

THE 1927 'FIVE', A YEAR AHEAD OF ANY OTHER SET!

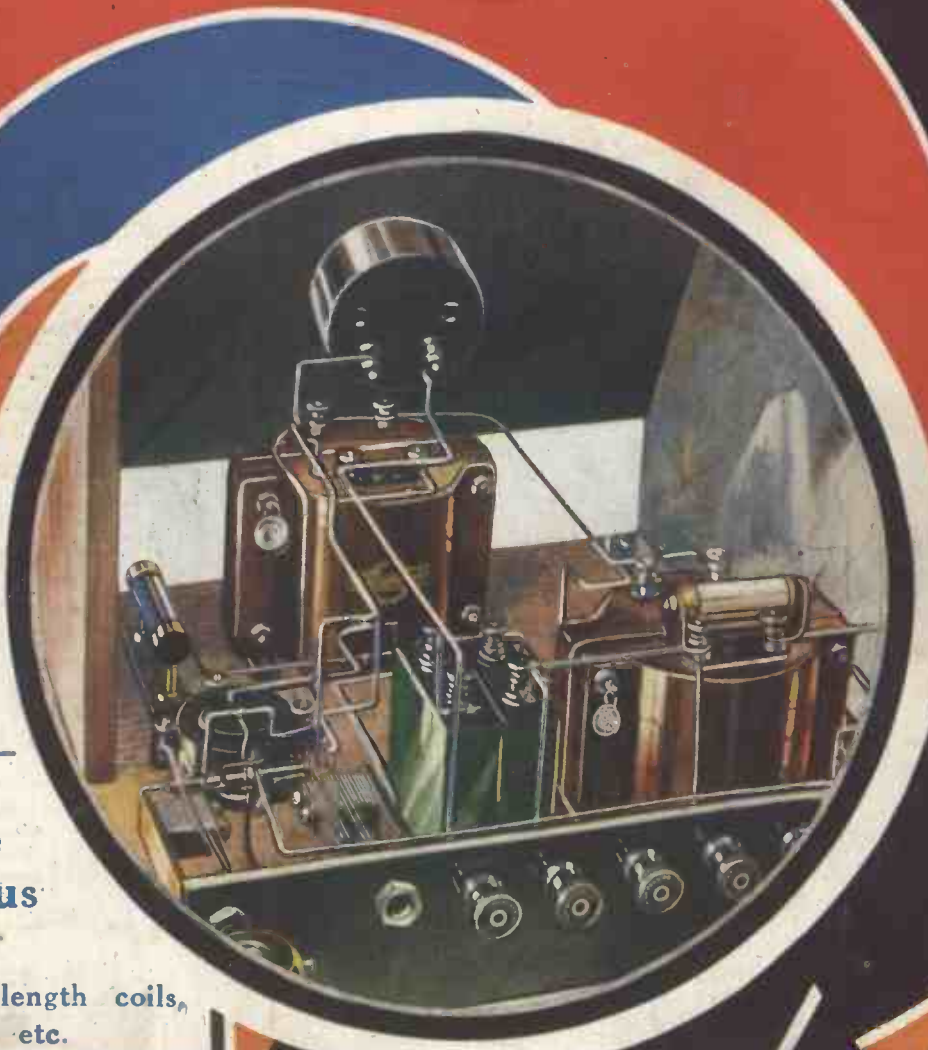
(see within)

# Wireless Magazine

1/6

Monthly

Edited by  
Bernard E. Jones Vol. 4, No. 22. November 1926.



## IN THIS ISSUE—

More About the  
Already Famous  
"1927 Five"—

Winding the long-wavelength coils,  
Stabilising the set, etc., etc.

With FREE Constructional Guide in Colours

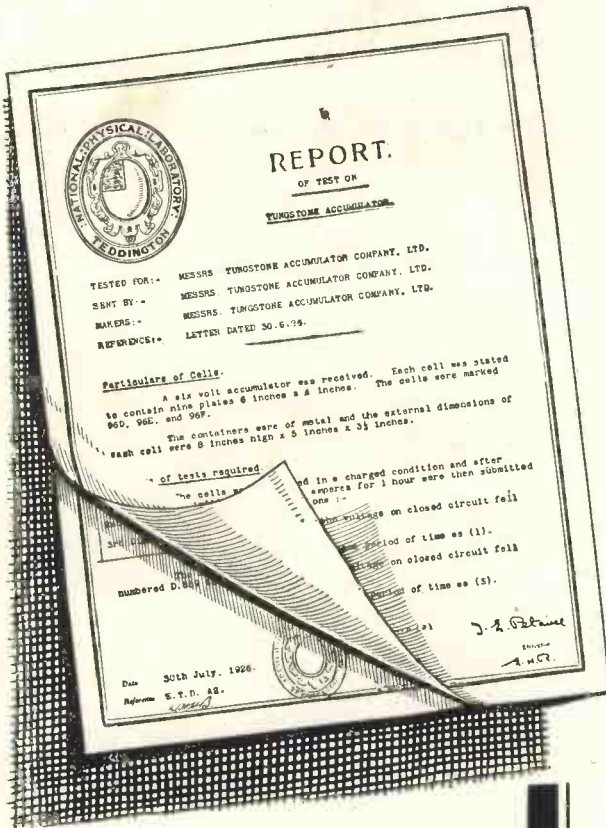
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T.M. 76

