

N/A. & Volt. meters.

Amateur Wireless, December 20, 1930

HOW TO BRING IN THE CHRISTMAS BROADCASTS

"THERMION" TESTS THE "STENODE"

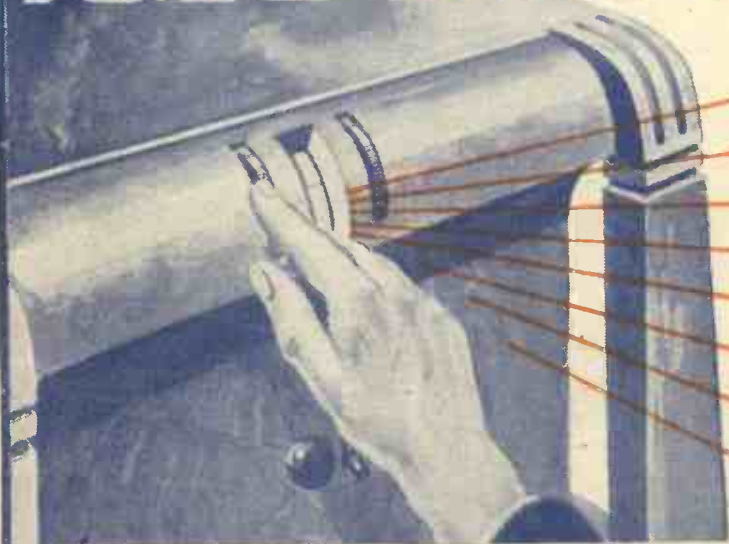
Amateur Wireless

Every Thursday 3^d
and
Radiovision

Vol. XVII. No. 445

Saturday, December 20, 1930

BRINGING IN THE XMAS BROADCASTS



WESTUCH

HALO BRATISLAVA!

KALUNDBORG-KOBENHAVN

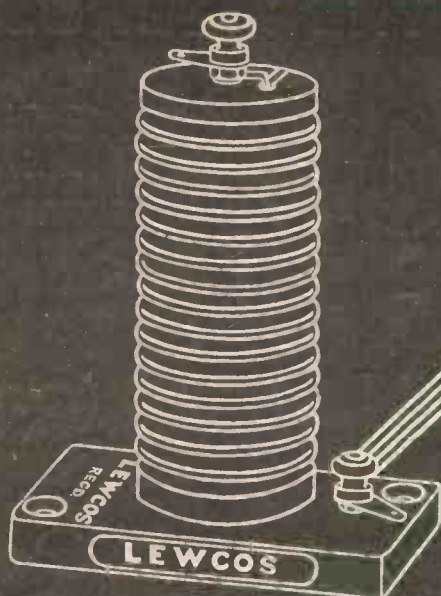
HIER RADIO GRAZ!

ICI TOULOUSE!

HIER BERLIN!

RADIO ROMA!

HOW TO GET FOREIGN STATIONS
— AND RECOGNISE THEM (see Page 983)



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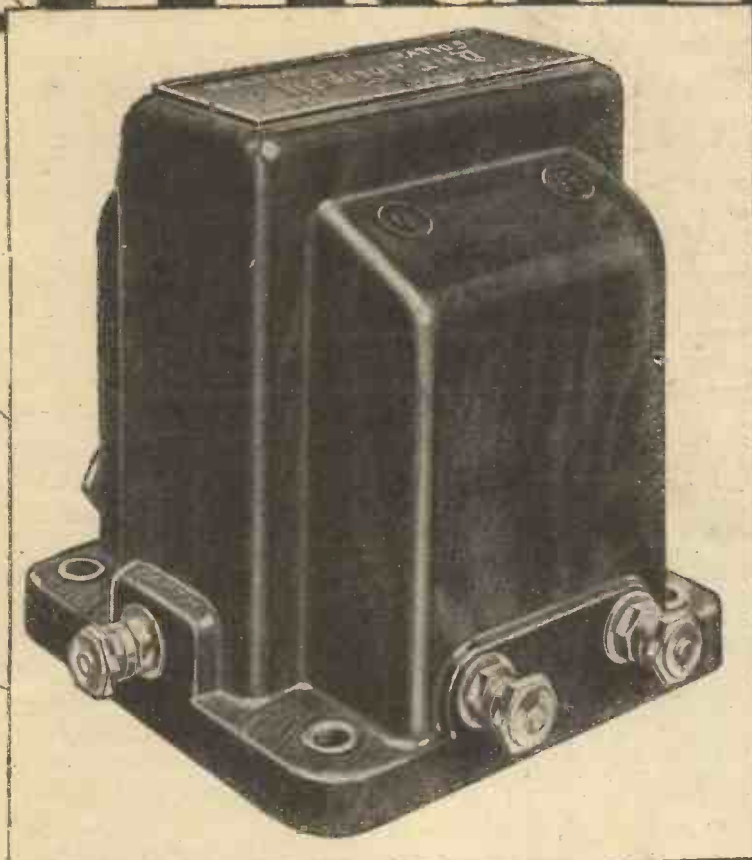


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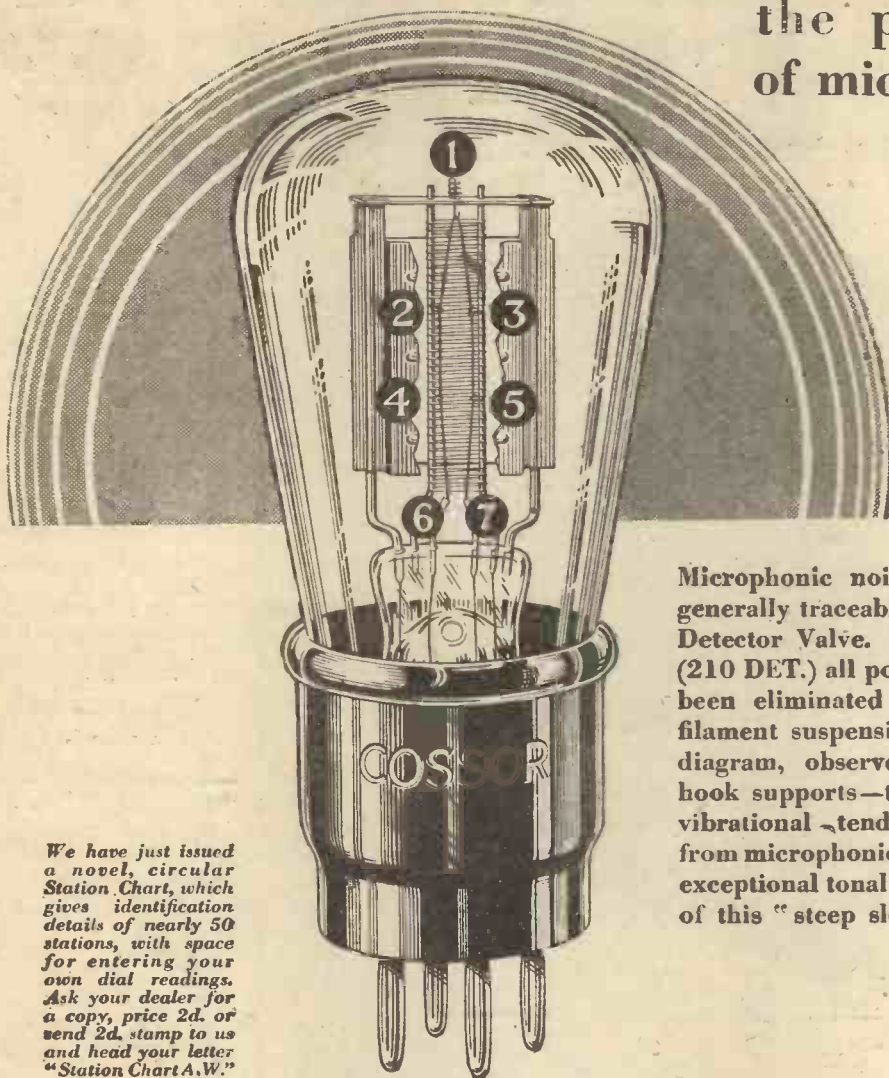
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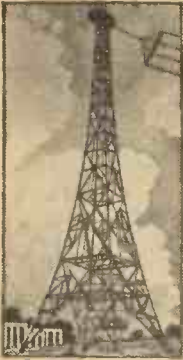
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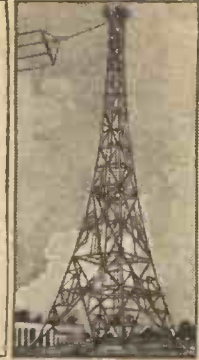
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THE LEADING RADIO WEEKLY FOR THE
CONSTRUCTOR, LISTENER & EXPERIMENTER.

NEWS · & · GOSSIP · OF THE · WEEK

RUSSIA AGAIN!

WHAT a fuss was raised last week about the broadcast of "red" propaganda from a Russian station. In the Commons the reply of the Soviet Government to two British protests was read. In regard to the protest against the recent broadcast of propaganda in English from Moscow, the Soviet Government say that this was done by a trade union body, and, although they deny that it was a breach of the no-propaganda agreement, they promise that steps shall be taken to prevent a recurrence. The Commissar's reply concluded: "I can say that at the time that the Union of the Central Council was given the right to broadcast, no messages of this nature were contemplated, and taking into consideration Mr. Henderson's (Foreign Secretary) declaration as to the undesirability of such broadcasts in the future, it will be impressed on the Union

of the Central Council that no such messages should be transmitted." Yet Russian broadcasts seem to be ninety per cent. propaganda.

A LONG LANDLINE

IT is hoped that when the B.B.C. broadcasts the Nativity Play from the fourteenth century church of St. Hilary in Cornwall, the excellent work done by the landline staff will again show to good effect. Listeners will, on Monday, December 22, be able to see whether the long landline from Plymouth to London introduces distortion. The last two or three broadcasts with this line have been very successful. We should like to correct the misconception that the play, which is by Bernard Walke, is an entertainment. It is an act of worship on the part of the villagers. The whole church is the stage about which they move during the play.

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AN EXPLORING PORTABLE!

SURELY one of the strangest adventures that ever befell a portable was the lot of a Marconiphone which travelled 8,000 miles from south to north of the continent of Africa in the back of a six-year old car. Two intrepid English women set out last April to attempt the hazardous feat of travelling by land from Cape Town to Cairo, and as their only link with civilization for long periods of the journey, the two adventurers decided to take a portable set. It kept them company in the desert, and picked up a healthy "bag" of DX stations.

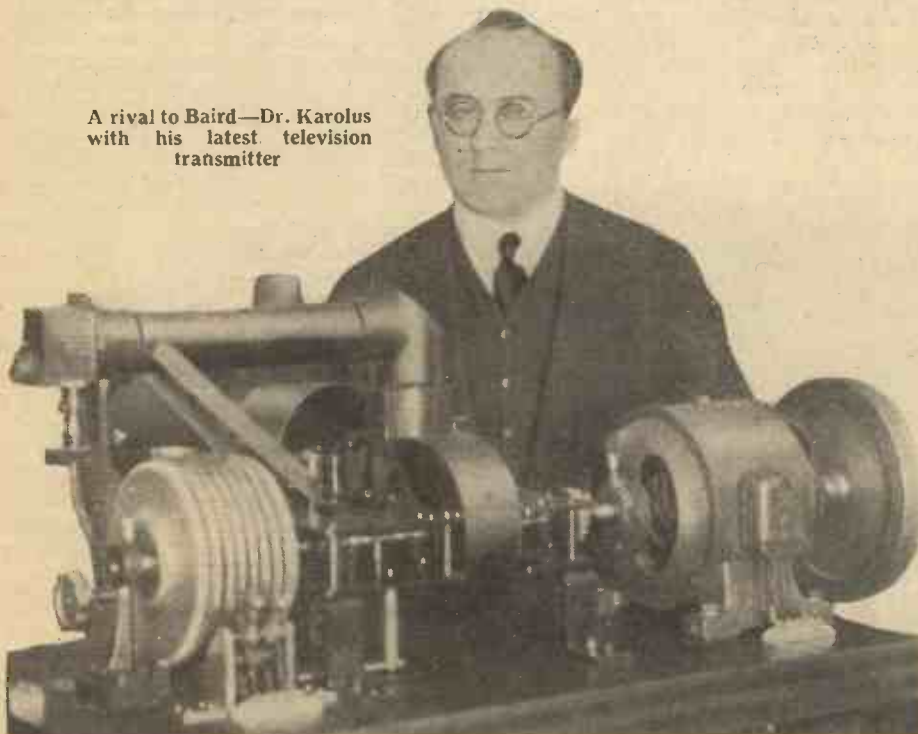
A GRUMBLE FROM U.S.A.

IN a letter that illuminates the present state of affairs in American broadcasting, H. F. Cappel, of Dayton, Ohio, says: "I believe it might pay the N.B.C. to find out just what programmes attract the public and what kind of programmes are turned off. I don't believe they get the true picture from letters received at the studio. If radio advertisers would undertake such a survey, radio programmes would be changed rather quickly and radio announcers would be paid a premium for brevity." We hear many complaints from America that the advertising announcements are too long winded.

SOME EXCERPT!

WHAT must be one of the longest broadcast excerpts will be that relayed from the Gaiety on December 23, when

A rival to Baird—Dr. Karolus with his latest television transmitter



NEXT WEEK : A ONE-COIL ONE-VALVER FOR ALL WAVELENGTHS

NEWS · & · GOSSIP · OF THE · WEEK

—Continued

the B.B.C. will broadcast one and a half hours of *The Love Race*. These excerpts will be of the first and second acts of the play. The cast includes such well-known stage people as Laddie Cliffe, Stanley Lupino, and Madge Elliott. Altogether this should be one of the most popular of recent broadcasts. And the free advertisement afforded by radio should certainly increase the box office receipts!

FOR SET-TESTERS

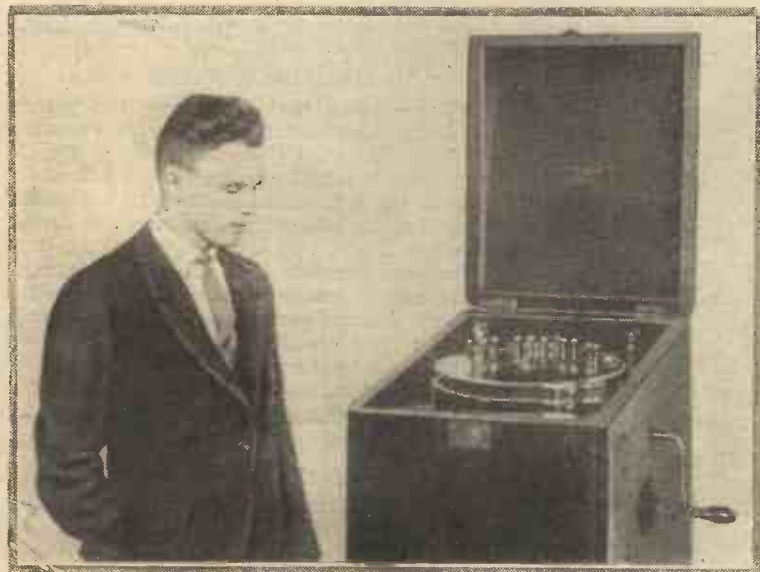
WHETHER our contributor "Set-tester" proposes to work through the Christmas holiday is unknown to us, but we see from the London Regional programme that, on Christmas Day, gramophone records are to be broadcast from noon till 3 p.m. The B.B.C. explains this lengthy broadcast of "canned" music in its statement that "it will enable listeners to test the new sets that may be numbered among their Christmas gifts."

A STUDIO FOR BRISTOL

WE have it on the authority of the B.B.C. that, in preparation for the western regional transmitter, a studio is to be erected at Bristol. This will save artistes the journey between Bristol and Cardiff, which is still to remain the western regional headquarters. The erection of the Bristol studio is part of the B.B.C.'s regional policy, whereby one of the twin transmitters at each region will call upon all the available entertainment talent within that region. No doubt other studios will be erected as the regional scheme develops.

POLAR DIAGRAMS CONTINUE

MEANWHILE, B.B.C. engineers are still roaming the Somerset countryside with the famous test van. At the moment it is resting at the village of Kilve, not far from Minehead. The 3-kilowatt transmitter is sending out the usual signal so that engineers can wander around drawing circles of field-strength. Polar diagrams by the dozen are being drawn, to determine the most suitable site for the western regional transmitter.



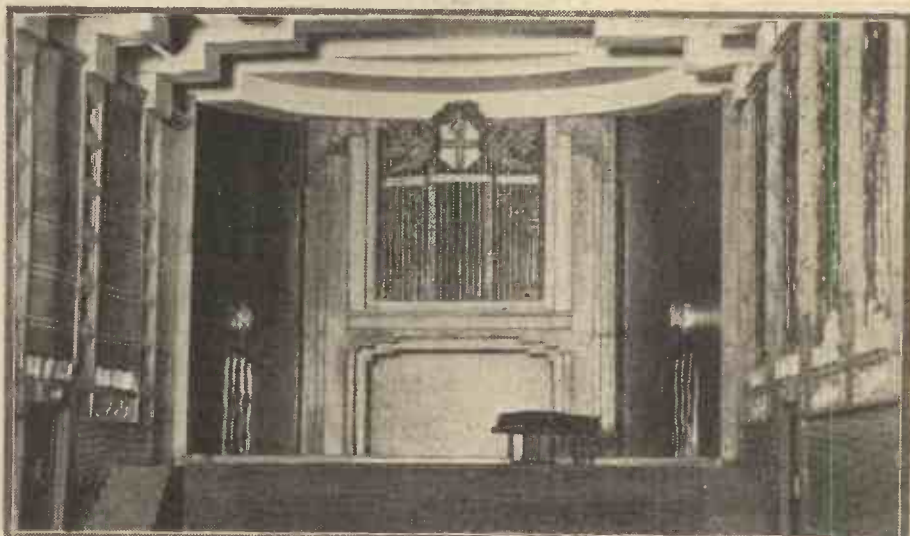
An automatic SOS sender. If this American idea comes into general use it will over-ride the old sea dictum that an operator stays at his post in case of emergency. This machine will continue transmitting SOS signals and latitude and longitude messages for 14 hours; it has a range of 50 miles.

NO EDUCATION "WAR"

ONE of the daily papers has, it would seem, concocted a little war at Savoy Hill. In fact, no such war is in progress, but the writer in question alleges that adult listeners refuse to be taught! He says they want to be amused and demand *entertainment* from the B.B.C., not education. All of which has been said before. But the B.B.C. does not agree that their policy of broadcast adult education

suitable timing for educational talks. Ways and means of making this inquiry are now being discussed between the Executive Committee of the Central Council, the B.B.C., and statistical experts. Between them they certainly ought to make things hard for the entertainment enthusiasts. Still, most people can now tune in one of the foreign stations that still retains the ingenious idea that people listen for entertainment!

A BROADCASTING HOUSE STUDIO



Broadcasting House as it will be. This is a photograph of the architect's model of the giant studio which will be the chief feature of the new Broadcasting House in London. An organ is hidden by the grille at the back of the stage

ABOUT WAVELENGTHS

SINCE the change-over in wavelengths between the London National and Regional stations, for periods when only one station is broadcasting, fewer complaints have been received of poor reception. The 356-metre station at Brookmans Park has undoubtedly a much greater service range for British listeners than the 261-metre station. Of course, in all regional centres there will have to be one fairly short wavelength and, if the region is lucky, it will have one fairly long wavelength. For the Northern Regional centre the National outlet will be on 301 metres, and the Regional on 479 metres. We southern listeners will have a good opportunity to test the relative carrying powers of these two wavelengths when the stations start up within the next six months.

THE "ROOSTERS"

ONE of the bright spots of the vaudeville broadcasts during Christmas will be the ever popular War-time concert party, the "Roosters." They are doing a sketch by Percy Merriman entitled "Tommy's Christmas," and this should be well worth watching for.

The B.B.C. has renewed for the ensuing season its arrangement with the Reid Orchestra, of Edinburgh, for the broadcast of excerpts from five of the orchestra's concerts. These will be relayed from the Usher Hall, Edinburgh, on Thursday evenings.

The STENODE OPENS THERMION'S EYES

*An account of a practical test of
the first privately-owned Radiostat
in the world*

EAGER as I am to see progress made in wireless, I must confess that I am always a little sceptical about new inventions for which big claims are made. However wonderful may be the results produced in the laboratory or at demonstrations, I am never prepared to accept

shown operating the set is not your "Thermion." My set measures 26 in. in length by 10½ in. in depth by 8 in. in height. The actual model which will eventually be placed on the market is considerably smaller and it will have only one tuning knob, whereas mine has two thumb-controlled dials. However, I could not wait for the final model to be ready, so I had a set specially made for me from the drawings of what we may call the intermediate pattern; that is, the stage on the road towards compactness and simplicity which comes between the original laboratory type and what will be the broadcast receiver. It is no use, by the way, writing to me to ask where you can obtain one. For the moment you cannot, and when sets are available the various manufacturing firms who are making them will, no doubt, advertise the fact.

Simplified Tuning

The two condenser dials tune respectively the frame aerial and the oscillator. In the type that will go on to the market these two will be ganged. The photograph shows four other knobs, but one of these was unnecessary and has since been removed. The only ones now remaining are that near the bottom left-hand corner of the set which operates a wave-change switch, the one near the condenser dials which works a volume control, and one rather to the right of the middle of the set by means of which switching on or off is done.

I need hardly tell you what was the first test I made after switching on. What would you have done yourself? Wouldn't you have tried to see whether Stuttgart and Graz could be received with the London

Regional in full blast? In case, by the way, you are not familiar with the wavelength tables, let me mention that each of these stations is separated by 9 kilocycles from "Raucous Reg.," Stuttgart being 3.7 metres above and Graz 4 metres below. My aerial is just fifteen miles from Brookmans Park, whose wipe-out is such that, used in conjunction with an indoor aerial, a selective "straight" set containing two screen grid stages is very rarely able to receive Barcelona (18 kilocycles away) on the one side, or Hamburg (18 kilocycles away) on the other, completely free from interference. With less than two H.F. stages or with a set of ordinary selectivity the blanketing effect extends a good deal farther.

