.C. 12	12 m/A	S.G.; 80; 120/150	£2.15.0	6/6	5/-
A.C. 18	18 m/A	S.G.*; 50/80*; 120/150	£3. 7.6	7/9	6/2
A.C. 25	25 m/A	S.G.* 50/80*; 120/15		8/9	7/1
D.C. 15/25	15 or 25 m/A	S.G. 50/		/-	3/8

Combined H.T. &

Model	Current & Voltag
K. 12	Curre put
K. 18	
K	



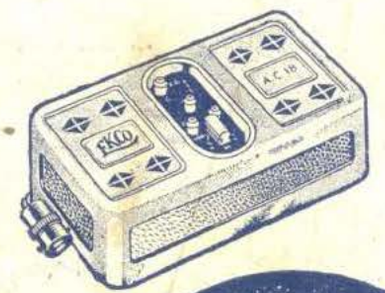
Internal view showing robust construction.

The Unit Control Panel, Showing :—

Top : The S.G. Plug, with its three alternative voltage tappings; 80-90 ; 70-80 ; 60-70 ; up to 3 m/A.

Centre : Negative Plug.

Bottom : The 50/80 v. Plug, adjustable in three positions, High, Medium and Low, up to 3 m/A ; and the 120/150 v. Plug—120 volts at approximately 21 m/A up to 150 v. at approximately 11 m/A.



All models are similar in external appearance. Size, 9 × 5 × 3½

50/- worth of H.T. for one shilling!

An EKCO Unit will give you ample, silent, unvarying current at high voltage at a cost of only one shilling a year ! In a year you would buy at least four H.T. batteries—costing at least 50/-!

There is an EKCO Unit for every type and size of radio set and portable. Just connect the appropriate model in place of your usual battery—then switch on—that's all !

Choose the Unit suitable for your set from the Table below or post coupon for full details.

All EKCO Units are obtainable on Easy Payments.

EKCO H.T. UNITS

Model	Current Output	Voltage Tappings	Price	EASY PAYMENTS Initial Payment	11 Monthly Payments of
A.C. 12	12 m/A	S.G.; 80; 120/150	£2.15.0	6/6	5/-
A.C. 18	18 m/A	S.G.*; 50/80*; 120/150	£3. 7.6	7/9	6/2
A.C. 25	25 m/A	S.G.*; 50/80*; 120/150	£3.17.6	8/9	7/1
D.C. 15/25	15 or 25 m/A	S.G.*; 50/80*; 120/150	£1.19.6	6/-	3/8

Combined H.T. & L.T. Charger Units (for A.C. Mains)

Model	Current & Voltage	L.T. Output (for charging accumulators)	Price	EASY PAYMENTS Initial Payment	11 Monthly Payments of
K. 12	Current Output and Voltage Tappings same as Models A.C.12, A.C.18 and A.C.25.	½amp. at 2, 4 or 6 volts	£3.19.6	9/-	7/3
K. 18		½amp. at 2, 4 or 6 volts	£4.12.6	10/3	8/5
K. 25		½amp. at 2, 4 or 6 volts	£5. 7.6	11/9	9/10

Tappings marked * are adjustable.

EKCO POWER UNITS

Woburn

To E. K. COLE, LTD., (Dept. K.12.), Ekco Works, Southend-on-Sea.

Please send me full details of EKCO Power Units.

Name .....

Address .....

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