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CONTENTS: Components and Their Varied Purposes; Crystal Detectors; Coils, Making and Mounting; Condensers; Variometers and Variocouplers; Resistances or Rheostats; Transformers; Making a Test Buzzer; Index.

*In course of preparation*

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## Wireless Telephony Explained

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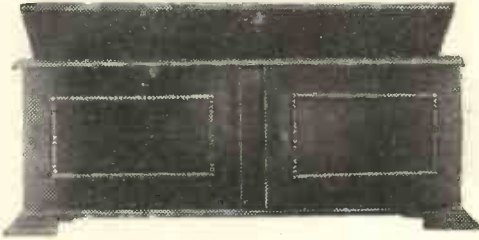
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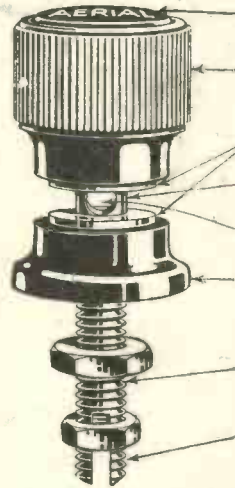
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# 10/6

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Highly finished screw-action Bakelite-insulated head.

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Transverse slot with clamping nut, eliminating soldering.

Patent No. 248921.  
 Registered Design No. 715424

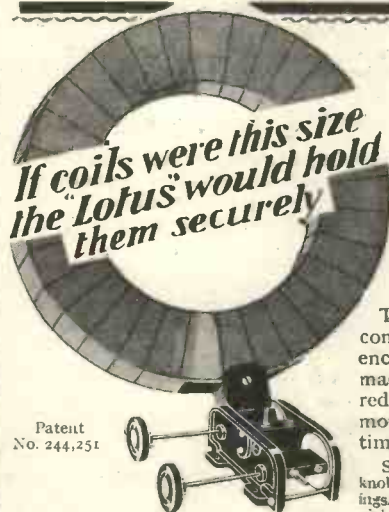
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The vernier movement comprises three sets of enclosed precision machine-cut gears, and reduces the speed of the moving block by eight times.

Side plates, coil blocks, and knobs in artistic bakelite mouldings. All metal parts heavily nickel plated. Made for left as well as right hand.

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The Duvarileak has been in the experimental stage for three years. The final result is that this Grid Leak will show a smooth and uniform variation of resistance from zero to five million ohms. More important still, by successfully discovering a resistance element of extremely hard surface and by arranging a ball-bearing contact (see inset) we have assured that the wear in operation will be negligible. This means that the Duvarileak will, throughout its life, give a *constant resistance value for any given setting of the dial.*

Like all Dubilier products the Duvarileak can be relied upon to give the utmost efficiency in service—it is, in fact, the perfect variable Grid Leak at last.

As seen in the illustration it has one-hole fixing and a dial scale by which the resistance may be set. The Duvocon for Loud Speaker Volume control is the same in appearance and price as the Duvarileak and is suitable for use with any Loud Speaker.

Price 7/6 of all Dealers.



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E.P.S.228



# Wireless Magazine

for November, 1926

Vol. IV

No. 22

Not only a handsome picture but a loud-speaker as well!



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**Announcements.**—The WIRELESS MAGAZINE, edited by Bernard E. Jones, is published about the 25th day of the month, and bears the date of the month following. Technical Adviser: Sydney Brydon, D.Sc., M.I.E.E. One Shilling Net. Subscription rates are 15s. 6d. a year, post free; Canada, 13s. 6d. a year, post free. Contributions, accompanied by stamped and addressed envelopes, are invited. All editorial communications should be addressed to The Editor, WIRELESS MAGAZINE, La Belle Sauvage, London, E.C.4. Subscriptions should be addressed to The Publisher, WIRELESS MAGAZINE.

# More About the 1927 Five—

**THE SET THAT IS A YEAR AHEAD!**

*General Hints on Operating :: Making Long-wave Coils :: Use of Special Formers :: Adjusting the Neutralising Condensers :: Economising in High Tension*



*Great interest was taken in the 1927 Five at the National Radio Exhibition held at Olympia.*

**T**HE interest aroused in the 1927 Five has exceeded even our expectations. At the National Radio Exhibition held at Olympia in September the original receiver was on show, and our technical representatives had all their time taken up in giving particulars of the new receiver.