A Convincing Test

Well, first I found the London Regional, and then I tuned just a tick upwards. There was Stuttgart roaring in, and even in intervals of the programme nothing was to be heard of London. Then I dropped down a tick below London—and in came Graz. Now, Graz is a still more convincing test station; first of all, because the wipe-out effect is usually rather greater below than above and, secondly, because the Austrian transmitter is not, as a rule, strongly received. When he is coming in at all well he is absolutely clear of London, and even when he is at his weakest a little careful tuning entirely cuts out interference.

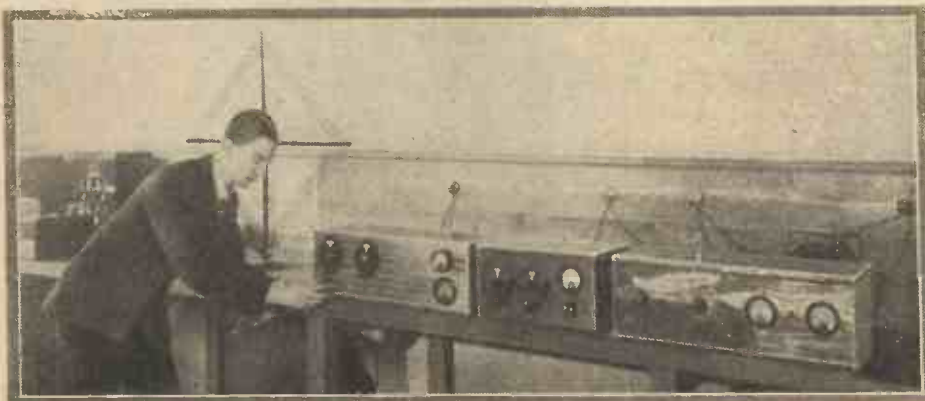
That test was my first eye-opener. I had seen the Stenode separate the stations in London where Brookmans Park's field strength is much less, but, frankly, I did

(Continued on next page)

The cabinet model Radiostat as used by Dr. Robinson on his American tour

them in their entirety until I have had the apparatus in my own house and operated it with my own hands. I approach any new things in wireless, therefore, hoping for the best, but quite prepared to meet, if not the worst, at all events a severe disappointment.

Hence, when I had installed my Stenode—which is, by the way, the only one in the world now in private ownership—I placed a large salt cellar on the top of it so that the desirable grain should be handy if needed. The model that I am using you can see in the first photograph, whilst the second shows the original laboratory pattern in three large boxes. I hasten, by the way, to mention that the gentleman



The original laboratory model. This has been greatly simplified; the modified type appears in the heading

not expect that it would do so in my house. Its selectivity, by the way, is not produced by the directional properties of the frame. Stuttgart and Brookmans Park lie very much in the same direction from me, but even if I turn the frame directly towards Brookmans Park and tune to Stuttgart, I don't hear a sound of the Regional.

"Pretty good," thought I, "but I really will test the thing out." At fifteen miles "Noisy Nat." on 261.3 metres is a very much stronger transmission than

"Raucous Reg." and has a far greater wipe-out. Could the thing possibly bring in Gleiwitz or Moravska-Ostrava, the National's next door neighbours in the wavelength tables? They lie 9 kilocycles above and below, the wavelength difference being 2 metres in the case of Gleiwitz and 2.1 in the case of the Czechoslovakian station. I got both of them quite clear. The selectivity then was amply proved.

Next for sensitiveness. Having made a rough calibration of the set, I thought

that it might be a good idea to work upwards from Leeds. Though Leeds has a rating of only 160 watts and is 200 miles away, I found him at the first attempt, tuning straight on to the loud-speaker and obtaining fine volume; though there was, of course, the fading that one associates with all shorter-wave transmissions. Working slowly upwards, I found three Swedish-speaking stations before I encountered Warsaw No. 2 on 214.2 metres. Clearly, then, the three must have been Joenköpings, Kristinehamn, and Gävle. Two series of jumbled sounds indicated common wavelengths, and then came Helsinki, which was fair, though not strong. Fécamp, a small French station, came in well and Cork was a big signal.

I won't go through them in detail. Let me just say that Beziers, Belfast, Lotz, Juan-les-Pins, Leipzig, Toulouse (PTT), and Hörby were all pulled in at fine strength before the National was reached.

Nearly Every Station

After three days with the Stenode, which time sufficed for an accurate large-scale calibration chart to be made, I had received on the loud-speaker, with three exceptions, every European station between 200 and 550 metres that has an individual channel. The exceptions were Almeria, Barcelona No. 2, and Oviedo, none of which appeared to be working. The stations received included such tiny fellows as Fredriksstad and Freiburg.

With a set of this kind, then, the whole of Europe, at any rate, is the wireless man's oyster. I have not yet had time to explore in detail the long waves, but I have not the least doubt that within a day or two I shall have logged every station contained within their compass.

One most important point remains. I can hear the reader asking by this time: "Selectivity and sensitiveness are all very well, but what about quality?" Thanks to the corrector circuit which it incorporates, one can adjust the reproduction to suit one's own likings. It ought by all the theories to be utterly lacking in top, and if it were so it wouldn't suit me at all, for I am not of those who like "woomfy" loud-speaker working. As a matter of fact, the upper notes are magnificently brought out and you can have as much real bass as ever you like by merely altering the value of a resistance. Both speech and music from short-, medium-, or long-range stations are as good as one could desire.

When I first thought of acquiring the set it occurred to me that my batteries were in for rather a bad time, since I am not fortunate enough to have electric light in the house. I have been pleasantly surprised by the modest current consumption of both H.T. and L.T. of this big set. The filament current is .7 ampere, or exactly what my first single-valve set consumed. The high-tension current totals 30 milliamperes, which is well within the compass of even a small high-tension accumulator battery.

This is the kind of set that one has been longing for ever since wireless was wireless. I still have a lurking fear that I shall wake up and find that I have dreamt it all.

THERMION.

THE FAIR SEX—

Savoy Hill has been trying out a Lady Announcer recently, but there seems no immediate possibility of the fair sex monopolising the B.B.C. microphone. Other countries have tried it with success. Italy specialises in women broadcasters.

The probable reason for this is, that the Italian language is almost as liquid as the French, and certainly not so guttural as the Spanish. It is admirably suited to the female voice, and the diction of these lady announcers is extraordinarily clear, as you can prove for yourself by tuning in to at least four of the Italian stations which can be heard on practically any night.

Radio Roma, the giant 75-kilowatt, has Signora Luisa Boncompagni (4) at the microphone—a very popular personality with a bell-clear voice. At Naples is Signora "Rosa di Napoli" (1)—literally "Rose of Naples"—which is a pet-name given to this announcer by listeners.

Other women announcers use their microphone "stage-names," in preference to their real names; Signora Maria Rosa (2), for instance, at the Turin station. Her real name is Signa Cosini. Turin is well received in this country, owing to its power of over 8 kilowatts.

Still another woman announcer is to be found at Genoa (Radio Genova). Here Signora Lia Cavinagli (3) does her bit before the microphone, both in announcing and directing programmes, and you may often hear her on 379.5 metres.

Apart from the rather natural interest which centres on a woman at the microphone, there is a very real advantage in the feminine voice, for some purposes of announcing, the higher frequencies predominating, and making for clarity. It is notable that women's voices are often more easily heard over the telephone, there not being so much bass to "cut off."

—AND THE MICROPHONE

and this makes for a greater sound intelligibility which may be an advantage where reception conditions are difficult.

It is rather surprising that America, who would be willing to try anything enterprising in the announcing line, to make publicity broadcasts more popular, has never gone in seriously for women announcers. Perhaps it is because America has a "bass" complex, as you may gather from the tonal balance of most talkie films;



In this seasonable article ALAN HUNTER tells how to get those foreign stations and how to identify them when they have been logged. Outstanding B.B.C. items are included.



Photo: Marconiphone

"YOU experts say it is easy to get foreign stations; but let me tell you that all I ever hear are the two London stations. And even if I got these wonderful foreigners I should never know one from the other!"

Now, that sort of remark—actually made to me a few days ago—is enough to provoke a really heated discussion. Instead, it has prompted me to write this article. Supposing we start by asserting that, under present conditions, almost any valve set can be made to receive several foreign stations. Then in answering the question:

when the Nativity Play from the fourteenth-century church at St. Hilary, Cornwall, will be broadcast. The B.B.C. engineers have made great strides in land-line quality, so in this broadcast there is no reason why distance should not lend enchantment.

Regional Broadcasts

For Regional listeners on December 23, a Christmas Miscellany is promised. So is a broadcast of the Lord Mayor's Dinner at the Guild Hall. This evening is also notable for the broadcasting of a very long

Britain and America, which it is hoped to broadcast some time during Christmas night.

As far as I can see from advance programme information, the B.B.C. is offering listeners every inducement to remain tied to the local station! Some of the programmes certainly breathe the spirit of the festive season. But as Christmas will, this year, extend from Wednesday to the following Monday, there is a glorious opportunity for local listeners to become quite expert in receiving foreign stations.

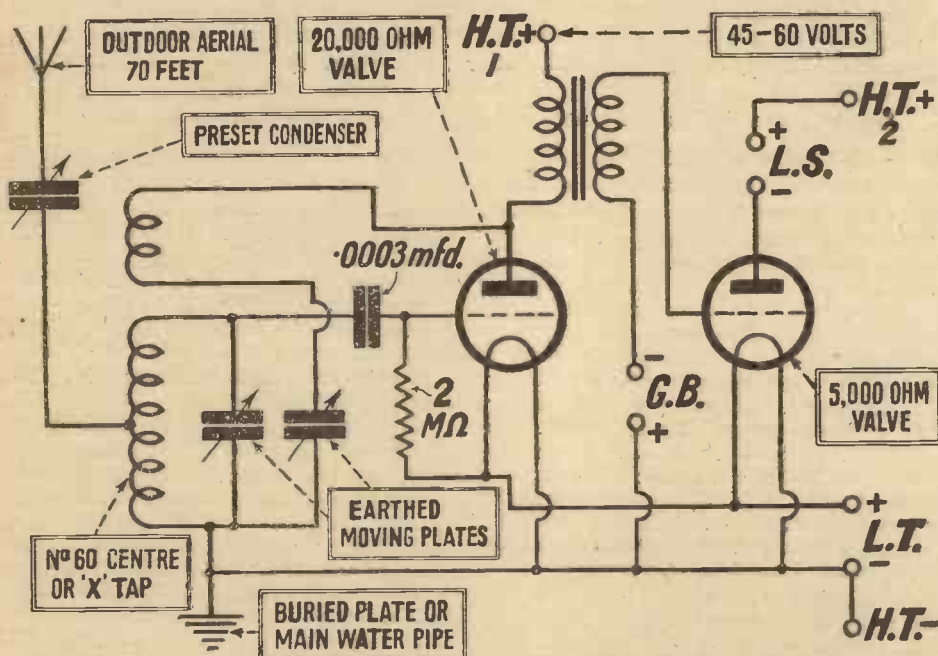
Foreigners on a Two-valver

I have said that nearly every valve set of to-day is capable of bringing in some foreign stations. Even a two-valver, provided it has reaction, can, with careful manipulation, reproduce at moderate loud-speaker strength such stations as Rome, Toulouse and Cologne. The more efficient the aerial and earth with such a set, the greater will be the strength of foreign stations received. So if the two-valve owner has ambitions to cross the channel by radio this Christmas, I suggest an overhaul of the aerial system. The earth wire might well be renewed, for this connection is just as important as the aerial wire.

I frankly admit that you must be fairly expert to get foreign stations on a two-valver, however good the aerial may be. Usually it is a question of understanding the reaction control, and of realising that adjustments of the reaction knob imply re-adjustments of the tuning knob. The detector valve in a two-valver owes its sensitivity to the application of reaction. If reaction cannot be applied gradually and smoothly, the detector valve cannot be brought to its most sensitive condition, which is just below the point of oscillation.

Here is a simple test to determine whether reaction is being efficiently applied to the detector valve. Increase reaction until the detector valve oscillates at, say, 50 degrees on the tuning dial. Then decrease the tuning dial setting and see whether oscillation ceases at the same point that it started. Sometimes it will be found that there are several degrees between the point where oscillation starts and the point where it stops.

This is known as reaction overlap. It is caused by incorrect working of the detector valve. When present, it prevents the
(Continued at foot of next page)



Outstanding points that need attention in a two-valve set for long-distance reception

"Well, why don't I get them?" we shall surely come across several valuable hints and tips.

Before we venture abroad, let us see what the home stations have to offer for Christmas. A pantomime, provided by Ernest Longstaffe, will be broadcast to Regional listeners on Christmas Eve, and to National listeners on Christmas night. *Little Red Riding-Hood*, in its radio version, should be very acceptable to listeners young and old.

I expect a great many listeners will be looking forward to Monday, December 22,

excerpt from *The Love Race*, relayed from the Gaiety Theatre, London.

One of the departures in this year's Christmas programmes by the B.B.C. is a long spell of gramophone records, from noon until 3 p.m. on Christmas Day, via the Regional station. Dance music from the regional and the Daventry national wavelengths will start at 10.45 p.m. on Christmas night and continue until 1 a.m. on Boxing morning.

A taste of long-distance reception, for those who listen only to the local station, will be the interchange of greetings between

For the Newcomer to Wireless : MUTUAL CONDUCTANCE

I NOTICE that in all published data for valves the factor mutual conductance is given. It must be very important, for often a strong point is made of the big mutual conductance of a particular valve, but I haven't the least idea what it means. I wonder if you could explain?

We may call the mutual conductance the efficiency factor of the valve. The higher the figure the better is a valve fitted to do the work for which it is designed.

Please go on.

Let us take an analogy. In order to see the relation between motor car engines of to-day and those of twenty years ago we could very well make a comparison between them in the matter of horse-power produced from a given engine weight. For example, if an old engine was found to weigh 500 lb., and to have a horse-power of 10, we could say that its weight efficiency factor was 10 divided by 500, or .02. A modern engine might give the same horse-power with a weight of only 200 lb. Here the weight efficiency factor would be 10 divided by 200 or .05. Do you follow the idea?

Yes, that's quite plain.

To simplify matters we could knock off the two noughts from the weight in

pounds and we should then have efficiency factors of 2 and 5, which would serve very well for the purpose of comparison.

I follow. Now about valves.

If you think for a moment you will realise that generally speaking high amplification goes hand in hand with high impedance in the wireless valve.

Is that so? Wait a minute. I've got a valve list in my pocket. Yes; here's an R.C. valve with an amplification factor of 50 and an impedance of 60,000 ohms. And then there's a medium impedance valve of 20,000 ohms with an amplification factor of 20. This power valve has an impedance of only 3,500 ohms, but the amplification is 8. The next one is a super-power valve with an impedance of 2,000 ohms, and an amplification factor of 5. Yes, I realise that a high amplification factor seems to mean a high impedance.

If you had looked through a similar list published five or six years ago you would have found that impedances were ever so much higher in proportion to the amplification factor. For example, the original Ora valve had an amplification factor of only 7, but an impedance of 40,000 ohms.

Do you mean that progress has been

made by getting a bigger amplification for a given impedance?

That's it exactly, and the higher the relation between amplification and impedance the more efficient the valve is. Take, for example, an output valve. Here we want low impedance in order to bring out the deep notes, but we also want a respectable amplification factor to provide sufficient volume. Suppose we fix 1,500 ohms as the most desirable all-round impedance for the output valve in a wireless set, then clearly the bigger the magnification we can get with such an impedance the better the valve is.

That's quite clear. But just how does mutual conductance come in?

The mutual conductance figure is simply the amplification factor divided by the impedance. If we left the impedance figure complete this would give us the mutual conductance in amperes, but as we want the answer in milliamperes we multiply the amplification factor by 1,000 before making the division.

Here's a valve with an amplification factor of 3.6 and an impedance of 1,400 ohms.

Then the mutual conductance is 3,600 divided by 1,400 or just about 2.6?

Yes, that's the figure given.

"TUNING-IN THE CHRISTMAS BROADCASTS"

(Continued from preceding page)

detector valve from working at its maximum sensitivity. One way of reducing the trouble is to lower the anode voltage of the detector valve. If the two-valver has only one high-tension positive connection, and reaction overlap is noted, it is worth taking a separate high-tension-positive lead from the detector valve circuit. If the two valves are transformer coupled, the anode voltage for the detector will be supplied through the primary winding. The end of the primary remote from the anode of the detector valve should be taken to a voltage of, say, 45 to 60 volts.

On a two-valver with good reaction, and assuming a moderately efficient aerial, one should be able to bring in at least three foreigners. The easiest is probably Rome, on 441 metres. This station should be heard between the settings for the Midland Regional and the London Regional stations. It is a very easy station to identify. They have a lady announcer at Rome who says: "*Eh-yar Radio Roma.*" As Rome nearly always relays Naples in the evening, she says "*Radio Roma Napoli.*" Another distinctive feature of Rome is the interval signal, which, once heard, can never be forgotten. An air is played by means of oscillating valves.

As this station has a power of 75 kilowatts its 900 miles distance from London

does not prevent it from being heard with great clarity on almost any set. The lady announcer ends up with "*Buona notte a tutti!*"

Another station a two-valver can pick up quite easily is Toulouse. Although it is over 500 miles from London, Toulouse is one of the strongest signals received from the Continent. They always seem to have the same announcer at this station. His "*Allo. Ici Radio Toulouse!*" is unmistakable. And the announcer always says "*Ici Radio Toulouse.*" before and after every item broadcast. The dial setting for Toulouse is about 10 degrees above the London Regional setting.

The third station for two-valvers is Cologne. On a wavelength of 227 metres this station is very strongly heard in London. It is really not very far away, only 300 miles. But its power is only 1.7 kilowatts. To those unaccustomed to foreign station reception the German announcement from Cologne is rather a teaser. Here it is: "*Achtung fur die Westdeutschen Sender.*" This means attention for the West German transmitter.

As Langenberg relays Cologne, one hears the same announcement. On most two-valvers it should be possible to hear Langenberg, although as it comes in only a degree or so below the Midland Regional setting there is a probability that it will not be received clear of interference.

The long wavelengths are worth the

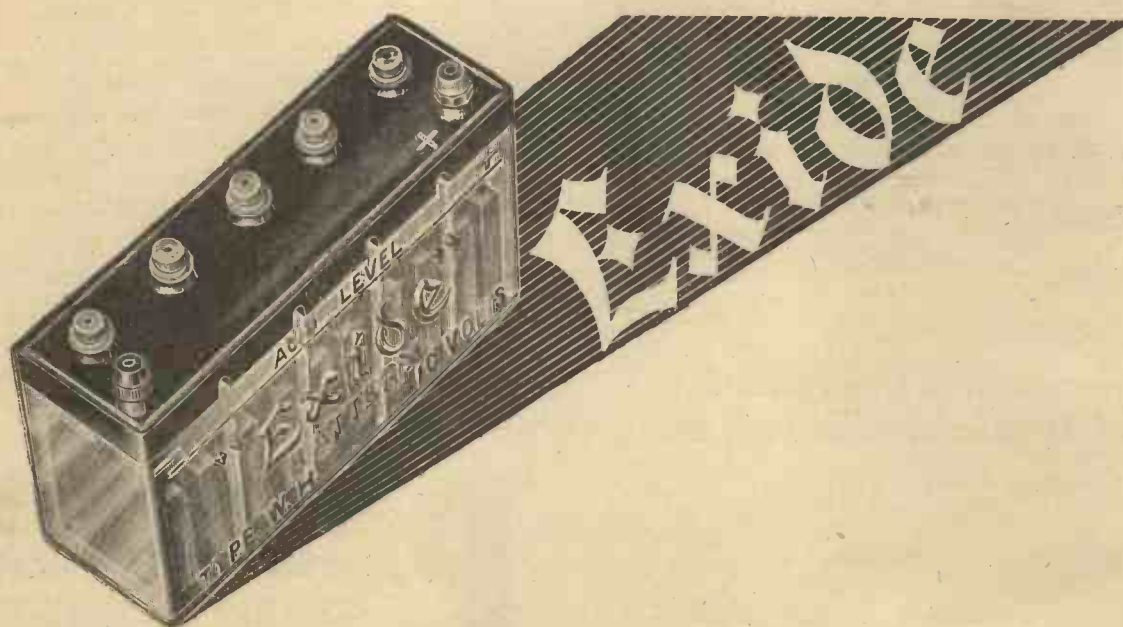
attention of two-valvers, and for that matter three-valvers. If Daventry 5XX is heard at really good loud-speaker strength, there is every reason to expect Radio Paris at moderate loud-speaker strength. This powerful French station should be heard 10 degrees or so above Daventry. The call sign between announcements is: "*Ici Radio Paris.*"

Just below Daventry is the Eiffel Tower station, which should also be heard quite easily on simple sets. These two French stations are little more than 200 miles from London, they are on fairly high power, and their long wavelength transmissions do not become attenuated in the manner common to medium wavelengths. Another advantage of these long wavelength stations is that they can be heard during daylight just as well as at night. Moreover, they do not fade like medium waves.

Although I have barely fringed the possibilities of long-distance reception on medium-power sets, I hope I have convinced some readers that this Christmas is going to be well worth while in a radio sense. The great power of foreign stations as received here is making us realise that our tight little island is no longer immune from Continental influence. Tune in a German orchestra playing, rather inevitably, something by Johann Strauss, or a novelty orchestra from Gay Paris and then see if you do not agree that variety is the spice of life!

Constant, clearer reception—the Exide High Tension Battery gives you the programme full and faithfully . . . it adds nothing, no background of buzz or crackle, no harshness it makes your set more stable.

Improved selectivity—the Exide H.T. Battery helps to cut out interfering stations . . . its voltage does not fluctuate or fall. It gives silent, steady service to the end of its charge . . . and it can be easily, cheaply recharged—no new batteries to be bought . . . you listen at less cost with the Exide H.T. Battery in your set.



Make sure it is an Exide—keep in mind that nine out of every ten British ships rely for their wireless on the **Exide Battery**

Prices per 10-volt unit: W.J. 2,500 milliamps 5/- • W.H. 5,000 milliamps 6/3 • W.T. 10,000 milliamps 12/-

From Exide Service Stations or any reputable dealer. Exide Service Stations give service on every make of battery

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a cheery fire . . . happy laughter . . .
and music clear and pure from a good radio
that has been made better by Pertrix.
What more *could* one wish for?