### *Details Repeated*

This month we are giving again, in brief, constructional details for the benefit of those readers who were unable to obtain the October issue, which was rapidly sold out.

Those who prefer to wind their own coils may obtain specially cut ebonite formers from the British-Ebonite Co., Ltd., of Hanwell, Middlesex.

These formers consist of a cylinder of ebonite along the surface of which, parallel to the axis of the cylinder, are six projections of triangular section, equally spaced round the circumference of the cylinder. The dis-

tance between diametrically opposing projections is 3in.

A set of three of these formers is obtainable for both the short and long wavelengths.

To one end of each of the formers a circular ebonite base is screwed into which the four pins are inserted. The spacing of these pins is different from the original Magnum coil in that the distance between the two pins on the major axis is 1½in. instead of 2in. The length of the minor axis is 1in. as before.

These measurements are the same for the sockets mounted on the three ebonite platforms. Sketches are given showing the dimensions, method of winding and tapping the coils for broadcast wavelengths.

For longer wavelengths (from about 1,000 to 2,000 metres) another set of three coils is required. In construction and the method of winding and tapping, the long-wavelength coils are slightly different from those already described for short broadcast wavelengths.

The long-wavelength aerial coil, for instance, is tapped at only one portion of the winding and in the centre. Connections for the winding to the pins are therefore different from those of the short-wave aerial coil. The former is 4¼in. long, and is wound with 250 turns of No. 30 gauge d.s.c. copper wire, tapped at the 125th turn.

### *Coil Connections*

Connections from the two ends of the coil and the centre tapping are shown in one of the sketches. This sketch shows an elevation of the coil and a view of the *base* (not the platform on which the sockets are mounted) looking at the bottom of the coil. The connections are brought through small holes drilled beside each of the four pins and soldered to the latter.

It is very important that these connections are correct, and it will be noted that the two pins on





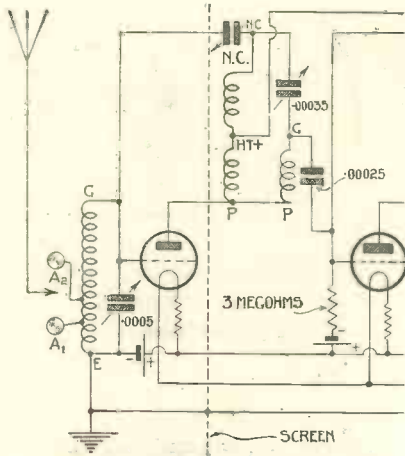


Diagram showing how grid bias can be applied to the H.F. valves.

the minor axis are joined together and to the top turn of the coil.

In order to keep the turns of wire in position, it may be advisable to apply shellac varnish lightly over the completed winding.

Each of the anode coils is wound on a similar type of former,  $1\frac{1}{2}$  in. long. The winding consists of 300 turns of No. 32 d.s.c. wire tapped at 100th and 200th turns. Note that in the case of these long-wave coils there is no spacing between each of the three sections, and that the coil is wound straight on

leaving loops at the tapping points for connecting to the pins.

Sketches are also given showing the construction, winding, and connections of these coils, of which two are required.

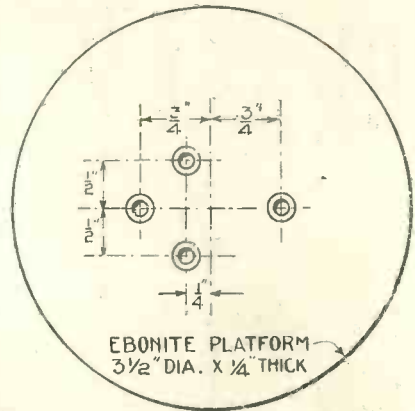
The Magnum coils, which may be obtained ready for use, have the same winding specification, the only difference being in the spacing of the pins.

The constructor has thus two courses open to him. He may either buy the coils already made to our specification, or else he may wind them for himself on the Becol formers, as illustrated.

We would point out that as the coil platforms for the bought coils are different to those for the Becol formers, the constructor must not buy one set of coils and make the other set. He must buy both or make both sets.

So much for the coils. Now we have some remarks to make concerning the neutralisation of the H.F. valves.

In the specification of the valves given in the last issue of the WIRELESS MAGAZINE a misprint occurred



Dimensions of the base for mounting the home-made short- and long-wave coils wound on Becol formers.

can use Cossor Point One valves, which need only a 2-volt battery. For the high-frequency stages two red-band valves should be used; for the detector a black-band valve; and for the low-frequency stages two Stentor Two's or a black-band and a Stentor Two.

If these valves are used the total current consumption will be only .55 ampere.

Other valves may, of course, be used with as good results, only it may be necessary to vary the tapping points on the two H.F. anode coils.

If neutralisation is found to be at all difficult, experiments should be made in the following order:—Take the two low-wavelength anode coils and wind the top and middle sections of the formers (see p. 194 of the



Photograph of the 1927 Five, showing its handsome appearance.

in the nomenclature of one of the valves. The last valve—that is, the second L.F. amplifier—should be a DE5A, and not a DE5B as stated.

By the way, those who do not desire to use a 6-volt accumulator

Cabinet and baseboard (Unica Cabinet Co.).

Grained ebonite panel, 27 $\frac{1}{2}$  in. by 7 in. (American Hard Rubber or Becol).

Terminal strips, 10 in. by 2 in. and 6 in. by 2 in. (Siemens or Trelleborgs).

12 engraved terminals (Eastick or Belling and Lee).

.0005-microfarad variable condenser (Igranic-Pacent S.L.F. type or Ormond, G.E.C., Raymond S.L.F.).

Two .00035-microfarad variable condensers (Igranic-Pacent S.L.F. type or Ormond, G.E.C., Raymond S.L.F.).

Three 4 in. mahogany dials (American Hard Rubber).

LIST OF COMPONENTS REQUIRED

Panel-mounting milliammeter, reading 0-10 or 20 milliamperes (Sifam).

Set of special coils made to our specification complete with baseboard mounting (Burne-Jones), or home-made coils as described in this issue.

Four aluminium shields (Burne-Jones).

Two neutralising condensers (McMichael).

Five baseboard-mounting anti-microphonic valve holders (Lotus or Benjamin, Burndept).

Five fixed filament resistors (Burne-Jones).

Two .00025-microfarad grid condensers (T.C.C. type SP or Dubilier, Mullard).

One 3-megohm and one 5-megohm grid leak (Ediswan or Dubilier, Mullard).

Two jacks (Igranic-Pacent types 65 and 66).

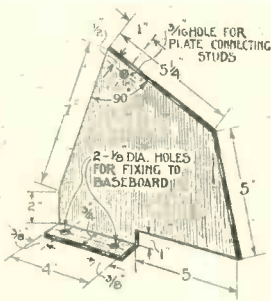
One plug (Igranic-Pacent Auto-plug).

Three 1-microfarad fixed condensers (Dubilier-Mansbridge or T.C.C.).

Two L.F. transformers, ratios 2.7 to 1 and 4 to 1 (Marconiphone).

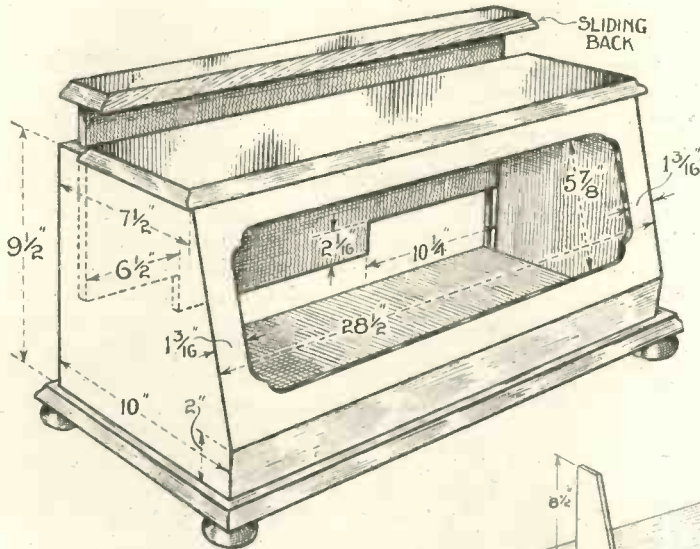
.0003-microfarad fixed condenser with clips (Wates K).

**CONSTRUCTIONAL DETAILS  
OF THE ALREADY FAMOUS  
1927 FIVE—  
THE SET THAT IS A YEAR AHEAD!**

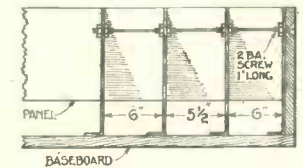


(Above). — Dimensions of the aluminium screens which play no small part in making the 1927 Five as efficient as it is.

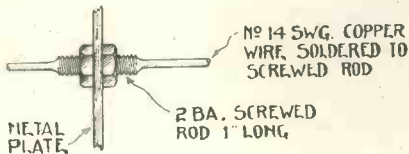
(Below). — All the screens are earthed. This diagram shows how they are connected together electrically.



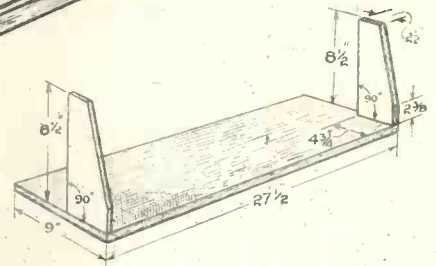
(Left and below). — Dimensions of the cabinet and baseboard of the 1927 Five. The panel and all the components are fixed to the baseboard, which slides into the cabinet from the back.