It is because NO sal-ammoniac is used in a Pertrix Battery that it gives the purity of current that is so essential in obtaining perfect reception. So don't forget, make it a Pertrix Christmas this year, and enjoy your radio.

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and Accumulators as Presents
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100 " "	13/-	120 " "	25/6
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Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

On Your Wavelength!

A D.C. PROPOSITION

A.C. USERS seem to be fairly well catered for these days, but D.C. has not received the same attention. True, there are quite a number of published designs and several manufacturers will supply mains sets for D.C., but one cannot really consider the average D.C. user to be adequately treated.

A particularly difficult supply to deal with is the 100-volt D.C. which is found in various parts of the country. It is almost hopeless to try and work a radio set from such a supply, because by the time one has taken grid bias and filament voltages there is only about 80 volts left. One can, of course, use a separate grid battery and be content with a small output, but it has to be a very small one. The undistorted power output increases rather more rapidly than the square of the voltage, so that if we can double our voltage we get at least four times the noise.

One solution of the difficulty is to use 80 volts of accumulators and to push these in series with the mains, making a grand total of 180 volts. When the set is not in use, a switch can be thrown over which puts these accumulators on charge across the mains, thereby keeping them always up to scratch. This then becomes a practical proposition, for with 180 volts and two P650's in parallel or push-pull one can begin to talk business.

CONCERNING MAGNETISM

I SEE that the Royal Society has appointed Dr. Kapitza to a Messel Professorship and have given a grant of £15,000 to the University of Cambridge for a special laboratory in which his startling researches into magnetism are to be continued. In spite of all our gropings, we have to admit that the essential nature both of magnetism and electricity still remains a profound mystery. More work has, perhaps, been carried out in purely electrical research than in the sister science though Professor Kapitza is now adjusting the balance. He has already succeeded in creating magnetic fields having the enormous intensity of 350,000 gauss, and hopes to increase this to a million lines per square centimetre. For the former figure a generator rated at 2,000 kilowatts sends a current of no less than 72,000 amperes through a small coil. The current is naturally only momentary, or it would disrupt the winding—and everything else within range, I should imagine. The new experiments are expected to throw fresh light upon the constitution of the atom, and more particularly upon the physical nature of electric resistance.

THE B.B.C. IN SCOTLAND

THINGS are looking up beyond the Border. When opening the new B.B.C. premises in Edinburgh, Mr. Adamson, the Secretary for Scotland, laid stress on the fact that not only was the new studio the largest and best equipped in the whole

of Britain, but that the B.B.C. intended to make fresh efforts to foster Scottish sentiment and tradition. He did not, however, proceed to hit the nail right on the head by promising an immediate reduction in the licence fee! But, quite seriously, I am glad to see signs of improvement in the B.B.C. service for our northern readers, because judging from some of the letters I occasionally get from that quarter, they seem to have had some serious grounds for complaint.

HOW DO YOU FIND IT?

MY aerial is just fifteen miles as the crow flies from Brookmans Park. Therefore it requires no great stretch of the imagination to perceive that the field strength of the London Regional transmitter is pretty considerable in my locality. When I tell you that, even with a small transportable with self-contained frame aerial, the strength is such that I have to use a hefty amount of volume control to prevent the roof from being lifted, you will obtain a useful working idea of the way in which "Raucous Reg" comes to me and to my friends and neighbours. This being so, you would imagine that he would be capable of drowning any interference arriving from a range of several hundred miles; in other words, that he would sit upon Stuttgart, drowning the latter's voice. But it is not so, dear reader. With a receiving set selective enough to have a useful gap of complete silence between Rome and Stockholm, and to bring in Langenberg quite free from 5GB (the latter being just forty-five miles away), Stuttgart pushes his way through the London programme and causes constant interference. What reception of "Raucous Reg" must be like for those who live further away from him than I, I can only imagine.

THE NEXT MOVE

AT the moment we appear to have reached one of those queer little deadlocks that arise when neither side will budge an inch. The B.B.C., in its usual futile way, makes a statement about the "inevitable interference," and talked vaguely about possible wavelength changes on the part of Stuttgart. Meantime the German authorities are fairly happy, since in their own service area they are successfully shouting down "Raucous Reg," and they maintain that if anybody does change his wavelength it will not be Stuttgart. In passing, I quarrel rather with the adjective "inevitable" as applied by the B.B.C. to the interference. With my Stenode I can receive "Raucous Reg" clear of Stuttgart and *vice versa*. It would appear, then, that the interference is *not* inevitable.

STILL MORE

I WILL return to this question in a moment. Meantime, I just want to breathe the word Heilsberg. The new Königsberg transmitter located at Heils-

berg will have come into operation by the time that this appears in print. It is to begin gently (!) with a power of 75 kilowatts, but in a matter of weeks this will have risen to 120. On many receiving sets his signals are bound to interfere with those of "Noisy Nat," and I suppose we shall have more soothing syrup from the B.B.C. on the subject. The result, though, is likely to be that large numbers of listeners will be able to receive neither the London Regional nor the London National clear of interference; and goodness knows what steps, if any, will be taken by the B.B.C. to produce an amelioration of reception conditions. There will be still more fat in the fire when 5GB comes down to a wavelength not far removed from that of "Raucous Reg," and the second northern Regional programme is pushed out on Aberdeen's wavelength.

WHAT'S THE REASON?

TO return to that word "inevitable." I mentioned just now that with my Stenode interference by Stuttgart with the London Regional programme is perfectly avoidable. But for some reason, which completely baffles me, the B.B.C. never appears to have heard of the Stenode Radiostat. I have searched in vain the columns of its official publications for any mention of this British invention, to which other papers, such as *AMATEUR WIRELESS* and the *Wireless Magazine*, have devoted large amounts of space since they realised its importance. And not only the technical papers, but also most of the important lay organs recognise that the Stenode is not just a stunt.

If the inventors of this system were a manufacturing concern I could to some extent understand the B.B.C.'s position. But they are not. What they do is to say to manufacturers: "Here is our invention. Come and hear it, ask for any tests you like, and if you are completely satisfied we will give you full particulars and grant you a licence to manufacture." Many important firms have taken out these licences, and one imagines that they must have been pretty well satisfied before doing so. Yet the B.B.C. has never heard of the Stenode!

A DIFFERENCE

GETTING on for two thousand years ago it was said that a prophet was not without honour save in his own country. Dr. Robinson, the inventor, is a prophet in so far as he has shown us the way out of our present wireless difficulties. He is at the moment not in his own country, but in America, and there he is receiving his full due of honour. Not only the wireless papers, but also each and every one of the big lay papers has made a "splash" feature of the Stenode, using such headlines as only Americans know how to use.

IN-GERMANY

THERE is another rather interesting point whilst we are on this subject. I

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On Your Wavelength! (continued)

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happened to pick up the other day a back number of the official publication of one of the most important German broadcasting authorities. Turning over its pages, I was struck by a large heading: "*Der Stenode Radiostat*." There followed a long article by one of the most eminent of German wireless engineers, dealing with the Stenode principle. The article concluded by saying that the writer was making laboratory tests and that he would shortly give the full results of these. Meantime, this particular broadcasting authority has found the Stenode Radiostat so good that it is making regular use of it for the reception of foreign programmes for relaying purposes. Some day, perhaps, the B.B.C. will awaken to the fact that a British inventor has produced something of importance in the field of wireless.

HIGH POWER

WHAT will be the ultimate result of the shouting-down competition in which the wireless authorities of Europe are now so happily engaged? The B.B.C. began it, and now I think it is rather wishing that it hadn't. In less than a couple of years it will be wishing this still more so. Readers will give me the credit of admitting that I was one of the very few people who from the very first denounced the Regional Scheme as being utterly futile. If it is still decided to carry it through, the ultimate results are going to be these. First of all, we shall snaffle nine wavelengths on the broadcast band and make use of a super-power transmitter on each. This will mean that hundreds of thousands of present-day receiving sets will be rendered useless for any purpose but local reception. So far as I can see, the only foreign stations that are likely to be receivable when the scheme is in full operation will be Rome, Stockholm, and possibly the higher wave stations, such as Vienna and Budapest, which come through well only when conditions are particularly favourable.

COMPETITION!

RESULT number two will be the coming into operation of fifty or sixty even higher-powered stations in foreign countries, and unless we are very careful even local reception without interference may become impossible. And there is another cloud, no larger than a man's hand as yet, on the horizon. This is the Russian threat or promise to install within two years a hundred 100-kilowatt stations operating within the limits of the broadcast band. Let Europe pursue its present course of broadcasting development and the jammiest of jams is inevitable.

A SOLUTION!

I DON'T like destructive criticism, and I am going to offer once more a constructive suggestion that I made some time ago. Experience has already proved that high-power stations with wavelengths below a bit over 300 metres are pretty well useless, since their service areas are so restricted. Therefore, if we intend to put out super-power on the wavelengths at present used by

Cardiff, Aberdeen, the relays, and Belfast, we know perfectly well that no particular good is going to come of it. The whole of this country can be adequately served by five high-power stations. My own suggestion would be to increase the power of

DOCTOR WIRELESS

(A medical officer has reported that the population of Daventry has become healthier and happier since the wireless station has been established.)

1

Oh, wireless is so bracing,
Better far than sport or racing,
For it brings you health, as well as happiness.
So away with melancholy,
For the ether is so jolly,
And all your petty ailments plague you less.

2

If neuralgia makes you bellow,
Then Miss Harrison's sweet 'cello
Will charm it, as she does the nightingale.
And an hour of Ridgeway may go
Far to cure your old lumbago,
And for wrinkled brows the Kiddies' Hour
can't fail.

3

If arthritis makes you shiver,
And you suffer with a liver,
You will find that Mrs. Buggins is no bane.
A melodious cadenza
Will banish influenza,
And jaded nerves are soothed by Jazzing
Payne.

4

A morsel of old Schubert
Is better far than Tube air,
Its glorious 'mid Daintree's dales and hills.
An orchestra symphonic
Is a never-failing tonic,
And you'll save a host of chemist's little
bills.

5

Sciatica is painless
With a dose of Stephen (Stainless),
And Leonard Henry drives the gout away.
While if the doldrums find you,
I hardly need remind you,
You might do worse than try the "Roosters"
lay.

6

Oh, headphones are so jolly,
So away with melancholy
And let us hear no more of strain and stress.
Plump for cheery Doctor Wireless,
For dispelling ills he's tireless,
And he brings you health as well as happiness!
Percy Merriman.

NEXT WEEK'S ISSUE

Readers should note that next week's issue, dated December 27, will be On Sale on Tuesday, December 23.

Just before Christmas Eve!

Order your copy
for the holidays.

5XX to 100 kilowatts and to send the National programme out from this station only. With a power of 100 kilowatts on a wavelength of 1,554 metres, 5XX should be able to give excellent reception on even single-valve sets throughout the country. There is not the slightest need to cater for crystalisers since in a year or two from now there probably won't be a crystal set in existence; the need for greater selectivity will automatically wipe out the crystal set, anyhow. The Regional programmes I would have transmitted by four stations, using the highest "broadcast" wavelengths that we possess. We have four of these in the wavelengths now used by 5GB, Glasgow, Manchester, and the London Regional. We could therefore reduce our requirements to four channels on the broadcast band, and if we went to the next Conference prepared to take a step of this kind I have little doubt that other countries would fall into line. At present the whole position is simply silly, and we are heading for chaos as fast as we can.

THE INTERVAL SIGNAL

AT last, we are to have an interval signal for our home stations, and I, for one, am very glad to hear it. It is more than five years now since I first advocated this improvement in the columns of AMATEUR WIRELESS. What happened then, and still happens to-day—especially at Christmas-time, when thousands of new sets come into use—is that during programme intervals people think that they have lost the transmission and start searching for it with reaction tight coupled. Up and down they howl during what is meant to be a silent interval, and when the music starts again it generally takes them some little time to find the proper adjustment once more. If there is an interval signal something comes through all the time, and those who are using valve sets for the first time do not panic. But why—oh, why—make this signal the soulless and completely unoriginal ticking of a metronome? To my mind, interval signals should always be such that the station sending them out is easily recognised.

A SUGGESTION

AND the solution is really delightfully simple. Why not have for the National transmitters the first four notes of "Rule, Britannia," sent out by a valve oscillator? At present there are only two National transmitters, and no one is going to mix up 261.3 with 1,554 metres. If and when the others come into operation they could be numbered and each could send the four notes in question plus one, two, three, four, or five dashes. Then for the Regionals. Why not four or five notes of one of the old London street cries for London, "The Cock of the North" for Scotland, and so on? Valve oscillators are very satisfactory, and they are already in use by many foreign stations, as readers doubtless know. If the scheme suggested were adopted, any British station could at once be identified by its interval signal.

THERMION.

THE HOW AND WHY OF RADIO

XIV—WHAT YOU SHOULD KNOW ABOUT METERS

If you are a beginner in wireless, now is your chance to gain a clear conception of its theory and practice. In this series of articles, specially prepared for the beginner, no previous knowledge of wireless is assumed. It is intended to deal with every aspect of the subject and the whole series will endow the beginner with sufficient knowledge to enable him to derive the greatest possible interest from the fascinating hobby of wireless

TO a beginner, the inanimate nature of wireless must always be a handicap. One cannot see the wheels going round, so to speak. An electric current is not easy to imagine; nor is a high-frequency wire-

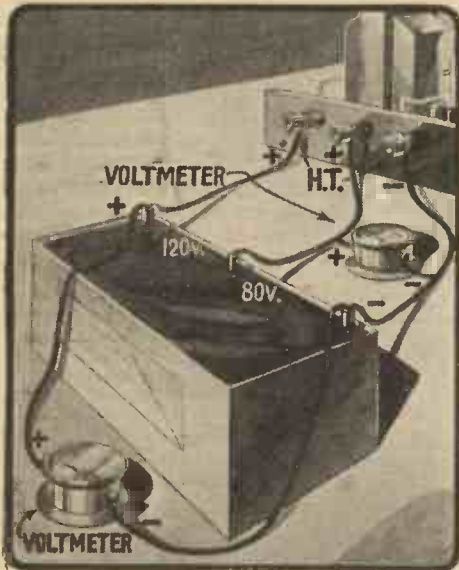


Fig. 1. Two positions of a voltmeter are shown here—one measuring the maximum voltage of a battery and the other subsidiary voltages

less wave. But through the "eyes" of meters we can gain some idea of what is happening inside the set. We can see the effect of a wireless wave on the current flowing through the battery or other source of power. We can even see signs of distortion that the ear cannot hear.

The two meters most commonly used in wireless are the voltmeter, which measures volts, and the ammeter, which measures amperes. The voltmeter shows how much voltage is applied to the anodes of the valves; whether the battery is running down; other very useful facts can be determined with this meter. Suppose we have a set worked from a 120-volt high-tension battery; there might be two positive high-tension supplies, one going to the 120-volts maximum and the other to 72 volts. While the set is working, a voltmeter can be used to see whether the required volts are being applied. Note that the meter has positive and negative terminals, which must be connected to like poles of the battery, otherwise the needle will be deflected in the wrong direction. Fig. 1 shows the two positions of the voltmeter for determining the value of the maximum voltage and of the subsidiary voltage.

The voltmeter is said to be in parallel with the battery. The battery connections are not intercepted. The positive side of the voltmeter is connected to the positive end of the battery and the negative of the voltmeter to the battery negative. The voltmeter has a very high resistance for the object is to keep the current flowing through the meter as small as possible. If an appreciable current flows through the voltmeter winding, some voltage will be dropped across the meter and so the reading will not be accurate.

The best voltmeter is the one that takes the least current to deflect the needle across the scale. In the moving-coil voltmeter are many turns of fine wire. The resistance may be as much as 1,000 ohms for every volt on the scale. A voltmeter reading from 0 to 250 volts would therefore have a total resistance of 250,000 ohms. The

current to the set is to record something misleading. A unit might give 200 volts on no-load and when delivering say 20 milliamperes of current only 150 volts. A run-down battery would also show a higher voltage on a no-load test than when connected to the set.

Voltmeters are available in various voltage ranges. Some are wired so that two or three voltage ranges can be covered in one instrument, as, for example, 0-to-10, 0-to-50 and 0-to-250 volts. The low reading voltmeter is not often wanted, since the filament voltage and the grid-bias battery voltage are not usually in doubt.

Now we come to the ammeter, which works on the same principle as the moving-coil voltmeter. That is to say, current flowing through the coil tends to move the coil so that its flux is at right angles to the plane of the magnet surrounding it. We say that a clockwise twisting torque is exerted between the coil and the magnet, against the anti-clockwise torque of the springs connected to the pointer.

In an ammeter the fine-wire coil is shunted with low-resistances, so that when the meter is inserted in series with an electrical circuit its resistance is negligible. In this the ammeter differs from the voltmeter. Remember this simple rule:

Voltmeter; high resistance; parallel.

Ammeter; low resistance; series.

We very seldom need an ammeter in the wireless set, since the only large current is that taken by the filaments, usually a total of between .5 ampere and 1 ampere—in a battery-operated set. We are much more

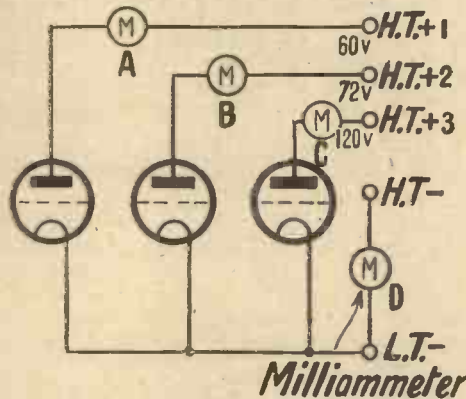


Fig. 3. Meters arranged at A, B and C, measure separate anode currents. At D, total current

accuracy of such a meter is near enough for all amateur needs, and is much greater than with the moving-iron meter, which draws appreciable current from the battery.

One may often hear and be mystified by the expression "load voltage." This is the only voltage that counts. It is the value of the potential difference between the positive and negative of the power supply when that supply is delivering power. So a voltage reading of a battery, or mains unit, should always be taken when the set is working, for then the load voltage will be determined and not the no-load voltage, which is the value of the potential difference recorded when the supply is not delivering power.

This load voltage is most important in battery eliminators. It so happens that the load voltage of a mains unit is seldom as high as the no-load voltage. To take a voltmeter reading of a unit not delivering

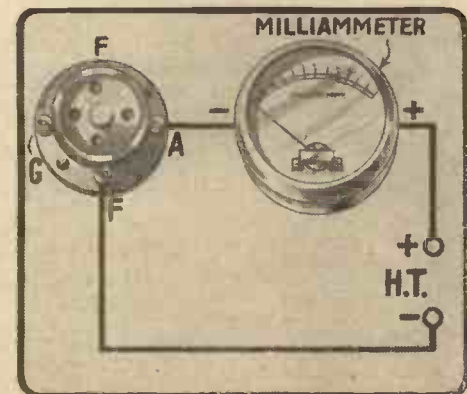
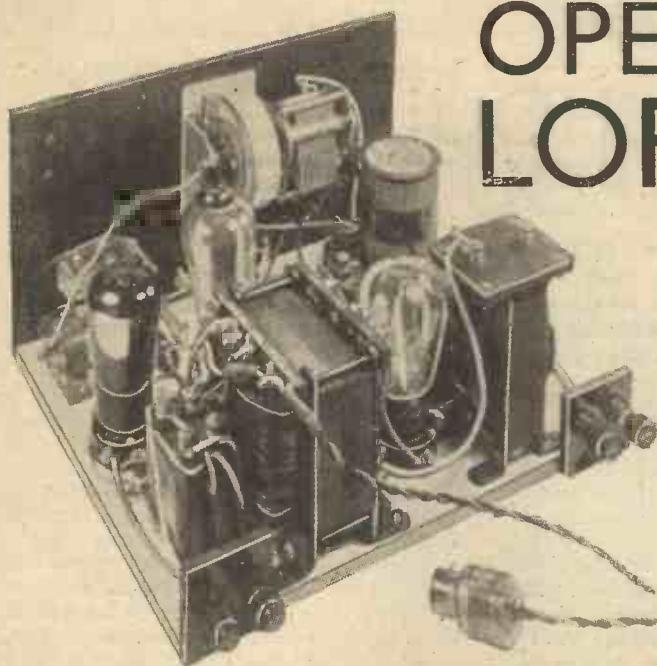


Fig. 2. This is how a milliammeter is used to show the anode current of a valve

interested in the small currents flowing in the anode circuits of the valves. To measure these currents we use the milliammeter, which has its resistance shunts arranged so

(Continued in third column of next page)



OPERATING THE LOFTIN-WHITE 2

Some further notes on the novel mains receiver described in last week's issue

By J. H. REYNER, B.Sc., A.M.I.E.E.

THE simplicity of this receiver is such that little remains to be said over and above what was given in the constructional details last week. Provided that reliable resistances are used, which are within a few per cent. of the stated values, the set will work without any difficulty and will give very pleasing results.

Circuit Features

I have been asked what the particular feature of the circuit is. The inquirer had apparently tried some experiments with the system (details of which have appeared in certain American papers) and had not obtained good results. The reason for this is that the resistances have not been correctly chosen for our British valves, and as the circuit is one in which the various voltages at the different points must be just right, the results are disappointing if the values are incorrect.

I had just the same difficulty at first and the circuit behaved rather like a poor two-

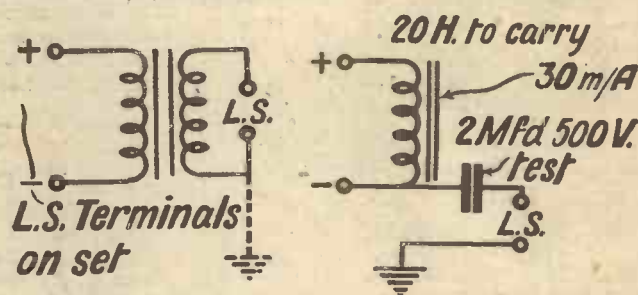
valver of the ordinary variety. When the necessary alterations had been made, however, the difference was remarkable. It gives more volume than any ordinary two, even of the transformer-coupled type; while, of course, the cost is considerably cheapened, due to the fact that the smoothing required is less than usual, and resistances are used for intervalve coupling. Finally, since there are no coupling condensers, it is particularly good on transients.

I referred last week to the desirability of using a choke- or transformer output circuit. The last valve handles a current of some 30 to 35 milliamps, and this passing through the winding of the average loud-speaker will not be desirable for any length of time. True, in this case, the current grows to its normal value slowly and dies away again just as slowly, so that the sudden interruption of the current will not occur. It is, however, desirable to incorporate some isolating device, and this has the further advantage that it effectually isolates the loud-speaker from any possible high voltage in the set.

moving-coil speaker, which possesses a built-in transformer and therefore the difficulty is removed.

This loud-speaker, by the way, is a large auditorium model, yet I can produce loud volume from this simple two-valve set with surprising quality. A gramophone pick-up, of the ordinary sensitivity, giving about .5 to 1 volt, will produce adequate volume.

It is as well to reiterate that this set is only intended for local-station work. It will receive the Midland Regional programme at Elstree at good volume, but it is not intended for distant reception. I hope to describe very shortly a three-valve Loftin-White set, having one stage of H.F., and this is capable of a really remarkable



Two forms of output circuit suitable for the Loftin-White 2

performance. For all ordinary work, however, this two is efficient and inexpensive.

"WHAT YOU SHOULD KNOW ABOUT METERS"

(Continued from preceding page)

that the pointer moves for thousandths of an ampere, or milliamperes. The milliammeter, measuring milliamperes, is connected as shown by Fig. 2.

Note that the milliammeter intercepts the anode circuit between the anode of the valve and the positive side of the power supply. The positive and negative connections of the meter must be connected as shown; that is, negative to anode and positive to battery positive. As shown, the meter will record the anode current of that particular valve. To measure the total current consumption of a three-valver with separate anode feeds, the meter must be connected in the negative battery lead, since that is common to all.

Fig. 3 shows how the separate anode currents of each valve can be measured by inserting the milliammeter at A, B and C, and how the total anode current can be measured at D.

HOTSPOT.

NEXT WEEK:—XV: "Simple Radio Formulas."

COMPONENTS REQUIRED

Ebonite panel, 12 in. by 8 in. (Trelleborg, Becol, Lissen)

Small drum dial, with .0005-mfd. variable condenser (J.B., Burton, Polar, Formo, Lotus, Ormond)

.0001-mfd. reaction condenser, (Polar, Lissen, Bulgin, Lotus, J.B., Dubilier, Formo, Keystone)

Pick-up jack and plug (Lotus, type J.K.2: Igranice)

400-ohm panel-mounting potentiometer (Lissen, Varley, Igranice, R.I., Sovereign, Rotor)

Single-pole mains switch (Claude Lyons, Bulgin, Utility, Igranice)

Baseboard, 12 in. by 10 in. (Clarion, Camco, Pickett)

Two four-pin and one five-pin valve holder (Burton, Telsen, Lotus, W.B., Benjamin)

Dual-range coil (Lewcos, D.W.A.)

.01-mfd. fixed condenser (Dubilier, T.C.C.)

Two 1-mfd. fixed condensers (Dubilier, T.C.C., Lissen, Igranice, Ferranti)

2-mfd. fixed condenser (Dubilier, T.C.C., Lissen, Igranice, Ferranti)

Two 2-mfd. fixed condensers (800

volt D.C. test) (Dubilier L.S.B., T.C.C., Ferranti, Igranice)

.5-megohm grid leak (Dubilier) Grid-leak holder (Lissen, Dubilier, Bulgin)

50,000-ohm spaghetti resistance (Bulgin)

100,000-ohm spaghetti resistance (Bulgin)

20,000-ohm spaghetti resistance (Bulgin)

5,000-ohm power resistance (Colvern, Ferranti, Varley)

400-ohm resistance (Colvern)

High-frequency choke (Telsen, Varley, Lissen, Read-Rad, R.I., Lewcos)

Mains transformer, with following secondaries: 375 v.-0-375 v., 40 m.a., 5-volt C.T. 1.6 amp, 6-volt C.T. .25 amp, 4-volt C.T. 1 amp (Savage, Wearite)

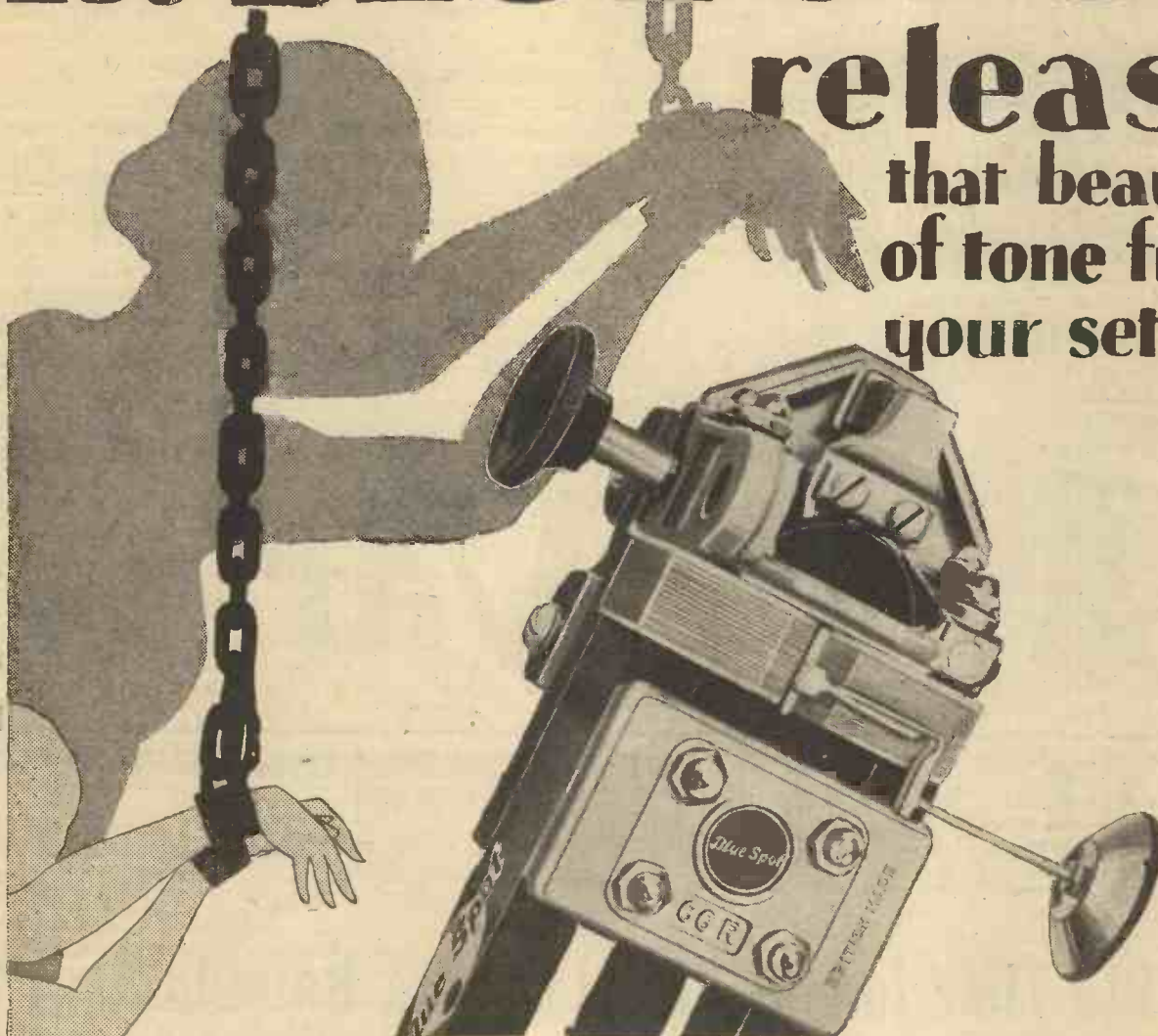
Smoothing choke (Lotus, Igranice, Varley, Lissen, R.I.)

Two terminal strips, 2 in. by 2 in. (Read-Rad, Junit, Belling-Lee, Becol)

Four terminals marked: L.S., L.S., A, E (Belling-Lee, Clax, Eelex, Burton, Igranice)

Screen-grid connector (Belling-Lee)

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Within your radio receiver, fettered and helpless, lies a rich tonal quality you have never heard

The wonderful 66R—designed and constructed of the finest materials obtainable—with its robust magnet—micrometer adjustment, and precision movement of “butterfly wing” sensitivity is the last word in loud-speaker units.

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66R 37

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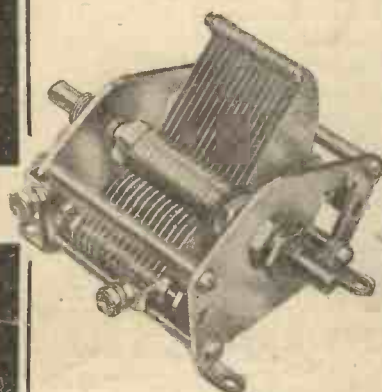
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THIS TIME for the "CHALLENGE" RADIOGRAM

Chosen by the designers because of their outstanding and proved merits.

YOU WANT 2 "UNIVERSALS" AND 1 POLAR DRUM DRIVE to ensure the finest results.



POLAR "UNIVERSAL"
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DRUM DRIVE - 8/6

POLAR "UNIVERSAL"

A condenser specially designed for ganging. Fitted with detachable spindle — various lengths supplied. Baseboard mounting lugs ensure rigidity and accurate alignment. Locked rotor vanes. Screens easily fitted between units. May also be used as a single unit. Suitable for mounting to any type of S.M. drive.

POLAR DRUM DRIVE

An improved slow-motion drum drive with smooth, precise action. Clearly marked scale, 0-180. Recessed aperture with window for illumination. Metal Escutcheon, Bronze finish. Suitable for single or ganged condensers mounted parallel to panel.



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Please Mention "A.W." When Corresponding with Advertisers

BROADCAST ARTISTES IN PICTURE



ETHEL WALKER.—As an exponent of modern music, especially that of MacDowell, Miss Ethel Walker is especially noted.



JERRY HOEY.—For many months now Jerry Hoey has directed the fine little orchestra known as the Piccadilly Grill Band.



DORIS VANE.—One of the original "Follies" of Pellissier's famous troupe. Miss Vane is a fine singer and actress.



JOSEPH LEWIS.—Late of the Birmingham station, is now at Savoy Hill, where he takes an active part in the practical side of programme making.



SIGNOR LENGHI-CELLINI.—In the earlier days of the Queen's Hall concerts, his name frequently appeared.



ESTHER COLEMAN.—A singer who has made her name by her artistic work and the many recitals she has given.



JESSE STAMP.—Chief trombone player in the Queen's Hall Orchestra. A pupil of the Manchester Royal College, Mr. Stamp has played in all the great orchestras.



HELEN ALSTON.—A fine singer, she is known on all the big concert halls, as well as broadcast concerts.



JOHN PERRY.—A tenor of exceptional quality and compass; as he has sung some thirty principal roles, his experience may be considered wide.



MARY OGDEN.—A fine contralto. Born in Manchester, she went in particularly for oratorio work.



LEONARDO KEMP.—At present running the orchestra which broadcasts twice weekly from the Piccadilly Hotel.



ARTHUR KENNEDY.—A well-known provincial musician and conductor, often heard through the Regional station, when he conducts the Midland Wireless Orchestra.



MURIEL CHILDE.—A clever artiste, who has been heard over the ether as well as in many provincial concerts and halls.

THERMION SAYS:

"GIVE YOUR SET A CHRISTMAS PRESENT"

I SHALL never forget the Christmas when Mrs. Thermion, full of loving pride, handed me the compliments of the season and the world's worst transformer. Of course, one should not look a gift transformer in the primary impedance. Still, one glance was sufficient to show it to be the kind of thing that causes stout fellows to be filled with a longing to bury it deep in the barrenest part of the garden.

Since then we have come to a much better arrangement, such as I strongly recommend to all readers. She presents me with silk stockings and things, and I give her valves and moving-coil loud-speakers. Then, when the glad season is over, we solemnly swop presents.

It is, I think, the duty of every wireless man to give his set a Christmas present; and here I may remark that the business of squaring your conscience is the easiest thing in the world, once you know how. For instance:—

"I would like to give my set a new output valve, but it *does* seem a bit selfish."

"Doesn't the family enjoy the music from your set?"

"Why, of course."

"And won't the valve improve the music?"

"There's no doubt about that."

"Then, by giving it a new valve you are

performing a most unselfish deed, since you are increasing the joy of your family."

You see?

Of course, the best present that you can give your set, really, is a thorough overhaul, going over all the wiring and possibly substituting up-to-date components for old ones. And there is a nice long time to do it in this Christmas, for there are four whole days' holiday from the Thursday onwards. But I am not going to recommend this course, for I know that if I did so thousands upon thousands of families would heap curses upon my head, since the wireless set would be silent over the whole of the Christmas holiday.

A Few Hints

Still, if you won't let on that I am responsible, I can, I think, give you one or two little hints and tips that will help to pass the holiday time happily whilst greatly improving the performance of the set. For instance, a jolly and quite inexpensive little present to the family is a slow-motion dial for the reaction control. This can be fitted in a trice (whatever a trice may be!), and it does make the tuning-in of foreign stations a whole heap easier. And if those valves have seen their best days I am sure that the family would appreciate a new lot.

And then there's that low-frequency transformer—not, perhaps, the world's worst, but, at any rate, not quite the world's best. At the glad season you might as well make the family a really good present and buy them an up-to-date transformer, even if it does cost thirty bob. You can change a transformer pretty quickly without disarranging the set, for all you have to do is to whip off the terminals and lift aside the connecting wires. Out with the baseboard-mounting screws, and there you are. Reverse the process, and the new component is in place.

And here's a present you can give the set and the family with the pleasant feeling that, however much you spend on it, you are saving money hand over fist. What I mean is a super-capacity high-tension battery to replace the little fellow that you use and ill-use at the moment. Honestly, no standard-capacity battery is up to working anything bigger than a two-valver economically. I have tested hundreds and hundreds of them in the laboratory, and I know what they really can and can't do.

Of course, if you have lighting mains in the house, one of the best presents that you can give the set is an eliminator. You needn't alter a single wire if you buy one of the type that incorporates an L.T. trickle charger.

SOME USEFUL SUGGESTIONS



Telsen transformer



Clarke's
'Atlas'
H.T. unit



Igranic Elkon rectifier



Exide accumulator



Westinghouse H.T. rectifier



Lissen variable condenser



(Above) Varley table-type receiver. (Right) The new Marconiphone 560 set



Ediswan two-valver



An R.I. Varicap condenser

A Weekly Programme Criticism—By SYDNEY A. MOSELEY.

Without Fear or Favour



THE MOST POPULAR
CONDUCTOR?

THE TWO PAYNES

STORY TELLING

CRITICISMS

IF, the play by Lord Dunsany, which was rather reminiscent of the *Aladdin* and *Brass Bottle* type of play, justified its production by Lance Sieveking. I preferred the beginning, in which Ernest Thesiger and Gladys Young were a pair of Cockneys. The scene in the East was noisy and not new, and I was longing for the epilogue which would bring us back to the pair of Cockneys.

To my amazement, however, Mr. Thesiger had dropped most of his Cockney accent and maintained his "dream speech," which was a pity. As a Cockney Mr. Thesiger was *par excellence*. So were Gladys Young and Olive Walter. Lilian Harrison acted the part of a vamp with a certain cuteness.

Naturally, the producer tried one of his modern stunts, but, although his method of producing the passage of time would probably irritate many people, it rather had my approbation. Indeed, I go so far as to say that it was clever.

Who is the most popular conductor of the big B.B.C. Symphony Orchestra? I would have plumped for Adrian Boult, and then for Sir Henry Wood, judging from the applause of the audience. But Sir Landon Ronald, I think, comes an easy first, for the orchestra for the first time joined in vociferous applause. This is where Arthur Catterall again shows himself a good leader.

Some critics aver that we should get younger conductors and hint that Sir Henry Wood has had his innings. Certainly Sir Henry lacks the fire and gymnastics of the man I used to watch night after night before the War, but there is no gainsaying that he is still a popular favourite.

And, talking about the Symphony Concerts, why can there not be some arrangement whereby a bell would just tinkle one minute before the conductor raises his baton, so that the attendants would automatically close the doors, and we should not have the spectacle of the conductor having to wait for people to be seated, not only keeping the visible audience waiting, but also the millions of listeners?

I was prepared to criticise the Weekly Theatrical Cartoon, for it is rather late in the day to boost theatrical stars. However, Elizabeth Pollock's portrayal of Marie Tempest was quite good, and easily justifies the series. But what always occurs to me is that theatrical people seem to get all this big free publicity. What about musicians, artistes, doctors—yes, and even authors?

Mr. G. O., of Tooting, in an interesting letter says he is going to "start something" by contesting the claim that Teddy Brown is the world's greatest xylophone player. Indeed, he will arouse Teddy's warmth by suggesting that he should buy the latest book on harmony!

"Carry on with your good work of criticism," concludes my correspondent. I will. But must add that the xylophone, without criticising Mr. Brown's technique, comes over very well indeed. I agree with my correspondent, however, that playing masterpieces to ragtime is very distasteful to lovers of good music.

I shall have to write an article one day about the B.B.C. entering into competition

with the music-halls. Here is a "top of the bill" announcement of "So-and-So and his B.B.C. Dance Band." Isn't that tantamount to invading the music-halls?

Incidentally, here is an amusing incident worth repeating. One of my readers was passing a music-hall and noticed on a bill: "Jack Payne" and "A B.B.C. Star" prominently displayed. He went in on the spur of the moment and found that it was Jack Payne, the B.B.C. whistler, who was appearing.

On another occasion in London Jan Ralini was described in large letters as "a B.B.C. star." Some people think that this is an unjustifiable use of the B.B.C.'s name. Yet it is difficult to see how the B.B.C. can stop it.

I still give full marks to Cardiff for the Joan and Betty Bible stories, although the King in "Daniel and the Lions' Den" sounded sometimes rather unkingly. That is the way to teach the Bible. Pity there isn't a similarly interesting way of learning irregular verbs.

I see the Bach Cantatas still go strong. I am told that these are costly transmissions. Why? They "didn't ought" to be!

The Gershom Parkington Quintet still holds its own; and who can say that it doesn't deserve it, despite the "grand" orchestras and "splendid" bands.

I am afraid that all was not well with A. J. Alan in his latest effort, "The Well." Not only was A. J. in bad form, but his material was even more slender than usual.

I rather gather from some of my friends that A. J. has an arresting personality, for he certainly managed to impress a critical friend of mine, with whom he dined and to whom he read a story. But in my house, where he has had much support, that last effort was regarded as the limit.

I listened to James Agate the other night, and he certainly maintained the lead as an intelligent, yet not too high-brow, critic. He is also mature, and the only pity is that the B.B.C. has failed to find somebody as good for its cinema criticisms.



Amos'n Andy the famous Americans who are to be relayed on December 31

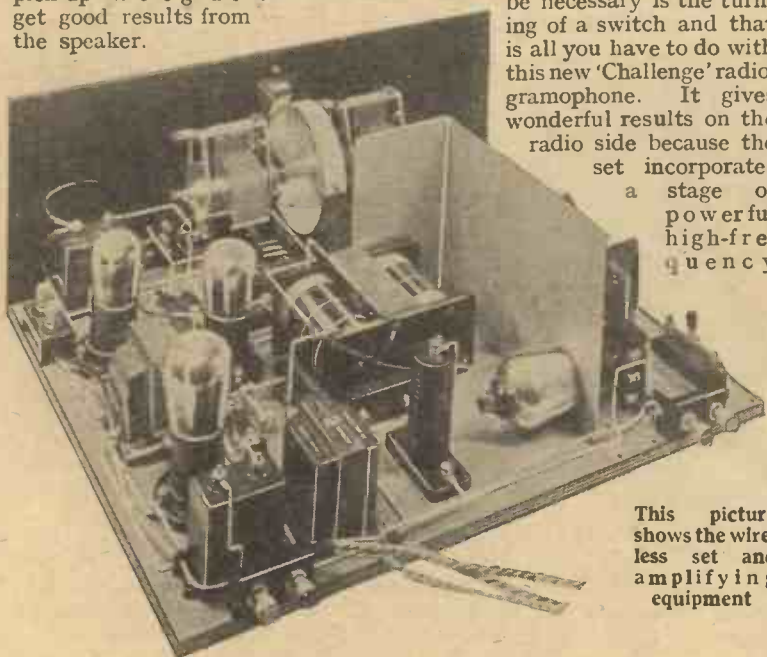


The "CHALLENGE" RADIO-GRAM

A powerful four-valve wireless set provided its use in conjunction with a gramophone assembly makes a very fine dual-p

HAVE you a radio-gramophone? If you have not, then in all probability the only two reasons are that you think the cost would be excessive and that you think the constructional difficulties would be beyond you. Here is the "Challenge Radio-gramophone" to disprove both these notions. It is basically a four-valve set which is as easy to make up as any of the previous sets of the successful Challenge series—and that is saying something—and it is built in a cabinet carrying the other essentials for a radio-gramophone, turntable, pick-up and speaker.

Of course, it is possible to get electric reproduction with gramophone records with practically any set having two or more valves, and it is easy to connect the pick-up in the grid circuit and get good results from the speaker.



This picture shows the wireless set and amplifying equipment

However, with many set users that is not the most convenient plan because it means having trailing wires from the pick-up, which has to be mounted externally with the turntable and motor board, to the set. Moreover, it may not be possible easily to switch over from radio to gramophone working, and at times that may be a serious disadvantage. The very best plan is to make up the radio side and gramophone equipment in one cabinet, preferably building a special set for the purpose. In this way you can be sure of having a set designed to give equally good results on radio and gramophone working and which will incorporate easy change-over arrangements.

The most that should be necessary is the turning of a switch and that is all you have to do with this new 'Challenge' radio-gramophone. It gives wonderful results on the radio side because the set incorporates a stage of powerful high-frequency

magnification and it will put new life into your old records because of the well-arranged low-frequency and power amplification stages.

Wireless Set and Gramophone

From the accompanying photograph you will see that the appearance of the complete instrument is more than pleasing. It is at least equal to a very expensive commercial radio-gramophone, the performance and appearance alike being well up to the most costly standards. Briefly, it may be explained that the receiver is quite a

Components for the "Challenge" Radio - Gramophone

Ebonite panel, 18 in. by 7 in. (Becol, Keystone, Trelleborg).