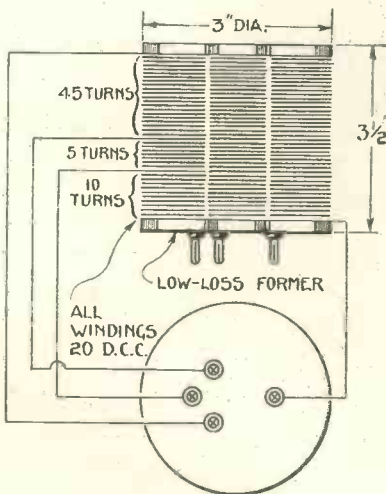
(Above). — Four aluminium screens are cut and fixed in position as shown.



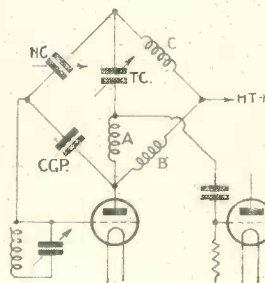
**A LIST OF  
COMPONENTS  
APPEARS ON  
PAGE 295**



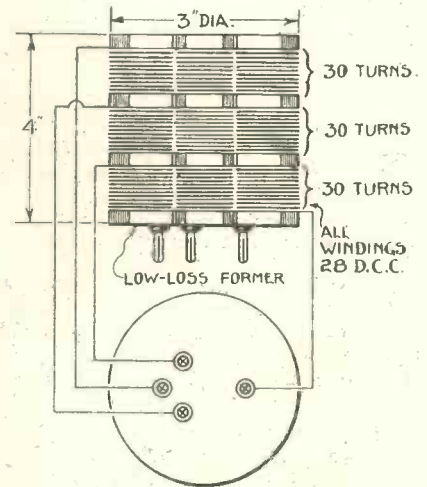
(Below). — Details of the home-made short-wave coils wound on Becol formers. The base for these coils is shown on page 297.



Short-wave Aerial Coil.

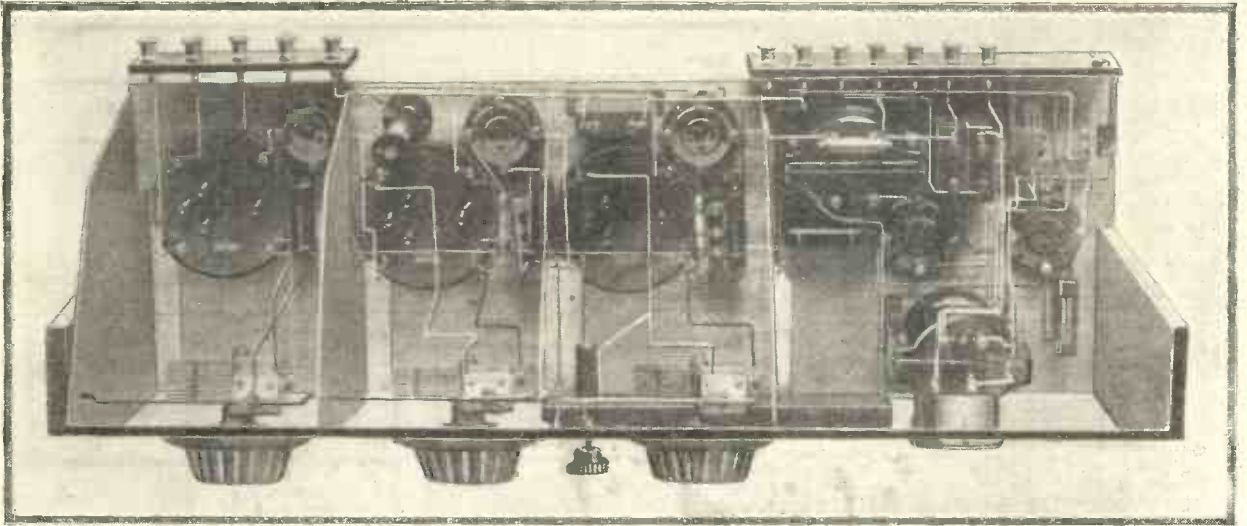


(Above). — This diagram shows the secret of the efficiency of the high-frequency side of the 1927 Five. The H.F. coupling is a simple adaption of the Wheatstone-bridge principle and gives perfect balance.

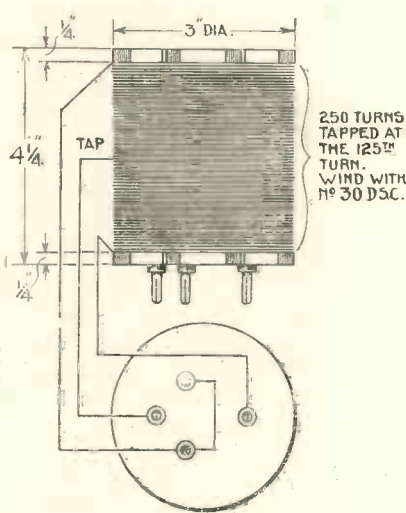


Short-wave Anode Coil.