Baseboard, 18 in. by 14 in. (Camco, Clarion, Pickett).

Two .0005-mfd. variable condensers (Polar Universal, Lotus, Lissen, Ormond, Formo, J.B., Burton, Igranie, Utility).

Slow-motion drum-drive (Polar, Ormond, Lotus, J.B., Utility, Burton).

.0003-mfd. reaction condenser (Lotus).

Double-pole change-over rotary switch (Wearite No. 122, Utility).

1-megohm volume-control (Rotorohm, Gambrell, Igranie, Claude Lyons, Sovereign).

One dual-range aerial coil, and one anode coil with reaction winding, Challenge type (Tunewell, Clark, H. & B., Wearite, Parex, Readi-Rad).

Horizontal-mounting valve holder (Junit, W.B., Parex, Wearite).

Three valve holders (Lotus, Benjamin, Telsen, Burton, Lissen).

Four fixed condensers, one .0003-mfd., one .005-mfd., one .0002-mfd., and one .0001-mfd. (Lissen, Telsen, Readi-Rad, T.C.C., Dubilier).

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

Two 2-mfd. fixed condensers (T.C.C., Dubilier, Lissen, Igranie, Ferranti, Formo).

Grid-leak holder (Lissen, Bulgin).

2-megohm grid-leak (Dubilier, Lissen, Readi-Rad, Igranie).

High-frequency choke (Lewcos, Readi-Rad, Lissen, Varley, Formo, Tunewell, R.I.).

Low-frequency transformer (Telsen, Lissen, Varley, Burton, R.I., Ferranti, Igranie).

Low-frequency choke (R.I. Hypo, Igranie, Lissen, Varley, Wearite).

Pre-set aerial condenser, .000 max. (Formodensar type F, Polar, reign, Lissen).

One 30,000-ohm and one 80,000-ohm spaghetti resistance (Bulgin).

Three terminal blocks (Belling-Lee, Junit).

Six terminals marked Aerial, Pick-up (2), L.S. (2) (Belling-Lee, Ealex).

Aluminium partition screen (H. & B., Readi-Rad, Wearite).

Piece of aluminium foil, 8½ in. by 7 in. length of half-inch angle.

2 in. extension rod, coupler, and for change-over switch (Wearite).

Wire and 7 yds. flex.

Six wander-plugs marked H.T.—, H.T. 2, G.B.—, G.B.—1, G.B.—2 (Belling-Lee, Clix, Ealex).

Two spade terminals marked L.T.—, (Belling-Lee, Clix).

Screen-grid connector (Belling-Lee).

Electric gramophone motor (Apex, Pick-up and tone arm (Ediswan)).

Moving-coil loud-speaker (Hegarty).

Gramophone cabinet (Camco, Wainwright, Novotone [optional], Gambrell).

CHALLENGE" GRAMOPHONE

with pick-up arrangements;
is optional, but the entire
purpose instrument

separate unit in the cabinet. Above it is the motor board carrying an induction motor and pick-up, while below it is the moving-coil speaker and the batteries or mains eliminator.

It is proposed to describe the receiver first and in a subsequent article the layout of the gramophone side will be dealt with fully. The receiver can, of course, be made up by anyone in need of a good four-valver and the gramophone switching arrangement can be dispensed with if required, although it is not recommended that this should be done. The question of cost, which naturally worries most constructors, is determined by the accessories which you use in conjunction with the set. The set itself is relatively inexpensive. In an accompanying panel will be seen a list of the parts needed, the original parts used in this set being specified first and suitable alternatives are also given in most cases. At the outset you are advised to examine the circuit diagram, for this

shows the general working of the set and explains why it is that good results are obtained, both with radio and gramophone working.

The Circuit

Essentially the circuit is of the screen-grid, detector, R.C. and transformer-coupled type. The aerial and high-frequency circuits are ganged so that the set is virtually of the one-knob control variety. There is, of course, a subsidiary reaction control, but this is not at all critical for ordinary working. It is only when the set is pressed to its limits in order to receive very distant foreign stations that critical control of reaction is called for.

The high-frequency coupling is of the shunt-feed type, a high-frequency

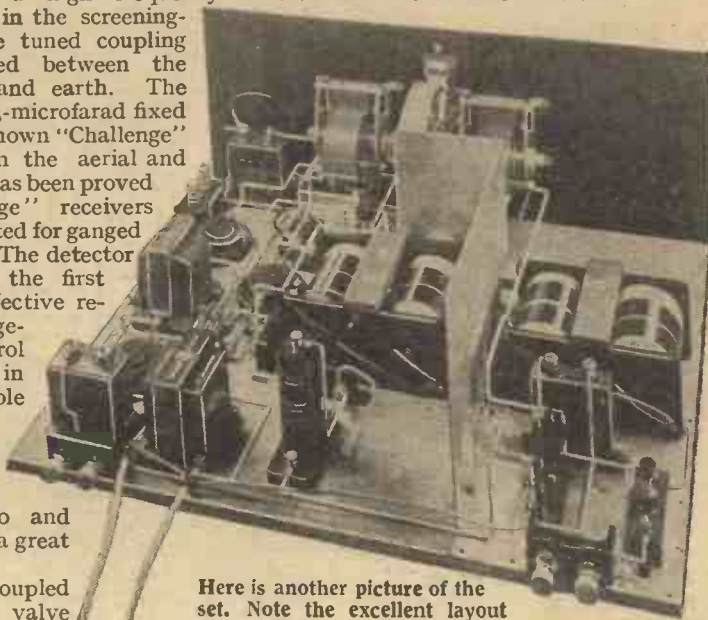
choke being inserted in the screening-grid anode circuit, the tuned coupling circuit being connected between the detector valve grid and earth. The coupling is via a .0003-microfarad fixed condenser. The well-known "Challenge" coils are used both in the aerial and anode circuit and as has been proved in previous "Challenge" receivers these are admirably suited for ganged tuning arrangements. The detector valve is coupled to the first power valve by an effective resistance capacity arrangement, a volume control being provided here in the form of a variable grid leak for the L.F. valve. It should be noted that this volume control is effective equally on radio and gramophone working—a great advantage.

The power valve is coupled to the preceding L.F. valve

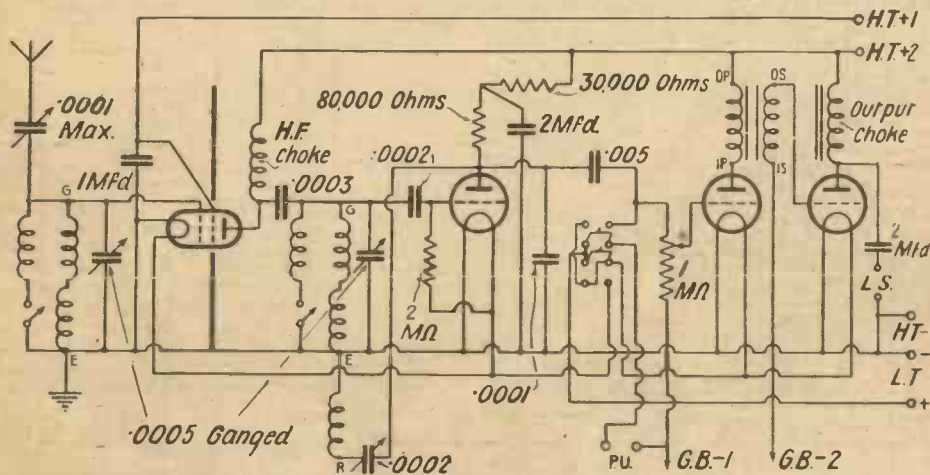
by a transformer and of particular interest is the output circuit provided in the anode supply to the power valve. This output circuit is of the choke-filter type and the coupling condenser is so arranged that the speaker is on the earth side of the set. This is an efficient arrangement in every way, and it is a big advantage if you want to erect an external speaker in conjunction with the speaker incorporated in the gramophone. With this output filter circuit in use you have no danger of getting a shock from the extended speaker wires.

Controls

The pick-up switch arrangement is included in the grid circuit of the first low-frequency valve. It is very conveniently arranged, for in the mid-position it switches the set off, in one position it brings into circuit only the two valves necessary for gramophone working and in the other position it cuts out the pick-up and switches on all four valves for radio operation. On the front of the panel are the controls for tuning and reaction, the radio-gramophone switch and the volume control.



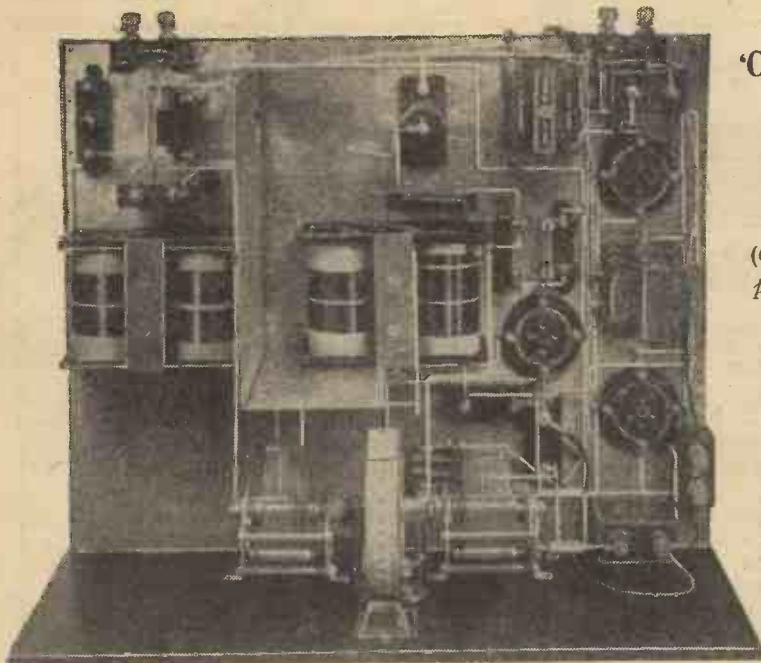
Here is another picture of the set. Note the excellent layout



The circuit of the receiver unit of the radio-gramophone

It is quite safe to let any member of the family handle this radio-gramophone outfit. The local stations can be tuned in even by an absolute novice and there is no difficulty in getting good results on the gramophone side.

So far as construction is concerned, the first step should be to obtain a copy of the full-size blueprint which can be obtained, price 1s. 6d., post free, from the Blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4. You will find this particularly handy because although the construction of the receiver unit of the "Challenge" radio-gramophone is on quite straightforward lines, there is no reason why you should make it more difficult by not having a full-size chart.



This photograph together with the diagram below indicates the layout and wiring quite clearly

As in any powerful receiver having high radio- and audio-frequency magnification, the layout of the parts is very important and, frankly, it is not easy to get this layout correct unless the blueprint is used. Panel drilling is quite easy although there is, of course, the aperture to be cut for the drum dial escutcheon plate. If you are not very handy with a fretsaw, then probably the easiest way of cutting out this aperture is by drilling small holes around the marked out rectangle until the centre portion of ebonite can be lightly tapped out. Take care when mounting the ganged condenser to get the whole assembly quite central. If desired the actual mounting of the condenser can be left till a later stage when the panel has been attached to the baseboard and some of the wiring has been done. True, this will leave more room for the wiring up of the reaction condenser, volume control, wave-change switch and radio-gramophone switch, but there is no need to do this if you are at all skilful with the soldering iron.

Assembly and Wiring

The next job, after the panel has been fixed to the baseboard, is to mount the baseboard parts in their places. Before the components on the high-frequency side are screwed down it is, of course, necessary to put down the small "floor" of foil. This should be cut to the size shown in the full-size blueprint, and tacked at the rear right-hand corner of the baseboard. Then the screen may be mounted and this will act as a rough guide to the correct positions of some of the other parts.

All the other parts, including the "Challenge" coils, and the two terminal circuits can be screwed down for there is ample room in which to carry out the wiring. The coils can be bought ready made or they can be wound at home. Full details for constructing the "Challenge" coils were given in AMATEUR WIRELESS No. 436. It will be seen that these coils are

'THE CHALLENGE' RADIO GRAMO- PHONE"

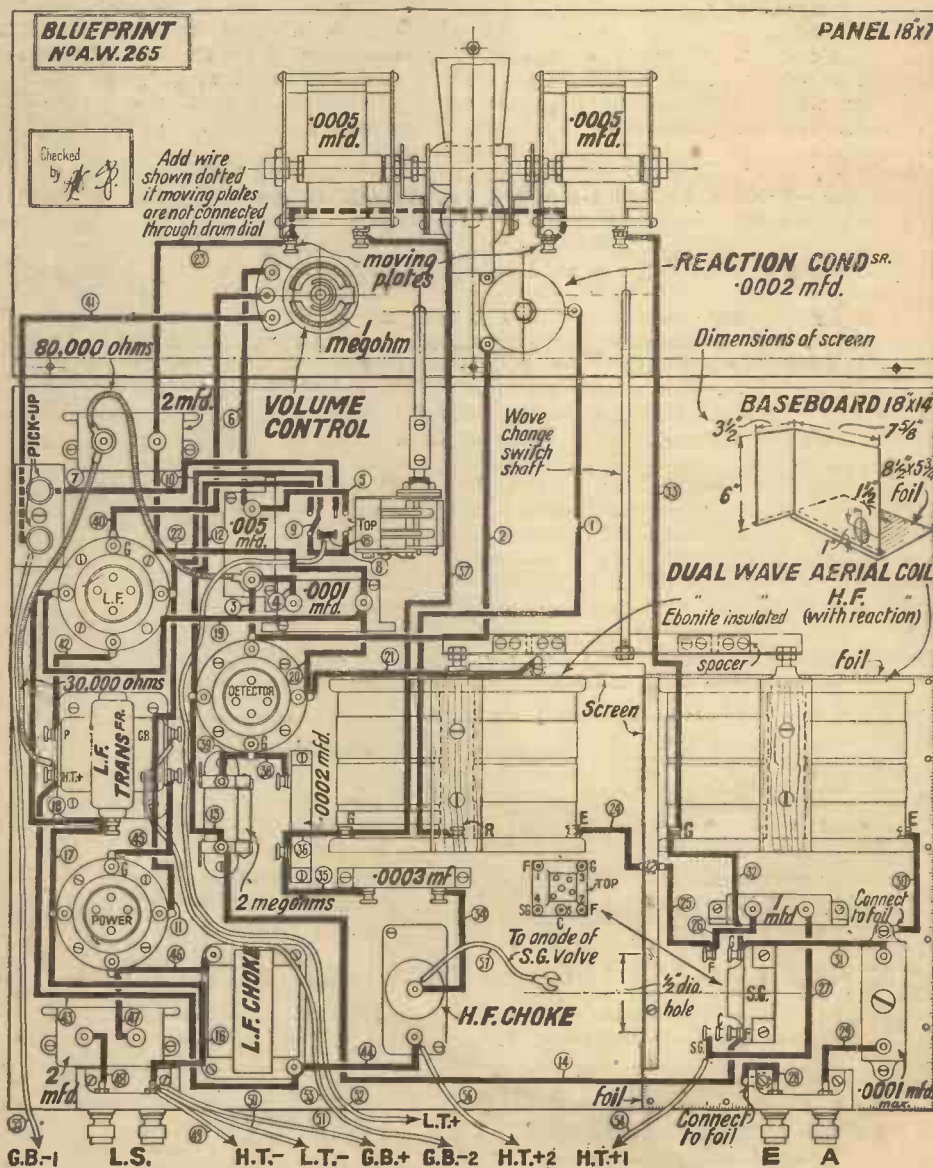
(Continued from
preceding page)

placed on their sides, little securing strips of plywood being used to hold the ends of the formers in place.

The dotted line on the blueprint, between the two sections of the tuning condenser, indicate the connections which must be made if a condenser is used in which the moving-vane sections are not joined. The switch-ganging strip (for wave changing) and the control rod can be bought with the coils or made out of brass scrap.

And now for wiring. You will have no trouble in this if you follow the blueprint closely. The theoretical connections are quite simple and if you follow the blueprint you will see the best positions for the wires. Be sure to make no mistakes when wiring up the radio-gramophone switch. The best plan is to tick off on the blueprint each wire as its actual counterpart is put in position in the set. You will see that rigid wire is used for all the main connections, although flex leads are used for the high-tension, low-tension, and grid-bias supplies and flexible resistances are used in two places. When the wiring is finished the set is ready for an initial test, and in next week's issue it will be explained how the set may be operated and how the other units of the radio-gramophone are assembled.

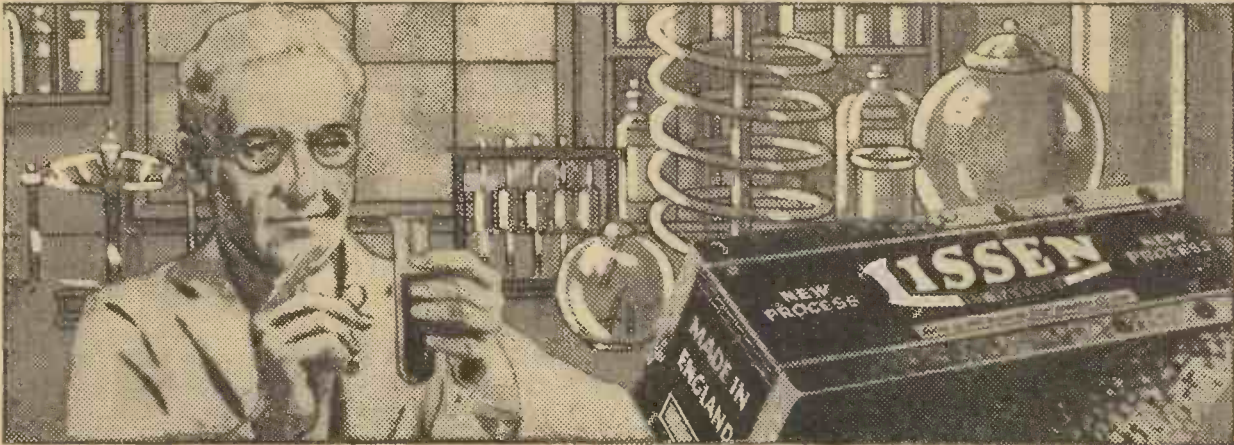
See this radio-gramophone in the Radio Department windows of Messrs. Selfridge and Co. of Oxford Street, this week.



The layout and diagram. A full-size blueprint of this is available, price 1/6

CHEMICAL MAGIC

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SETS OF DISTINCTION

Makers: Columbia Graphophone Co., Ltd. Price: £12 - 12 - 0



ENTIRELY novel in design is the latest product of the Columbia Graphophone Company, Limited. This is an all-electric two-valver for A.C. mains. It can be used on all supply voltages between 100 and 250 volts, provided that the right model is ordered. Still another model is available for D.C. mains supplies.

According to the makers, the power consumption of the A.C. model I recently tested is only 20 watts. This means that the set can be run for 50 hours for the price of a unit of electricity. In other words the running cost is negligible.

At 12 guineas Columbia 309 would, in any case, be an inexpensive two-valver. But when one realises that this price includes a very good quality cone loud-speaker a great bargain is at once apparent. Model 309 is, in fact, entirely self-contained, except for an aerial and earth. At the beginning I said that this set was novel. The novelty lies in the fact that instead of tuning in stations one switches them in.

Tuning Controls

In place of the usual variable condenser control there are two separate pairs of tuning and volume controls. One pair is used to bring in one of the local stations and the other pair the remaining local station assuming of course that the set is used in a Regional area. Each tuning circuit has a limited range, covering whatever wavelength is desired, by the insertion of one of ten available plug-in coils. For my test I was supplied with coils D for the London Regional station and coil A for the London National station. These coils, in conjunction with the two small range variable condensers, are flexible enough in wavelength range to allow the station for which they are designed to be tuned in on widely differing aerials.

By this simple means of switching from one complete tuning circuit and volume control to another similar circuit, a great simplicity of control has been effected. For once the two stations have been tuned in and their volumes adjusted to the desired degree, no further tuning is necessary to select which of the two alternative stations is wanted. It is simply a matter of pulling a switch up or down.

The four small knobs for tuning and volume control of each station are hidden under a readily-removable escutcheon plate mounted at the bottom of the cabinet, just under the loud-speaker grille. Through

this escutcheon plate projects the station switch on the left and the mains on-off switch on the right.

Model 309 is essentially a local-station set, being especially suitable for the loud-speaker reproduction of twin Regional programmes, as from Brookman's Park or Daventry. The circuit consists of an indirectly-heated A.C. detector valve, transformer-coupled to a pentode output valve. The combination provides great amplification, so that only a modest aerial is needed to give good loud-speaker reproduction.

For my test I used a 40-foot vertical length of wire coming from the top of the house to the bottom; by no means an efficient aerial. On this I got the National and Regional stations from Brookman's Park, at amazing strength for a two-valver. Using some reaction the volume could be increased to an enormous extent. So strong were these local stations that I succumbed to the temptation of trying for distant stations.

On tune 1, I got Turin at full loud-speaker strength, as well as Cologne, Rennes and Bratislava. On tune 2, I logged 6 other foreign stations. The set does so much better than intended that it is a pity larger control knobs were not fitted for the benefit of ether searchers!

Selectivity

As regards selectivity the set had to separate the two Brookman's Park stations. This was done with ease.

No trace of interference could be detected during the reception of each of the twins. Moreover, adjustments to tune 2 and volume 2 had no interaction on the adjustments of tune 1 and volume 1. For listeners living at greater distances from the local station, a more efficient aerial than mine would be needed. To provide for selectivity with a fairly long aerial the makers have fitted Model 309 with a series aerial condenser at the back, near the aerial and earth terminals.

Quality of reproduction on Model 309 frankly took me by surprise; it is really good. The pentode counteracts the natural low pitch of the cone loud-speaker, resulting in a well-balanced tone. Speech is crisp and clear and orchestral broadcasting has plenty of bass.

A Fine Set

The illustrations hardly do justice to the fine appearance of Model 309. It is dignified and useful. It is one of the most tidy sets tested for a long time. The size of the cabinet, which is of well-finished oak, is smaller than the average container of cone loud-speakers. Altogether Model 309 is an exceptionally fine two-valve all-electric set. Once again Columbia have produced a winner!

SET TESTER.