This photograph shows clearly the arrangement of the components of the 1927 Five on the baseboard.



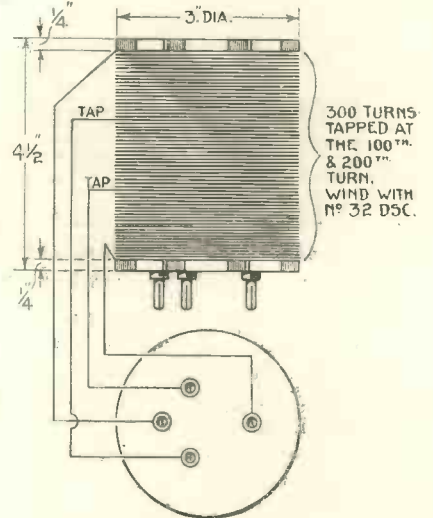
Details of the Long-wave Aerial Coil.

### STATIONS HEARD WITH THE 1927 FIVE

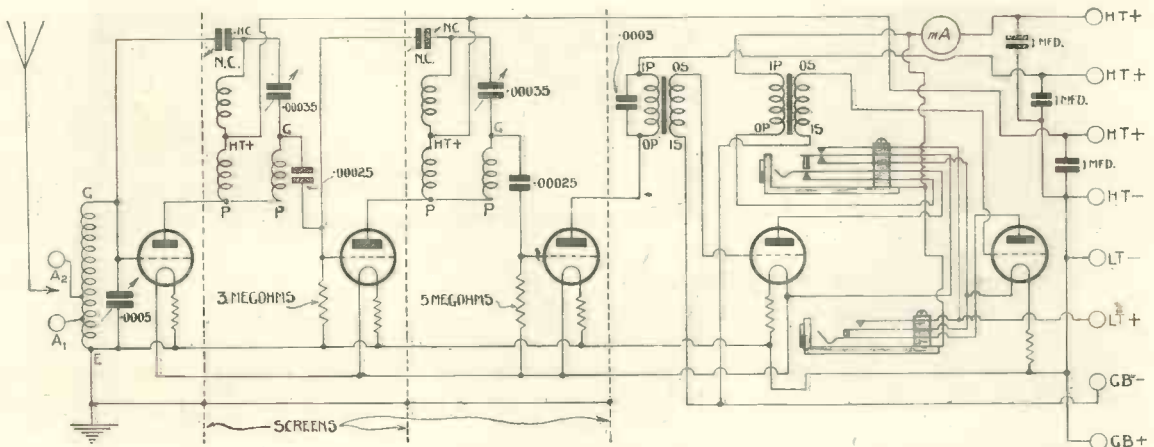
In addition to the fifty short-wave stations heard (particulars were given on page 195 of the last issue) ten high-wavelength broadcasting stations have also been received at loud-speaker strength on the 1927 Five:—

- |                    |             |
|--------------------|-------------|
| Soro               | Radio-Paris |
| Karlsborg          | Norddeich   |
| Königswusterhausen | Amsterdam   |
| Moscow             | Hilversum   |
| Daventry           | Ryvang      |

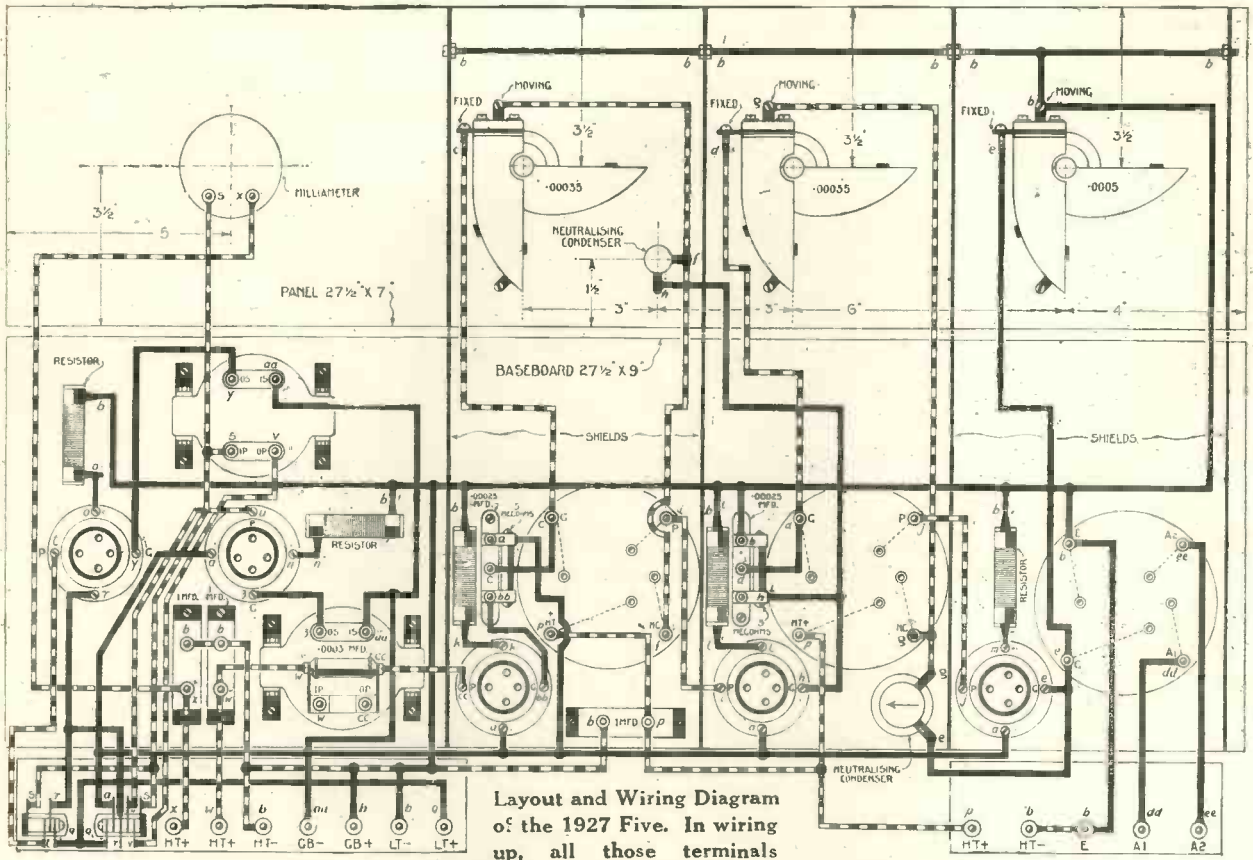
The long-wavelength anode coils specified will not tune down to less than about 1,150 metres, but by winding these coils on forms having the same dimensions, but consisting of 240 turns of wire tapped at the 80th and 160th turns, stations having a wavelength round about 1,000 metres (such as Hilversum) may be received at the sacrifice of Norddeich and Amsterdam.



Details of the Long-wave Anode Coil.



Circuit diagram of the 1927 Five—by means of the jacks, either four or five valves can be used at will.



Layout and Wiring Diagram of the 1927 Five. In wiring up, all those terminals

marked *a* should first be connected together with one wire or as few wires as possible, and then all those marked *b*, and so on, until all the connections have been completed.

October issue) each with 30 turns of wire as specified, and wind the lower section with about 40 turns of wire, the connections to be made exactly as shown in the sketch on p. 194. Now place the coils in position and "try them out."

If neutralisation is still difficult, reduce the number of turns on the lowest section five at a time, each

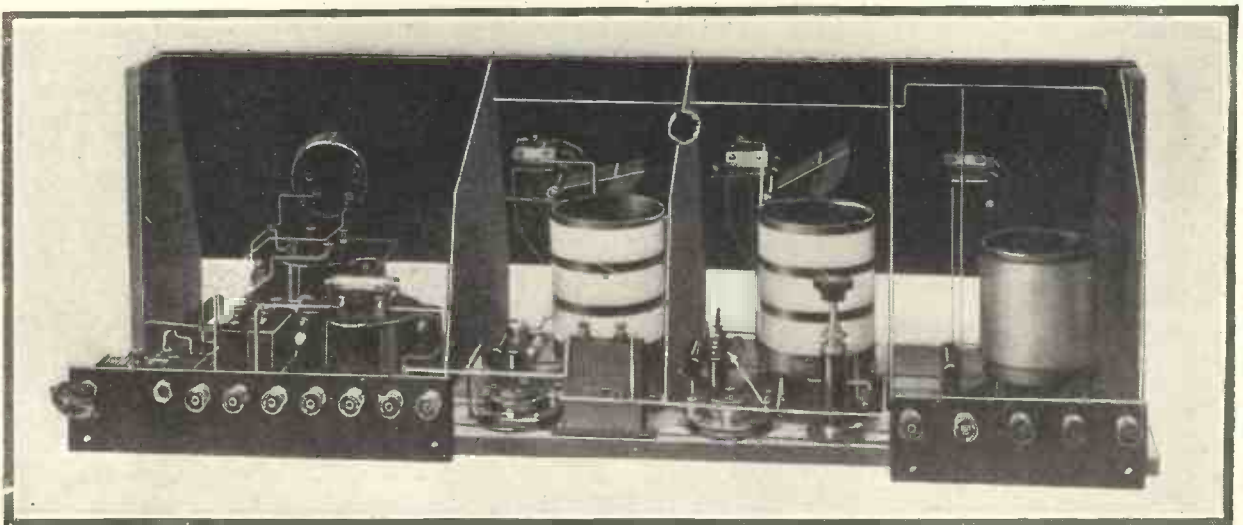
time trying the coils for perfect neutralisation. It may be found that the number of turns required on the lowest section is very small, and, indeed, the receiver will work very satisfactorily with the lowest section reduced to five turns.