The Heayberd L.T. Transformer.—

An error appeared in the Heayberd advertisement appearing in the November 15 issue of "A.W." The text of the advertisement indicated the advisability of constructing a low-tension eliminator incorporating the Heayberd low-tension power transformers. It is, of course, quite unnecessary to build such an eliminator. All that is required is that the receiver should be fitted with indirectly-heated A.C. valves, the valves being operated by the Heayberd L.T. transformer giving exactly 4 volts. The transformers have three secondary terminals, the centre one of which, indicated by a sign, connects to earth (or to H.T.—). The two outer terminals giving 4 volts connect to the heater terminals of the A.C. valves. For wiring purposes the 4-volt terminals of the transformer may be regarded as the 4-volt terminals of an accumulator. It will therefore be readily seen that by substituting the present valves in a receiver for indirectly-heated A.C. valves and using the Heayberd L.T. transformer with A.C. mains, it is far more economical to run than an accumulator.

Recently a Dutch subscriber put a call through from Amsterdam to Turin with the request that an S.O.S. be broadcast in order that he might get into touch with his parents then travelling in Italy. The transmission was carried out by the Rome and Turin stations on the same evening. Later, the latter studio was informed by a listener in Venice that the family had left that city for Florence. As the address was available it was telegraphed by the Italian authorities to Amsterdam without delay.

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GETTING THE TRANSIENTS RIGHT

Some Points to Note in the Quest for Quality Reproduction

By Our Technical Editor.

MOST readers will have heard of transients. They may perhaps have heard their learned friends discoursing on the subject and have wondered whether these transients, whatever they may be, are likely to affect them to any serious extent. The answer to this question depends entirely upon the circumstances. I suggested a short time ago in an article on resistance coupling, that the design of an R.C. amplifier depended on the musical tastes of the listener, and if one's musical perception is not strongly developed, or for that matter, if the loud-speaker being used is incapable of rendering the various passages with the correct delicacy, then it is useless spending time and money in making improvements which will not be noticed.

What a Transient Is

This transient question is very largely a case in point. There are many effects in music, and for that matter, even more in speech, where the current suddenly changes from one value to another. If, for example, one produces a "p" sound, this is the result of an explosion of air from the lips, and this sudden air wave hitting the microphone produces a sudden pulse of current, which is not repeated. Such a phenomenon is, therefore, termed a transient, to make a distinction from the ordinary sounds which are more or less gradual in their change and repeat themselves many times. With a pure note, for instance, the current increases to its maximum and then falls away to zero in a gradual manner and continues to do the same thing over and over again. The number of times this process takes place in one second determines the frequency or pitch of the note, but it will be seen that a transient term, which only occurs once, is quite a different story.

Resistance Coupling

Now the ordinary amplifier, even if of poor quality, will give some sort of response to an explosion transient such as we have just considered. It will not give a faithful response, and therefore the output will be distorted. The result of this will be that the music would lose a little crispness or "attack" as we call it, while speech (which contains a very high proportion of these transient terms) would not be absolutely natural. It would be perfectly intelligible, but one could detect at once that there was a difference between the reproduced speech and the actual speaker.

Therefore, if one is going all out for the best reproduction, assuming that one is able to appreciate it (and it is little use to blink the fact that many of us are not keenly musical), it is necessary to see that one's amplifier responds in the highest possible degree to these transient terms. I was present at a lecture in Liverpool quite recently, where an amplifier was described which handled faithfully a very difficult wave form produced by suddenly switching the current on and then off twice a second

(i.e. a frequency of 2 cycles only). With any ordinary form of amplifier such variation of current would be hopelessly distorted. The chokes and condensers in the circuit would slow up the changes and the current, instead of starting and stopping sharply, would become "round-shouldered." The difference is shown in Fig. 1.

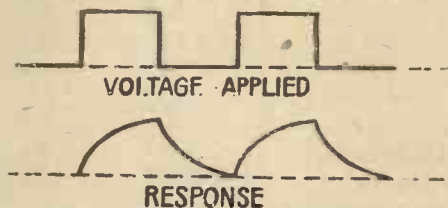


Fig. 1. Showing how inductance and capacity can distort a wave form

In order to avoid any such distortion, resistance coupling is often resorted to, particularly with relatively low values of resistance. Since there are no chokes in the circuit, the only source of distortion we have is the coupling condenser. Consider Fig. 2, which represents a simple resistance-coupled circuit. There is a high-tension voltage applied to the anode resistance, while the grid of the second valve is connected to L.T.— through a G.B. battery.

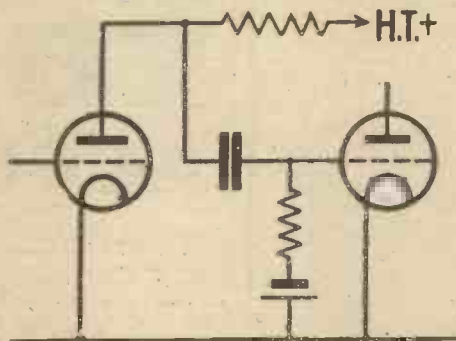


Fig. 2. A simple resistance-coupled circuit

In consequence, there is a definite difference in voltage across the coupling condenser (indeed, this is what it is there for), and the condenser is, therefore, charged.

Effect of Sudden Change

Suppose we suddenly alter the voltage on the grid of the first valve. The anode current will change, and therefore the voltage on the anode of the first valve will change, because of the different voltage drop on the anode resistance. At once we have a different voltage across the coupling condenser, which will require that the condenser shall charge or discharge to some extent in order to readjust itself to the new condition. If we are to avoid distortion this alteration in the condition must take place almost instantaneously.

It can be shown that for this condition to occur the condenser must be large. In the article already referred to, I gave

several figures for the value of the coupling condenser which was stated to be the minimum satisfactory for good reproduction. We now see, however, that for the best quality the value of coupling condenser must be considerably increased. Theoretically it may be increased indefinitely with continuous improvement in the result, and one must call a halt somewhere; generally speaking, a value of 1 or 2 microfarads is sufficient to obtain satisfactory amplification of transient phenomena.

This large increase in the value of the coupling condenser is only necessary or desirable where one has a really good loud-speaker, which is capable of detecting the difference between good and bad "attack."

OUR LISTENING POST

By JAY COOTE

IN radio it is not always the big voices which shout the loudest; in fact, many of these stentors have a pernicious habit, at times, of fading away into oblivion, whilst their juniors keep up a steady chatter in the ether. Much of interest can be found by searching for these little "one-horse" studios which, once captured, provide impromptu entertainments of which details are seldom available in the programme papers. Such a one is Radio Normandie at Fécamp (France). What its actual aerial power is nobody except its owner really knows, but in the south coast of England its broadcasts romp into my loud-speaker with the energy of many of the ten and fifteen kilowatts.

Try for it any evening towards 8 p.m., tuning in between Cork and Cologne, for Normandie works on 222.9 metres. Possibly some difficulty may be experienced in keeping out the Rhineland transmissions, but a frame aerial solves the problem with its directional properties.

Fécamp boasts of a woman announcer whose enunciation is so clear that if you only possess a smattering of the language you should understand every sentence. Her news bulletin is a comprehensive one—real, live, up-to-the-minute information on events of interest even to foreign listeners. The concert which follows is mainly composed of gramophone records, but reproduction is of the very best and far superior to such recitals offered to us by many wealthier studios. There is no regular interval signal, although now and again during a pause in the programme you may hear a silvery-toned bell, but the exact time is announced by a melodious carillon relayed from the old Benedictine monastery. Fécamp is not far from Le Havre and on Friday evenings we are taken over to that port for a concert from the Hotel Frascati.

I need hardly ask whether you have logged Muhllaker broadcasting the Stuttgart or Frankfurt-am-Main programmes on 360 metres, for it would be almost impossible not to pick it up when you twirl the condensers. A 75-kilowatt station cannot be ignored, and we must make the best of it even if, at times, it swamps our reception of the Regional. On any Friday at 3 p.m., a relay is made of a concert from the Wiesbaden Kurhaus which possesses an orchestra of some 90 musicians broadcasting in a hall with remarkable acoustic properties.

WHAT ARE THE SOUND WAVES SAYING?

THE sound waves have brought us a good deal of César Franck's music recently and, so far as I am concerned, it is more than welcome. Fate was cruel to Franck. He was a truly great musician and a straightforward, honest man; yet there is no story in musical history that tells of a musician so consistently ignored during his lifetime.

He came of Flemish stock and was descended from a long line of artists and painters; one of his ancestors was the famous Jérôme Franck who held an appointment as painter to Henri III. Strange as it may appear, in view of the life-stories of many of the great composers, we here have an instance of a father actually wishing his son to become a musician!

César Franck was sent at an early age to the Conservatoire at Liège; he must have been a brilliant youngster because it is on record that he had finished his course of studies there before he had attained his eleventh birthday. Twelve months later the family settled in Paris so that he could continue his studies at the Conservatoire there.

Franck gained most of the prizes for which he was at all eligible, and concerning one of them there is an interesting story told. Old Cherubini was the professor at the time, and a harder nut to crack could not have been found in the city. Franck went before him to play a test. A piece was placed in front of him and he was expected to perform it at sight. In doing so he calmly transposed the work a minor third, a feat which will appeal to those who appreciate it. Cherubini, however, was not pleased. Whether he thought Franck was trying to show off or not is not recorded, but Cherubini refused him the first organ prize and made some excuse to give him the second. His teacher interfered and there seems to have been some unpleasantness, but in the end Franck was given a special prize.

Franck had a bad time in the financial sense when he left the Conservatoire; he taught a good deal but money seems to have been scarce. It is not surprising, for the year was 1848, and the Revolution in Paris did not serve music well. When Franck married Mlle. Desmousseaux, the bridal party had to climb some barricades in order to enter the church of Notre Dame de Lorette, where Franck was organist.

Ultimately, after many vicissitudes, Franck was appointed professor at the Conservatoire, a fact which surprised him, because he had always been outspoken and had always refused to be mixed up in various intrigues connected with the institution. He worked slavishly at his compositions and wrote many admirable works. *Les Béatitudes* is, perhaps, one of his best known now, but there was a difficulty in getting it recognised at the time. He had it performed at his own house by some of his pupils and asked several noted people to come. Most refused, and those who did come honoured him by leaving before the end. There were only two people in the audience at the finish.

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IN MY WIRELESS DEN

WEEKLY TIPS—
CONSTRUCTIONAL AND THEORETICAL

By W. JAMES.

Dual-range Coils

IN many circuits we use a dual-range coil having a tap on the medium-wave coil for the aerial. This tap is useful, as the selectivity and magnification are both probably better when the aerial is taken to the tap instead of to the top of the coil.

The wavelength range with a given tuning condenser is greater, too. This is because the effect of the capacity of the aerial is reduced by connecting it to the tap. Now, these advantages are usually not obtained when we switch over to the long wavelengths, for the reason that the aerial is not connected to a tap on this coil.

Simplified switching is responsible, and you cannot obtain the best possible results without making the medium- and long-wavelength circuits in the best way. In the Binowave coils separate long- and medium-wave aerial connections are used in order that the efficiency of the coils shall be high on both wavebands.

Compact coils are sometimes not very efficient, although perhaps they are quite good for their size, and this point of the best aerial connection is bound to crop up. Sometimes a single separate aerial winding is used for both wavebands, but here again something is lost in the interests of simplicity and cheapness.

Those Mains Valves

Should we use a directly or an indirectly-heated power valve in an A.C. set?

Given a good and suitable directly-heated power valve, the hum is negligible, being hardly heard at all. The characteristics are as good, as a rule, as those of the indirectly-heated type, and valves working with an anode voltage of 200 and giving a good power output are available.

Myself, I feel that a directly-heated valve is a more simple job than the other type. I often use them, and have found the results to be good. A centre-tapped transformer or a wire potentiometer of low resistance may be used, and grid bias may be obtained by including a resistance in the high-tension negative return in the usual way. The centre tap must be fairly accurate, or a hum may be heard.

Low Loss

Although low-loss constructions are not now given as much attention as a few years ago, the need for avoiding the use of materials having doubtful electrical properties remains.

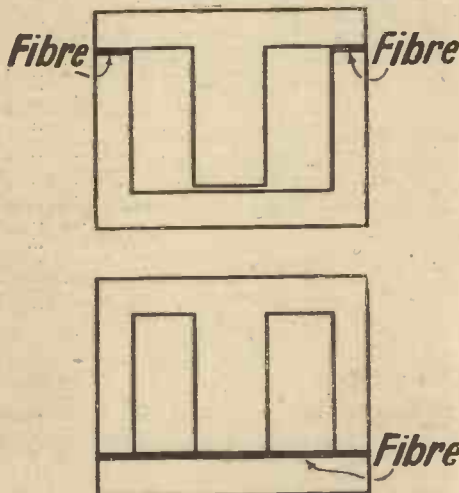
Cardboard is, for instance, sometimes used for coil formers. This may be satisfactory, but will probably not be unless it has been carefully treated. Good quality

ebonite and bakelite formers are worth using for coils which will be fitted in a set of reasonable efficiency. Most of the prepared tubes are suitable, too.

Transformer Troubles

It is often supposed that the iron core of transformers and choking coils ought to be so well made that air gaps do not exist. This is not true when a direct current is passing through one of the windings as well as the alternating current.

Both transformers and choking coils



An air gap can usually be provided fairly easily in transformers and chokes by the method shown

should have the highest inductance under working conditions. It is true that the greatest inductive effect is obtained when the direct current is very small or when there is none at all.

But in practice the current may be, say, 3 or 4 milliamperes in the case of the intervalve transformer and perhaps 20 or 30 milliamperes in the case of the choking coil. Tests show that in many instances the greatest inductance under the working conditions is obtained by providing an air gap.

It is possible, in fact, to obtain a fairly uniform inductance over a range of direct currents by carefully proportioning the core, air gap, and number of turns. In practice the gap is provided by fitting a thin piece of fibre or other material at a joint in the magnetic circuit, or two pieces may be used as shown in the accompanying diagram.

A Band-pass Filter

Those who have tried a set having a band-pass filter will, no doubt, have

noticed double-hump tuning. This indicates that the circuits are out of tune or else the coupling is too tight.

Attention to the ganging of the two circuits forming the tuned filter may put matters right, but if you find that the pronounced double humps continue, then the coupling should be reduced. Reaction effects may be partly responsible for the poor tuning, or there may be stray couplings.

In any case, a reduction in the coupling will produce the desired result, bringing the humps together. Band-pass circuits are very interesting and much time can be spent in finding the best values.

For testing, a meter connected in the anode circuit of the detector is valuable. Do not overlook the fact that the resultant tuning curve depends upon the characteristics of all the tuned circuits.

If, therefore, the filter circuit is in the aerial and a tuned intervalve coupling is used, be sure to note the combined effect, rather than that of the filter alone. The best scheme, naturally, is to have single-knob tuning.

A Problem

I have been asked to explain why a set, which appears to work very well when an output choke filter is used, motor-boats badly when the filter is taken away and a speaker transformer is fitted.

This happens in a number of instances, as a matter of fact. The filter circuit in practice tends to stop the varying currents produced by the last valve from entering the high-tension supply.

These currents pass through the condenser of the filter and the speaker to the filament or cathode of the last valve. If the choke is a poor one, a proportion of the varying currents may pass to the high-tension supply.

Naturally, the lower frequency currents would leak away to the high-tension supply before the currents of higher frequency.

It is the lower frequencies which usually cause the motor-boating or oscillations, and when the choke is not a good one the trouble may be experienced. When a transformer is used the circuit is usually much more prone to motor-boat, as the protection afforded by a good output filter circuit is not present.

Squealing may also occur; but the real fault lies, of course, in the high-tension supply or the anode-circuit feeds. With a high-resistance supply and poor filtering of the supplies to the circuits, motor-boating is to be expected.

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The New Process EDISWAN Battery is the finest in the history of radio. This new process of manufacture gives it greater power—power that is smooth, silent and which LASTS LONGER. You get more power for your money in an EDISWAN than any other battery. Get one to-day—from any good radio dealer—and notice how it puts new pep into your Set.

60 volt	10 m/a	-	-	7/9
66 volt	10 m/a	-	-	8/6
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60 volt	super power	20 m/a	-	15/6
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To Ensure Speedy Delivery. Mention "A.W." to Advertisers



The "Searcher Short-wave Two"

SIR,—With reference to the "Searcher Short-wave Two" (published in *AMATEUR WIRELESS* No. 442), the coil unit actually shown is one which we have now ceased to manufacture and there is likely to be some confusion when amateurs who intend building the receiver order the type 585 unit included. The layout and connections are somewhat different in the case of the new coil. Further, if the unit is wired in the way shown, that is, with the grid coil and reaction coil feeds reversed, although the set will operate on the short waveband, any amateur buying the extra broadcast coils to fit to the unit will find that his results are adversely affected and on the 5XX coil this will not work at all.

We recommend that the earth end of the aperiodic coil be coupled to the grid end of the aerial coil.

Stratton & Co., Ltd. (Birmingham).

Heterodyne Interference

SIR,—My receiver, a plain detector and two L.F. stages, has quite recently developed whistling and poor selectivity.

This seems only to occur around the London Regional wavelength. Until about two weeks ago I was able to receive this station with good volume and clear of interference, but now everything seems to be spoilt by mush. I have had my valves tested, aerial and earth overhauled, batteries recharged and renewed, and still the trouble persists. Being very much an amateur, I should welcome any assistance.

F. E. (Molesley).

You are experiencing heterodyning and interference from the new high-power German station, situated just outside Stuttgart. We are afraid there is nothing you can do to avoid the interference, but the matter has been reviewed by the B.B.C. and steps are being taken to have a greater separation between the London and Stuttgart stations' wavelengths. —Ed.

Simple Gramophone Amplifier

SIR,—Having constructed the Simple Gramophone Amplifier which was discussed in *AMATEUR WIRELESS* for November 15, I find that it is impossible to obtain a sound from the unit except by disconnecting the grid-bias negative connection.

Is this as it should be or can you advise how to remedy the trouble? A. B. (Worthing).

Unfortunately a slight error occurred in the wiring plan published for the amplifier in question and this accounts for your difficulty. You should disconnect the flexible lead, which is joined to the centre terminal of the volume control, and take it to the lower terminal of the volume control, that is, to the terminal which is connected to wire No. 15. It is really immaterial whether the flexible wire going to G.B.—1 is connected to the top or lower terminal of the volume control, provided that it does not join the centre terminal of the volume control.—Ed.

"The Challenge Four"

SIR,—I have constructed the "Challenge Four" and, whilst I am satisfied that the receiver is capable of receiving a great number of stations, it seems that the selectivity is not so good as one could wish for in a set containing two stages of screen-grid H.F. amplification. I experience considerable interference from the two London stations, even when using quite a small outdoor aerial, and several of the foreign

(Continued on page 1010.)

AS WITH TELSEN TRANSFORMERS . . . SO ARE TELSEN COMPONENTS BUILT TO GIVE

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TELSEN H. F. CHOKE. Designed to cover the whole wave-band range, from 18 to 4,000 metres. Extremely low self-capacity, shrouded in Genuine Bakelite. Inductance 150,000 microhenries, resistance 400 ohms. Price 2/6 each.



TELSEN FIXED (MICA) CONDENSERS. Shrouded in Genuine Bakelite, made in capacities up to .002 mfd. Pro. Pat. No. 20287/30. .0003 supplied complete with patent Grid Leak Clips to facilitate series or parallel connection. Can be mounted upright or flat. Tested on 500 volts. Price 1/- each.

. . . Built to serve . . . to function perfectly . . . individually and collectively . . . each to give its share towards the ultimate efficiency of the receiver . . . each helping to attain a quality of reproduction which will satisfy the most fastidious critic . . . and at the same time to give "LASTING EFFICIENCY."

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TELSEN VALVE HOLDERS. Pro. Pat. No. 20286/30. An entirely new design in Valve Holders, embodying patent metal spring contacts, which are designed to provide the most efficient contact with the valve legs, either split or NON-split. Low capacity, self-locating, supplied with patent soldering tags and hexagon terminal nuts.



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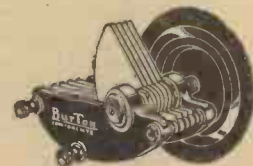
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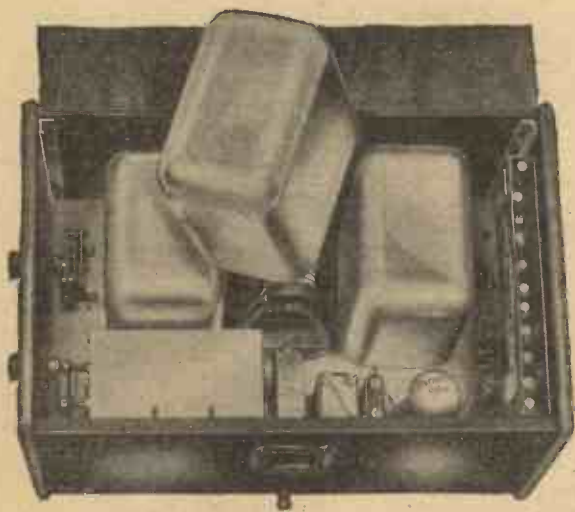
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Giving 150 volts at 25 milliamperes load, and incorporating 4 volt centre tapped winding for supplying filament current for indirectly heated valves. Size 9 ins. x 5 ins. x 3½ ins.

Tappings: One variable 0—150
" fixed 150
S.G.

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" fixed 120
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" fixed 120
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M.C. 121

WE TEST FOR YOU



Conducted by our Technical Editor: J. H. REYNER, B.Sc., A.M.I.E.E.

Burndept Needle-armature Pick-up

THE Burndept needle armature pick-up is one of those components which will appeal to the man who requires quality, for it does undoubtedly set a standard for pick-ups of all types; yet the sensitivity is well below the average. Generally speaking, a 3-stage amplifier is required for operating the pick-up at full volume with a moving-coil speaker: although when converting a wireless set, the detector valve can be used for one stage.

The design of this pick-up is such that the needle when inserted becomes the vibrating armature, having a mass so small that the natural period of resonance comes outside the audible limit, so far as gramophone reproduction is concerned. The needle movement is generous, and so lightly damped that it will follow the lowest frequencies and obtain the utmost life out of any record.

The characteristic of this pick-up is, save for minor and unimportant resonances, almost ideal. There is a rise towards the bass frequencies, counteracting to some extent for the inevitable restriction in amplitude of such frequencies on a record. Further, the high frequencies are well reproduced, and may be controlled by a



Burndept needle-armature pick-up

resistance or suitable condenser placed across the pick-up.

Tested on our standard two-valve amplifier, feeding a powerful moving-coil loud-speaker, the results were inadequate, due to the small voltage output from the pick-up. With the addition of another stage, however, the strength was brought up to standard, and we have no hesitation in saying that the reproduction was as near perfection as we have experienced from any gramophone record. There seems to be a complete absence of resonance, and in consequence all the instruments in an orchestra can be heard in their true relation, if the recording is good.

Grosvenor Batteries

MANY of the modern super-power valves when working with high anode voltages require a grid bias exceeding 9 volts. Although it is possible to use two 9-volt batteries in series, it is often prefer-

able to employ a single battery of higher voltage.

The Grosvenor Electric Batteries, Ltd., of 2-3, White Street, London, E.C.2, who have had much experience in the manufacture of H.T. and grid-bias batteries, have sent in for test a 16-volt battery measuring 9 in. long by 1 in. wide by 2¾ in. high. Tappings are taken out to sockets every 1½ volts, every other socket being clearly labelled with its voltage.



One of the range of Grosvenor batteries—a high-test high-tension battery. A test on a grid-bias battery is described in the accompanying paragraph

We applied to this battery the normal test for H.T. cells of standard capacity. The discharge rate was commenced at 7 milliamps and continued until it had fallen to 3½ milliamps; this it did after 260 hours of use, representing a useful output capacity of approximately 1,500 milli-ampere hours. This figure is well above the average fixed for standard cells, and indicates that the battery should give a good performance in actual use.

Although a grid-bias battery is seldom called upon to supply any current, it has been our experience that those cells capable of standing up well to a continuous but suitable discharge rate have the longest "shelf" life.

Polar Tub Condenser

AN examination of sets that have been in use for several years often reveals faults in the variable condensers. Either the plates have become buckled or dust has



A new Polar condenser—the "tub"

collected to such an extent that tuning is accompanied by crackling noises.

In the new Polar screened gang condenser, all precautions have been taken by the
(Continued at foot of next page)



It is reported from Savoy Hill that the announcing staff has adopted for Christmas week the catch phrase, "Modulation in all things."

According to a report from Belgium, the Grand Duchy of Luxemburg, anxious to own a high-power transmitter in order to establish a daily broadcasting service, has taken the decision to grant a concession, with full power, to exploit microphone publicity. As the necessary income for operating such a station could not possibly be derived from the listeners' tax, sufficient revenue might be acquired by radio publicity, and it is hoped to induce French and German business concerns to sponsor programmes.

According to statements issued by the control station of the *Union Internationale de Radiodiffusion* at Brussels, a deviation of more than one kilocycle from their allotted wavelengths by the European stations generally has been greatly reduced. From October, 1929, to April, 1930, the percentage of culprits has dropped from 14 to 9 per cent. of all transmitters in operation.

The Belgrade (Yugoslavia) short-wave transmitter on 30 metres, may be heard working every Monday evening between 8 and 9 p.m. G.M.T.

A French company, recently constituted with a working capital of one million francs, proposes to run a broadcasting station in Normandy. It has not yet been definitely decided whether the site will be at The Havre or whether the present Radio Normandie (Fécamp) transmitter is to be taken over and increased in power.

Some drastic changes in wavelengths are likely to be carried out by the French State broadcasting stations within the next few weeks. Ecole Supérieure (PTT), Paris, which is now almost completely swamped by Rome nightly, may change its wavelength with Radio Maroc (Rabat). Similarly, Radio LL (Paris), interfering in the French capital with the reception of the PTT Strasbourg broadcasts, will be asked to take over the Lille wavelength for its own.

Listeners report the reception of telephony from Tokio (Japan) between 10 a.m. and midday G.M.T. daily, on 24.8 metres.

Barring the Moscow morning physical exercises, the Posen studio claims to be the earliest station on the air; its first transmission takes place at 4.15 a.m. G.M.T. daily.

Daily, between midday and 2 p.m. G.M.T., the new Velthem-Louvain station tests with gramophone records simultaneously on 508.2 and 338.2 metres. Its power is gradually being increased to 15 kilowatts in the aerial.

The French Ministry of Posts and Telegraphs has now authorised the transfer of Radio Paris to its new home at Essarts-le Roi, near Rambouillet, where the high-power station is rapidly nearing completion. Within a month the special cable connecting the station to the studio will be laid and the tests will start forthwith. The *Poste Parisien* has also been allowed to remove its plant to Limours, outside city limits.

It may, perhaps, be taken as a commentary on the B.B.C.'s policy with regard to Scottish broadcasting that the increase in the number of licences north of the Border compares by no means favourably with other parts of the United Kingdom. Only about 7,500 licences are issued monthly on an average in Scotland, while Ireland can boast about 10,000, with Wales in the neighbourhood of 5,000.

The number of wireless licences held in Czechoslovakia at the close of September last was 290,395, an increase of 2,791 in the course of that month and 18,990 more than at the end of September 1929. It is expected that by the close of the year the total will reach 300,000.

Experiments carried out by the Technical section of the University of Jena at Chemnitz (Germany) having demonstrated the utility of ultra-short waves for broadcasting stations destined to serve the smaller towns, the German Posts and Telegraphs at Berlin have decided to construct a special transmitter with a view to further tests.

"WE TEST FOR YOU"

(Continued from preceding page)

makers, Messrs. Wingrove & Rogers, to prevent the gradual development of faults. This condenser, known as the "Tub," has the appearance of a model tunnel, the outer metal case being alone visible. In front there is an attractive oxidised bronze escutcheon plate with a large diameter and clearly marked rotary-controlled dial. Removal of the cover reveals three sets of fixed and moving plates fitted to a common metal spindle, with substantial metal screening between each set.

The maximum and minimum capacities of each condenser were measured separately, the variation in values being negligibly small. The minimum in each case was 30 micro-microfarads, a value slightly higher than usual, but not likely to cause any serious limitation to the wavelength range. The maximum capacity was approximately .00034 mfd. Those who are building up-to-date sets, and wish to dispense with condenser troubles can be recommended to use one of these "Tub" gang condensers.

TUNEWELL COILS

for the "Challenge" Radio-Gramophone with Bakelite moulded top and bottom plates.

10/6 EACH



SPECIFIED FOR THE "CHALLENGE" RADIO-GRAMPHONE

TUNEWELL Coils have built up a reputation for reliability and the finest workmanship. They are the choice of experts.

Careful positioning of the windings and materials of the highest insulation give TUNEWELL Coils their very low self-capacity. That is why they are more selective than others, why they give louder signals, why they will tune down to such low wavelengths.

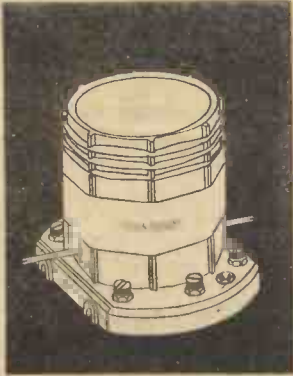
Always choose TUNEWELL — for maximum efficiency.

New "Popular Wireless" Dual Range Coil.	Tunewell Transformer. Ratios 3 to 1 and 5 to 1.	Two-pin coils. Plain, Centre-tapped and X type. BRITAIN'S FAVOURITE.
10/6	12/6	Prices from 1/6
New dual range coil for Reinartz circuits. X-tapped on both high and low waves. Super-selective.	Tunewell range of Speakers, including plaque types, from	Condensers, .0005, .0003 and .00015. 3/11 each H.F. Choices—97% efficient. Price 6/6
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Accuracy—



Matched Coils

are essential when tuning several circuits with a ganged condenser. The Colvern TGSC coils are matched to a standard. Tapping points are adjusted to compensate for the self capacity of each stage. A positive contact wave change switch contained in the coil base is supplied with ganging links so that any number of coils may be switched simultaneously.

Uniform Screening

is provided by the use of the Colvern Cylindrical Coil Screens, Type CCS. These screens are uniform in thickness and diameter, a necessity for—

Perfect Ganging

Coils, Type TGSC, 9/6 each
Screens, Type CCS, 3/6 each

COLVERN RADIO

Advt. of Colvern Ltd., Mawneys Road, Romford
Send for the COLVERN Booklet

"READERS' IDEAS AND QUESTIONS"

(Continued from page 1006)

stations overlap each other. Can you suggest how the selectivity may be improved?
A. R. (Ilford).

You are situated well within the swamp area of the new London stations and will experience difficulty in preventing shock-effect reception with your receiver. You should not use an outdoor aerial, but a small indoor one, consisting of not more than 10 ft. of wire. A good low-resistance earth connection should be obtained to maintain the efficiency of the aerial-earth system at maximum to offset the reduced receptive qualities of the small indoor aerial. If it is still found that the London stations occupy more of the tuning dials than is desirable, each screen-grid H.F. stage, and also the detector stage, should be completely screened in metal boxes. Finally, the whole receiver should be housed in a metal-lined cabinet or metal screening box.—Ed.

A Strange Phenomenon

SIR,—I was interested to read the letter, in your issue dated November 29, from W. M. (Manchester), regarding the red glow accompanied by a click which proceeded from his loud-speaker and coincided with a vivid flash of lightning.

The red glow appears to have persisted for some appreciable time, for, if the lightning flash was so vivid, the comparably small red glow would not be noticed. As the time of persistence of vision is in the neighbourhood of one-tenth of a second, the glow must have lasted longer than that.

W. M. is using an indoor aerial, which would hardly pick up a sufficient static charge to produce a glow discharge that would extend for a foot in all directions.

Let us now come to a possible explanation of what W. M. saw. If we allow our eyes to glance at the unobscured disc of the sun or at any other brilliant source of illumination and then look at a dark surface, we see an image of the source of illumination in a reddish colour on the dark ground.

W. M. is sitting in his room listening to the programme from Manchester and probably looking out of the window at the progress of the storm. The sky is overcast and the room is probably dark. Suddenly he sees a vivid flash of lightning, hears a click from the loud-speaker and, turning to it, sees—the red image of that portion of the sky that he has just seen brilliantly lit by the flash.
R. D. F. (Liverpool).

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.

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.

Queries cannot be answered personally or by telephone.

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Send **7/4** **EKCO 3F.20 H.T. ELIMINATOR**, 20 m.a., tapings for S.G. 60 volts and 120/150 volts. For A.C. mains.
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"Excellent Selectivity"



for 17'6"

DESIGNED to meet the new Regional Scheme requirements, the Watmel Tuner serves as the Aerial tuner for practically all circuits embodying reaction; also it acts as a wave trap, since the loose aperiodic aerial coupling gives great selectivity and a considerable degree of stability. Radio-Paris and 5XX are easily separated, as also are both Brookman's Park transmissions.

All moulded parts are of attractive Walnut-mottled Bakelite. The switch is a robust positive specially designed push-pull type, concealed in the base.

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If you cannot get this Watmel product at your dealers, write direct to us and enclose remittance, the tuner will be sent to you by return.

THE WATMEL BINOCULAR H.F. CHOKE gives maximum efficiency, very low self-capacity and an extremely restricted field.

Type DX3
Inductance - 200,000 mh.
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D.C. Resistance, 1,400 ohms.
Price 6/-

Type DX2
Inductance - 40,000 mh.
Self Capacity - 1.2 m.mfd.
D.C. Resistance, 450 ohms.
Price 4/-



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M.C.71

LATEST NEWS OF THE NEW NORTH REGIONAL STATION

By a Special Correspondent

THE aerial masts for the North Regional station, at Moorside Edge, near Slaithwaite, have now been finished. Each one stands 500 feet high on a massive concrete base. They are steel lattice masts of the type used at Daventry for 5XX, not the self-supporting type used at Brookmans Park. Each mast is supported by 21 stout wire guys. Two aerials will be suspended between the three masts, one to radiate the National programme on 301 metres wavelength and the other to transmit the North Regional programme on 479 metres (the present wavelength of Midland Regional).

The aerials have not yet been erected, but rapid progress is being made with the installation of the apparatus in the station building, which is a replica of that at Brookmans Park. One of the two transmitters is being prepared for the first test transmissions, which are expected some time next month. The engineer-in-charge of the Belfast station, Mr. Wheeler, has been transferred to Moorside Edge, to take charge there, and he is already on the spot. He will have a staff of about twenty assistant engineers.

The two transmitters will be brought on the air by gradual stages. At first the test transmissions will be outside of the normal programme hours. Gradually the periods of transmission will be extended until a full daily service is being given. It is expected that the North Regional transmitter, on 479 metres, will be the first to start testing, and, consequently, the first to give regular programmes. Its programmes will be partly relayed from London and partly produced in the Northern Region. It is anticipated that the northern studios at Manchester and Leeds will contribute the majority of the material on this wavelength. The National programme, on 301 metres, will be relayed from London, of course. It will probably be June before transmitters are in full swing.

By that time the present transmitters in the North of England will have been permanently closed down, with the exception of Newcastle.

The new station will be heard at considerable strength not only in the North of England, but also in the North Midlands, North Wales, the Isle of Man, and Ireland.

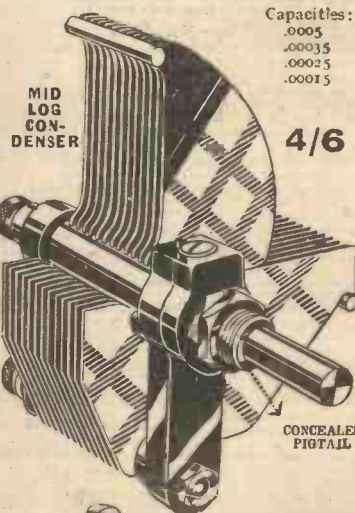
The 1931 "The Wireless & Gramophone Trader" Year Book and Diary should prove of valuable assistance to wireless manufacturers and retailers. All the technical wireless and gramophone data and broadcasting information has, of course, been revised to date. The trade directory portions are printed on various tinted papers for ease of reference. They include lists of manufacturers, manufacturer's agents and wholesale factors—their addresses and telephone numbers; proprietary names of wireless goods and their makers and a buyer's guide. The Year Book is issued to subscribers to "Trader" Journals at the special price of 3s. 6d., post free, the price to non-subscribers being 5s. 6d., post free.

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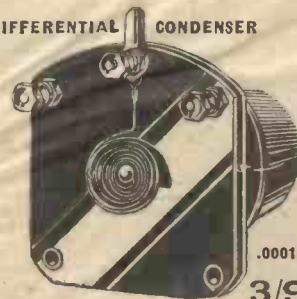
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"CHALLENGE"
RADIO-GRAMPHONE
Aerial and Anode Coils
exactly as specified.

£11.0

"CHALLENGE TWO," with reaction winding ... 10 6
"CHALLENGE THREE," three coils exactly, per pair ... 1 1 0
"CHALLENGE FOUR," three coils exactly as specified and carefully matched ... 1 11 6
"MUSIC MONITOR," "W.M." September ... 7 6
"SEARCHER TWO," "A.W." August 23, per pair ... 9 6
"A.B.C. TWO," "W.M." August ... 5 0
"BROOKMANS BY-PASS," "W.M." ... 3 0
"MUSIC LEADER," "A.W." ... 10 6
"JAMES S.G. PORTABLE 3," "W.M." July ... 9 6
NOTE.—We supply coils for any set described in "A.W." "W.M." etc. Any Coil built to your specification. Prices on application.

H & B RADIO GRAMPHONE KIT

Ebonite Panel 19 in. by 7 in. (Trelleborg) ... 6 0
Two .0005-mfd. variable condensers (Polar Universal) ... 15 0
Slow-motion Drum Drive (Polar) ... 8 6
5000-mfd. reaction condenser (Lotus) ... 5 6
Double Pole Change-over Rotary Switch (Utility) ... 4 6
1-meg. Volume Control (Isranic) ... 6 6
One dual-range aerial coil and one anode coil with reaction winding, "Challenge" type (H. & B.) ... 1 1 0
Valve Holder. Horizontal mounting (Junit) ... 1 6
Three Valve Holders (Telsen) ... 3 0
Fixed Condensers, .0005-mfd., .0002-mfd., .0001-mfd., .005-mfd. (Telsen) ... 4 0
1-mfd. Fixed Condenser (Dubilier) ... 2 6
Two 2-mfd. Fixed Condensers (Dubilier) ... 7 0
Grid Leak Holder (Lissen) ... 1 6
2-meg. Grid Leak (Dubilier) ... 1 6
High Frequency Choke (Lewco) ... 7 9
Low-frequency Transformer (Telsen "Ace") ... 8 6
Low-frequency Choke (R.L. "Hypercore") ... 17 6
Pre-set Aerial Condenser .0001-mfd. max. (Formodenset type F) ... 1 6
One 30,000-ohm and one 80,000-ohm Spaghetti Resistance (Bulgin) ... 3 0
Three Terminal Blocks (Belling-Lee) ... 2 0
Six Terminals marked Aerial, Earth, Pick-up (2), L.S. (2) (Belling-Lee) ... 2 3
Aluminium Partition Screen and Foil (H.B.) ... 2 6
7 in. length of half-inch brass ... 1 6
2-in. Extension Rod, Coupler and Bracket for Change-over Switch (H. & B.) ... 2 0
Seven yards of thin flex (Lewcolex) ... 7
Six Wander Plugs marked H.T.—, H.T.+1, H.T.+2, G.B.—, G.B.—1, G.B.—2 (Belling-Lee) ... 1 6
Two Spade Terminals, marked H.T.—, L.T.— (Belling-Lee) ... 8
Screened-lead Connector (Belling-Lee) ... 6
Price of Kit includes Panel already drilled.
Baseboard, all Wire and Screws needed.
NOTE.—If you buy this KIT, we build set FREE if desired.
Four Valves (Marconi, Mullard, or Osram) ... 2 7 8 extra
Electric Gramophone Motor (Ediswan) ... 3 3 0
Pick-up and Tone Arm (Ediswan) ... 2 5 0
Magnet-Dynamic Loud-speaker (Eggra) ... 2 16 0
Novotone (Type J) (Gambrell) ... 3 3 0
Gramophone Cabinet (Cunco "Waverley") ... 5 10 0
Carriage paid on all cash orders.
H & B C.O.D. charges paid on orders over £1.
H. & B. RADIO, 34, 36, 38, Beak Street, Regent Street, London, W.1. Gerrard 2834

SPECIFIED FOR THE LOFTIN-WHITE A.C. 2

Savage transformer, type L.W.2, 39/-, postage 1/- State voltage and periodicity of mains when ordering. Many other types available, also smoothing chokes and condensers.

Write for List
SAVAGE, 292 Bishopsgate, London, E.C.2
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J. H. TAYLOR & CO
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POST FREE ON REQUEST

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BROADCAST TELEPHONY

Broadcasting stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is aerial energy.

Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)
GREAT BRITAIN				GERMANY				NORTH AFRICA			
25.53	11,751	Chelmsford (G5SW)	15.0	316	950	Natan-Vitus	0.7	303.4	825.3	Algiers (PTT)	13.0
200	1,500	Leeds	0.10	329	911	Grenoble (PTT)	1.2	416	721	Radio Maroc (Rabat)	10.0
242	1,238	Belfast	1.2	320.5	910.3	Caen (Normandy)	0.6	1,350	222.2	Tunis Kasbah	0.9
261.3	1,148	London Nat.	68.0	347.7	862.8	Poste Parisien	1.2	NORWAY			
288.5	1,040	Newcastle	1.2	370	810.5	Strasbourg (PTT)	12.0	364	824	Bergen	1.0
288.5	1,040	Swansea	0.10	385	779	Radio LL (Paris)	0.5	303.1	826.1	Frederiksstad	0.7
288.5	1,040	Stoke-on-Trent	0.10	447	671	Radio Toulouse	15.0	453.2	662	Porsgrund	1.5
288.5	1,040	Sheffield	0.10	466	644	Paris (PTT)	2.0	453.2	662	Nidaros	1.2
288.5	1,040	Plymouth	0.10	1,445.7	207.5	Lyons (PTT)	2.3	1,073	279.6	Oslo	75.0
288.5	1,040	Liverpool	0.16	1,725	174	Eiffel Tower	15.0	POLAND			
288.5	1,040	Hull	0.16	GERMANY				214.2	1,400	Warsaw (2)	1.9
288.5	1,040	Edinburgh	0.4	31.38	9,560	Radio Paris	17.0	234	1,233	Lodz	2.2
288.5	1,040	Dundee	0.10	217	1,387	Zeesen	15.0	244	1,229	Cracow	1.5
288.5	1,040	Bournemouth	1.2	218	1,373	Konigsberg	1.7	312.8	959	Gdansk	0.5
288.5	1,040	Bradford	0.16	227	1,319	Flensburg	0.6	338.1	887.1	Wilno	1.9
301	995	Aberdeen	1.2	227	1,319	Cologne	1.7	381	788	Poznan	2.2
309.0	968	Cardiff	1.2	227	1,319	Munster	0.6	408.3	732	Katowice	16.0
350.3	843	London Reg.	45.0	232.2	1,292	Aachen	0.31	1,411	212.5	Warsaw	14.0
376.4	797	Manchester	1.2	239	1,256	Kiel	0.3	PORTUGAL			
398.9	752	Glasgow	1.2	246.4	1,217.2	Nurnberg	2.3	240	1,250	Oporto	0.25
479	626	Midland Reg.	38.0	253.4	1,184	Cassel	0.3	ROMANIA			
1,554	193	Daventry (Nat.)	35.0	259.3	1,157	Leipzig	2.3	320	937.6	Lisbon (CTIAA)	0.25
AUSTRIA				260.8	1,112	Gleiwitz	5.6	RUSSIA			
246	1,220	Linz	0.6	270.5	1,085	Augsburg	0.3	427	702	Kharkov	4.8
246	1,220	Salzburg	0.6	283.0	1,058	Heilsberg	120.0	720	416.6	Moscow (PTT)	20.0
Belgium				283.0	1,058	Magdeburg	0.6	800	375	Kiev	20.0
283.0	1,058	Innsbruck	0.6	283.0	1,058	Berlin (L)	0.6	824	364	Sverdlovsk	25.0
352	851	Graz	9.5	283.0	1,058	Stettin	0.6	870	344.8	Tiflis	15.0
453	666	Klagenfurt	0.6	316.0	947.6	Bremen	0.3	937.5	320	Kharkov (RV20)	25.0
517	581	Vienna	20.0	318.8	941	Dresden	0.3	1,000	300	Leningrad	20.0
Belgium				325	923	Breslau	1.7	1,103	272	Moscow Popoff	40.0
206	1,456	Verviers	0.3	300	833	Muhlacker	75.0	1,200	250	Kharkov (RV4)	25.0
206	1,456	Antwerp	0.4	372	806	Hamburg	1.7	1,304	230	Moscow (Trades Unions)	100.0
210	1,391	Chateaufort	0.25	390	770	Frankfurt	1.7	1,380	217.5	Bakou	10.0
243	1,235	Coutrai	0.1	418	716	Berlin	1.7	1,481	202.5	Moscow (Kom)	20.0
244.7	1,226	Ghent	0.25	452.1	662	Danzig	0.25	SPAIN			
244.1	1,229	Schaerbeek	0.5	473	635	Langeberg	17.0	251	1,193	Barcelona (EAJ15)	1.0
338.2	887	Velthem	12.0	533	563	Munich	17	206.7	1,125	Barcelona (EAJ13)	10.0
CZECHO-SLOVAKIA				559.7	536	Kaiserslautern	1.0	349	860	Barcelona (EAJ11)	8.0
509	590	Brussels (No. 1)	1.2	566	530	Hanover	0.35	308	815	Seville (EAJ5)	1.5
Denmark				570	527	Freiburg	0.3	413.8	725	Radio Espana	1.0
263	1,139	Moravska Ostrava	11.0	1,035	183.5	Zeesen	35.0	424	707	Madrid (EAJ7)	2.0
279	1,076	Bratislava	14.0	1,035	183.5	Norddeich	10.0	460	652	San Sebastian (EAJ8)	0.5
294	1,020	Kosice	2.5	HOLLAND				SWEDEN			
342	878	Brunn (Brno)	3.0	31.23	9,599	Eindhoven (PCJ)	30.0	230.6	1,301	Malmö	0.75
487	617	Prague (Praha)	5.5	299	1,004	Hilversum	8.5	257	1,166	Hörby	15.0
Finland				299	1,004	Radio Idzerda (The Hague)	0.6	300.2	999.3	Falun	0.05
281	1,067	Copenhagen	1.0	1,071	280	Scheveningen-Haven	5.0	322	932	Cöteborg	15.0
1,153	260	Kalundborg	10.0	1,875	160	Huizen	8.5	436	689	Stockholm	75.0
Estonia				HUNGARY				542	554	Stundsvall	15.0
401	748	Reval (Tallinn)	0.7	210	1,430	Budapest (Csepel)	1.0	770	389	Ostersund	0.75
France				550	545	Budapest	23.0	1,224	245	Boden	0.75
221	1,355	Helsinki	15.0	ICELAND				1,348	222.5	Motala	40.0
291	1,031	Viipuri	15.0	1,200	250	Reykjavik (shortly testing)	10.0	SWITZERLAND			
1,796	167	Lahti	54.0	IRISH FREE STATE				320	937.5	Basle	0.65
France				224.4	1,337	Cork (IFS)	1.5	403	743	Berne	1.1
172.5	1,739	St. Quentin	0.3	413	725	Dublin (2RN)	1.5	459	653	Zurich	0.75
200	1,500	Radio Roubaix	0.2	ITALY				678.7	454.6	Lausanne	0.6
222.9	1,346	Fécamp	1.0	80	3,750	Rome (3RO)	9.0	760	395	Geneva	1.5
235.1	1,275	Nîmes	1.0	296	1,013	Turin (Torino)	8.5	TURKEY			
240.6	1,247	Béziers	0.6	312	916.2	Genoa (Genova)	1.5	1,200	250	Istanbul	5.0
249.7	1,201	Juan-les-Pins	0.5	332	905	Naples (Napoli)	1.7	1,961	153	Ankara	7.0
256	1,171	Toulouse (PTT)	1.0	441	680	Rome (Roma)	75.0	YUGOSLAVIA			
265	1,130	Lille (PTT)	15.0	453	662	Bolzano (IBZ)	0.2	306.8	978	Zagreb (Agram)	0.7
272	1,103	Rennes	1.2	501	599	Milan (Milano)	8.5	430.5	696.8	Belgrade	3.0
286	1,049	Montpellier	2.0	LATVIA				574.7	522	Ljubljana	2.8
286.2	1,047.9	Radio Lyons	0.5	525	572	Riga	12.0	LITHUANIA			
296.4	1,012.1	Limoges (PTT)	0.08	LITHUANIA				YUGOSLAVIA			
300	1,000	Strasbourg	1.0	1,035	155	Kaunas	7.0	YUGOSLAVIA			
304	988	Bordeaux (PTT)	35.0	YUGOSLAVIA				YUGOSLAVIA			
315	952.5	Neully (Paris)	0.3	YUGOSLAVIA				YUGOSLAVIA			

MICROSCOPIC!

X-RAYS are identical in everything except wavelength, or frequency, with wireless waves. So, of course, is ordinary light. In fact light waves stand roughly midway in frequency between X-rays and the shortest wireless wave that has yet been produced in the laboratory. In modern science, X-rays are at present being used to extend the powers of the microscope. In the ordinary way it is quite impossible to "see" any object that is smaller than the wavelength of visible light. But by using the still more minute X-rays, photographs are now being taken of molecules that the human eye will never be able to see directly, even through the most powerful microscope.

B. A. R.

Blue Spot Literature.—Traders will be interested to know that adhesive labels referring to Blue Spot speakers as Christmas gifts can be obtained from Blue Spot House, 94-96 Rosoman Street, Rosebery Avenue, E.C.1.

Part Exchange.—Owners of old sets should note that at any branch of Messrs. Warners, old receivers are taken in part exchange for 1931 Osram Music Magnet Four sets. The balance may be arranged in easy monthly payments if desired.

R.I. Eliminators.—In connection with the Radio Instruments announcement on page 877 of "A.W." No. 443, it should be noted that the type D20/3 eliminator, price £2 12s. 6d., is for D.C. supply, and not for A.C., as stated. The model A20/3, price £4 15s., is for A.C. supply.

Easy Terms

FIRST IN 1924 FIRST IN 1930

COSSOR EMPIRE MELODY MAKER KIT, 1931 model, S.G., Detector and Power.

Cash price £6 17s. 6d.

Balance in 11 monthly payments of 12/9

1931 OSRAM MUSIC MAGNET KIT.

2 S.G., detector and power.

Cash Price £11 15 0

Balance in 11 monthly payments of 18/6

DYNAPLUS SCREENED THREE KIT.

S.G., Detector and Power.

Cash price £5 14s. 6d.

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LAMPLUGH INDUCTOR SPEAKER for perfect reproduction. Unit and Chassis complete, ready mounted.

Cash price £3 10s.

Balance in 11 monthly payments of 6/5

EPOCH PERMANENT MAGNET SPEAKER, Type B4.

Cash price £4 10s.

Balance in 11 monthly payments of 8/3

STANDARD WET H.T. BATTERIES.

144 volts, 20,000 m/a. Cash price £4 2s. 0d.

Other voltages and capacities available, detailed prices on application.

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EKCO 3F.20 H.T. ELIMINATOR.

20 m/a. Tappings for S.G., 60 volts and 120/150 volts. For A.C. Mains. Cash price £3 19s. 6d.

Balance in 11 monthly payments of 7/4

EXIDE 120-volt W.H. Type ACCUMULATOR, in crates.

Cash price £4 13s.

Balance in 11 monthly payments of 8/6

Every make of Radio Set or Accessory supplied on EASY

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56 LUDGATE HILL, LONDON, E.C.4

(Established 1924)

Telephone: CENTRAL 2726

RADIO AT SEA

MANY amateurs believe that the radio gear on board ship, and even on the new liners, is of the out-of-date spark and crystal-detector variety.

This is quite a mistake; the new Booth liner *Hilary*, for instance, has been fitted up with the very latest radio transmitters and receivers.

The valve transmitter for interrupted continuous-wave telegraphy will operate on wavelengths between 600 and 800 metres with a power of 1½ kilowatts. Its distinctive penetrating note in transmission will be very effective where atmospheric interference makes communication difficult at times.

The receiver will also be capable, to a large extent, of overcoming interference, as it is fitted with a rejector circuit covering the wavelengths which are most subject to interference. The valves, too, have a very high amplification factor, which increases considerably the distance over which signals can be received. The new Marconi receiver is particularly suitable for all the requirements of a ship's wireless service, as it more than covers the complete waveband used in commercial work.

Very short wavelengths, as well as very long ones, are now used for the transmission of useful information to ships, and this is provided for by the receiver's wavelength range of 15 metres to 20,000 metres.

K. U.

"Postcard Radio Literature."—It should be noted that the Superlamp catalogue reviewed on page 848 of "A.W." No. 442 is available only to the trade.

All interference with broadcasting programmes is ruthlessly banned in Yugoslavia; the latest law decrees that whoever willingly or through neglect spoils the reception of the wireless entertainments, on conviction will be liable to one year's imprisonment or a fine amounting to 10,000 dinar (roughly £400).

It is reported that the Marconi International Marine Communication Co. has the order to manufacture and install nine complete wireless sets with direction finders on new vessels of the British Tanker Company's fleet.

"Amateur Wireless and Radiovision." Price Three pence. Published on Thursdays and bearing the date of Saturday immediately following. Post free to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to "Bernard Jones Publications, Ltd."

General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets.

Contributions are always welcome, will be promptly considered, and if used will be paid for.

Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.

BROWNIE DOMINION MAINS S.G.3

A REALLY superb all-electric 3-valve receiver in a handsome, richly polished solid walnut cabinet—that's the wonderful new Brownie Dominion Mains S.G.3—the mainstay for the connoisseur! Just switch it on—then sit back and enjoy the cream of the world's programmes at brilliant loudspeaker strength!

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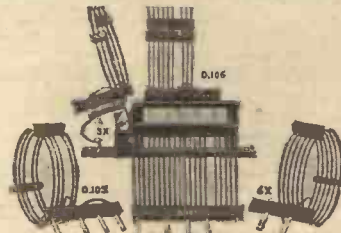
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Brownie Wireless Co. (G.B.), Ltd., Dept. U., Nelson Street Works, London, N.W.1.

EDDYSTONE SHORT-WAVE APPARATUS



SHORT-WAVE INDUCTANCE UNIT

This unit forms the complete inductance portion for a short-wave receiver, providing variable aperiodic aerial coil, grid coil and reaction winding. Complete with stand and 5 coils, it covers efficiently the whole short waveband from 15-95 metres. Price 22/6 complete with full circuit details. (Extra coils for B.B.C. waveband can be obtained.)



SHORT-WAVE H.F. CHOKE

This special EDDYSTONE S.W. choke is designed for use in any position in a

S.W. receiver for wavelengths between 10-80 metres. Wound on paxolin former with stand for vertical or horizontal mounting.

Price 2/6

LOW LOSS VALVE HOLDER

A valve holder of low loss construction with one-piece air spaced sockets. Bakelite insulating ring. Can be mounted direct on metal baseboard.



Price 1/6

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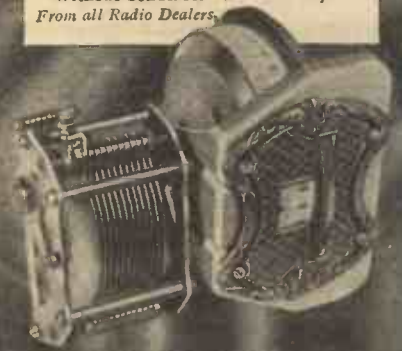
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SELECTIVE TUNING

The Lotus Single Drum Vernier Dial is made with metal escutcheon in heavy silver, oxidised silver, or Florentine bronze finish, or black or mahogany bakelite. The great accuracy of workmanship makes selective tuning simple and backlash impossible.

Price with '0005 Condenser ... 14/9
Without Condenser ... 9/-

From all Radio Dealers.



LOTUS SINGLE DRUM DIALS

Write for illustrated Catalogue to GARNETT, WHITELEY & CO., LTD., LIVERPOOL.

ELECTRADIX

Meggers, Ducters, Capacity Bridges, Fluxmeters, Lab Galvos and Shunts, Pointolite Sets, Unipivot Meters, Normal Weston Cells, Wheatstone Bridges, Reversing Keys. All Cheap.

Meters, Milliammeters, all ranges, 15/- to 22/6; 0 to 500 volts, 45/-; Dixonmeters, 50/-; Testing Sets, Elliot and other makes, E.108, 4 ranges, amps. and volts, 45/-; A.C. Hot Wire, 3 amp., 4/-; Circuit-test Silvertown Galvos, 7/6; Relays, 7/6 to 27/6.

DYNAMOS. L.T. Charging. Aero, 12 volts 250 watts, with auto cut-out, 25/-; W.W., 20 volts 5 amps., 50/-; L., 12 volts 8 amps., 45/-; Ct., 18 volts 8 amps., 65/-; 50 volts 25 amps., 27 10s.; 80 volts 20 amps., 28 10s., and Four 100 v. motors, 10/-; High Tension Charging Motor Generators: 230 volts A.C. to 100 volts, 100 m/a., D.C., 70/-; Dynamos: 250 volts 4 amps., 23 10s.; 100 volts 4 amps., 35/-; H.T. Anode Motor Generators: 100 volts D.C. to 250 volts, 250 m/a., 110/-; 220 volts D.C. to 400 volts D.C., 200 m/a., 112/-; G.E.C. and B.T.H. 2-com. Aircraft Generators: 950 volts 60 m/a., and 8 volts 5 amps., 110/-; 600 volts m/a. and 8 volts 3 amps., 55/-; Fine Newton H.T. Generators, 2 kw. 2,000 v., 230/-; Slow Speed Motor Generator, 1 kw., 2,000 volts, 224/-; 2 kw., 2,000 and 4,000 volts, 252/-; Large E.V. Megger Hand Generators, 600 volts, 25/-; D.C., to A.C. Rotary, 110/-.

Flashing Signal Lamps. Aldis, 14/6; C.A.V., 12/6; 3-colour Hand 8/-; Leather Cases, 10 by 8 by 6, with strap, 5/-; Smaller, 2/6; Aerial Halliards, 6d.; Aerial Winches, with brake, 1/6; Valve Boxes, 3 cell, padded, 1/4; Double Protractors, in leather case, 5/-; Instrument Cases, mahog., with brass handle, lid, and drop front, 7 by 8 by 5 1/2, 2/6; Marconi T6 Table Varia Condensers, 7/6; Mahogany Cases, with lid and ebon. panel, 5 sunk sockets, 8 by 4 by 3 1/2, 2/-; L.S. Filter Condensers, .05 m/f., 5 taps, 5/-; Earth Spikes, with terminal, 1/2.

SWITCHGEAR. Mains Set Glass Fuses, 2 amps., 3d.; Porcelain, 2-pin Plug 3d., fuses 4d.; Slow-motion Gears-Slide Rheos., 7/6; 147 S.P. Plug Boards, 9-way, 10 amp., 2/-; Lucas 8-way Switch Boxes, mahogany, Brass Cover, 6 S.P., 1 D.P., 1 C.O., 3/6; S.P.C.O. Switches, 1/6; H.T. send receive, 2/6; 100 or 200 v. Lamps, 6d.; 2 amp. 110-volt. Lamps for charging, 2/6; 1,000 ohm Res. Bulbs, 6d.; Auto Cutouts, 7/-; Switches, Controllers, and Charging Boards built to order.

Transmitters. R.A.F., 1-in. spark, with A.T.I. and all fittings in polished mahogany case. Cost £15. Sale 15/-; 100 watts, 25/-; 250 watts, 50/-; 2-valve Aircraft ditto, with Osram valves; speech or Morse, 30/- each; No. 1 Tapping Keys, open type, with massive contacts, 6/- each; No. 51KD with aluminium cover, double contact, fine work, 7/6 each; Morse Practice Sets, with buzzer and key on mahogany panel, 8/6 each; Morse Sounders, 15/-.

Power, Amplifier, or Transmitting Valves, 6-volt 40 watts, 4/6; Receiving, 3/-.

Wavemeters by Townsend, Paul, Silvertown, Gambrell, and Marconi, from 15/-.

Electric Pocket Torches, with new "Ever-Ready" Battery, 2/6; Airship Safety Lamps, 7/6; 2-volt, Accumulator 5/-; 25 volts to 220 volts Candle Lamps, 6d.; Hand Lanterns, ditto, 4/6; Radiator 250-watt 110-volt Lamps for charging, 2/6; Lucas 8-way Switches, in mahogany case, brass lid, 3/6; 3-amp. Wall Plugs for loud-speaker extension, 9d.

Electric Bells, G.P.O. Circular, 2/-; Outdoor, 1/6; Large Ironclad Bells, 5/-; Remote Control Relays, 8/-.

Insulators, H.T., in porcelain and ebonite, from 2d. each; Empire Insulating Cloth, for coils, chokes, etc., 100 sq. in. for 1/-; 4-pin Plug and Sockets, 8d. pair; 2-pin Wall, 5d. ditto, 10d.; Adaptors, 6d.

HOUSE TELEPHONES, 12 s. 6 set of two complete stations.

Home Recorder Talkie Sets, 24 10s.

LOUD-SPEAKERS R.K. Cones, fitted B.T.H. Moving Coil, 100 surplus, at only 7/6 each; Marconi L.S. Magnet Pots, 6 v., for Moving Coil Cones, 20/-.

THE VIOLINA CABINET LOUD-SPEAKER DE LUXE. Wonderful reproduction, complete tonal range. Beautifully polished mahogany. List, 25, Sale Price 22/6; Moving-coil Loud-speakers, 23 10s.

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Postcard Radio Literature

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Down in Price

Did you know that the new model 56 Marconiphone set has just been greatly reduced in price? A.C., D.C., and battery-driven models are all subject to this big price reduction. The model 56 is a five-valver, of course, with three screen-grid stages, and you can get full particulars from a Marconiphone booklet, to be had free. **117**

For Mains Users

There is no reason why you should not make up your own mains eliminator, and in the new range of Heayberd kits of parts for eliminators you are sure to find one that suits your needs. Models are available for alternating and direct-current mains. **118**

Junit Eliminators

Everyone seems to be talking about the new Junit eliminators, a new line so far as Junit is concerned. If I remember rightly this was described recently on the AMATEUR WIRELESS "We Test for You" page, and you can get full particulars in a new Junit folder. **119**

For Better Radio

I dare say 90 per cent. of set users have two-volt valves. A little booklet I have just received from Mullard deals with two-volters and it gives full particulars of the new P.M.'s. **120**

R.I. and the Mains

These new all-insulated R.I. high-tension units seem to be the "goods." I advise designers who are changing over to mains operation to get the latest literature which gives full information about these new units, in which the new alloy Nikalloy is used. **121**

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," 55-61, Fetter Lane, E.C.4. "Observer" will see that you get all the literature you desire.

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PROBLEMS

MORE RADIOGRAMS

The Compania Radio Internacional de Brazil, an associated company of the International Telephone and Telegraph Corporation, has been granted a concession to construct radio stations and carry on international radio-telegraph and radio-telephone services from Brazil. Stations will be installed to give telephone service to Europe and the U.S.A., as well as other countries connected to the international network of South America. The concession is for a period of ten years.

Although no wireless listening tax is in force in Holland, all owners of wireless apparatus must register with the Dutch telegraph authorities. According to the latest statistics, on October 1 last 233,314 receiving licences had been issued, thus showing that 2.98 per cent. of the population was interested in radio entertainments. Sweden, on the same date, numbered 466,750 licence holders.

Radio Toulouse has always been well received in certain parts of the West of Scotland, and the strength of transmission has undergone a further appreciable increase since the new transmitter was brought into operation by the big French station.

Although 1,000 lire were offered as a prize and 370 different suggestions were considered by the studio authorities, the Rome broadcasting station has not yet discovered a suitable interval signal. In the meantime between programme items the Naples Pan flute is heard.

ROTARY

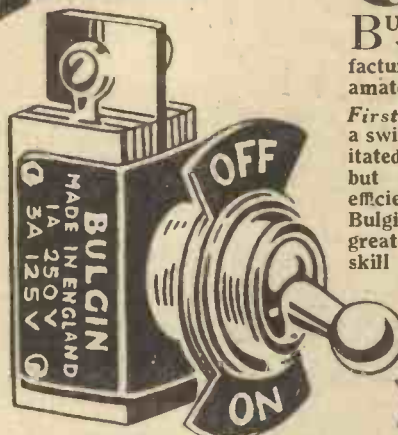


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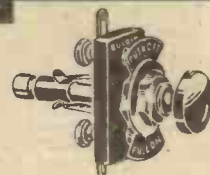


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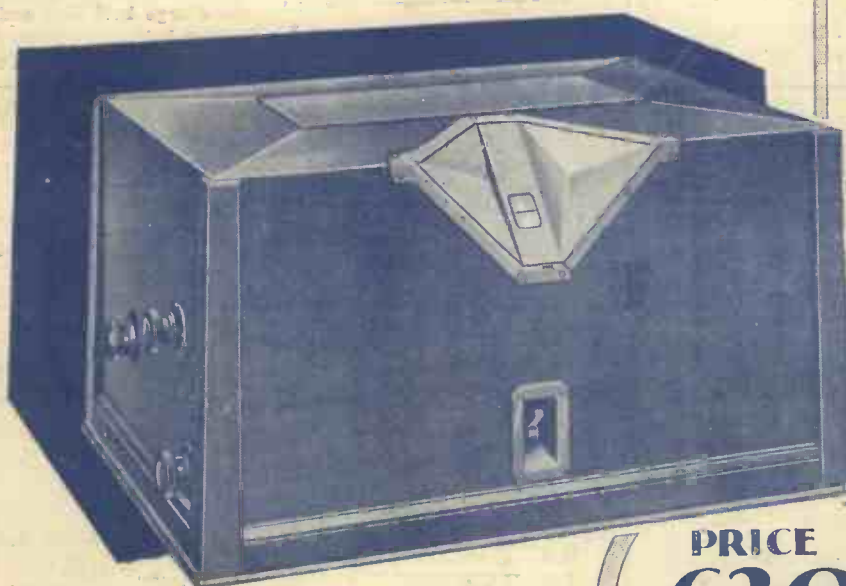
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