The number of turns specified in the original article were found to work satisfactorily with the valves

mentioned, but even here, as no two sets will be identical in the wiring and, possibly, the components used, the number of turns on this lowest section may have to be reduced.

A five-valve receiver will cause a considerable drain on the H.T. battery, but this may be counteracted to a certain extent by applying a nega-

(Continued on page 307)



Another photograph showing disposition of the components of the 1927 Five.



## Halyard's Chat on the Month's Topics

*Getting Down to It*

**H**OW do you intend to tune-in the relay stations on their new wavelengths below 300 metres?

If you use plug-in coils, I daresay you will consider adopting the simple expedient of buying a new coil in order to get down to these unfamiliar depths.

Failing the purchase of a new coil, perhaps you contemplate accomplishing the same thing by replacing your present tuning condenser with one of

*Getting down to it.*

smaller capacity, or by altering the wiring of your set so that your tuning condenser is in series with your coil instead of in parallel with that coil as previously.

If you have not yet bothered about getting down below 300 metres because of the trouble or expense or uncertainty as to whether the new wavelengths will be adhered to, I wonder if you would not like to try the very simple method of placing a sheet of metal near your smallest coil.

You know that if you place a sheet of metal or a shorted coil near to an inductance coil the inductance value of that coil is lowered, and that this has the effect of lowering the minimum wavelength obtainable with that coil.

For example, suppose that your smallest coil gives you a minimum wavelength of 300 metres. Then, by putting a sheet of metal close up to that coil, you will get a minimum wavelength of 280 metres, say.

This seems to me to be the best scheme while doubt remains as to the permanency of the new wavelengths.

*Daventry's New Aerial*

Have you noticed any difference in your reception of 5XX since the new aerial at that station was put into commission?

I have not seen this new aerial yet, but, in one account I read of it, the new aerial was described as being V-shaped with a downlead at each end.

What do you make of this description? I think the chances are that the V has a horizontal top to it, and that a better description of the aerial would be that it is shaped like the Greek letter Δ.

The old aerial was T-shaped with a downlead at the centre. You will, perhaps, remember that the old aerial collapsed under the weight of snow which accumulated on it during a snowstorm early one morning last December.

There are two interesting questions which may be asked about this new Daventry aerial. Will it prove to be of greater mechanical strength and therefore less likely to break down under weight of snow? Will it give greater efficiency in transmission?

The answer to the first of these questions will be no less interesting to wireless engineers than the answer to the second question will be to us.

**THINKING OF BUYING  
A NEW SET?**

*Then turn to page 346 and  
read through our "Guide to  
the Best Valve Sets."*

*At Olympia*

Here is a special question I should like to put to those who were fortunate enough to see the wireless exhibition at Olympia.

What was the most wonderful thing you saw at the National Radio Exhibition?

Was it a receiving set in a cabinet de luxe, a variable condenser or a loud-speaker? Was it a high-tension accumulator, a crystal, or the model of Signal Hill, Newfoundland? Was

*Was it a valve?*

it a coil, a television set, or a folding frame aerial? Was it a transformer or a terminal?

It might have been any one of these things, or it might have been one of the hundreds of other wonderful things to be seen in the exhibition.

Shall I tell you what I thought was the most wonderful thing in the exhibition?

It was none of those things mentioned above. In fact, it wasn't a piece of wireless apparatus at all.

It was the long queue of people waiting to file past the windows of the B.B.C. studio.

There must have been some hundreds of people in that queue at times, and I am sure it must have taken the best part of half-an-hour to reach the window after joining the queue.

Could anything be more indicative of the interest taken in broadcasting these days?

By the way, what happened to all the armchairs on the stands when the exhibition closed?

## Under My Aerial (Continued)

## Uniform Pronunciation

I hope you are keeping an eye (and an ear) on the efforts of the B.B.C. to standardise the pronunciation of certain catchy words in our language.

What amuses me vastly about the instructions in pronunciation which we see in print from time to time is



"Uniform" pronunciation.

the curious contortions in spelling which have to be made in order to convey to us the right and proper pronunciation of the tricky word.

For instance, it really appeals to my sense of humour to be told that the B.B.C. standard pronunciation of the word *acoustics* is *acoosticks* and not *acowsticks*. Isn't it just delightfully puzzling to see the right and the wrong pronunciations together? How can one remember which is which?

The B.B.C. announcers and their listeners are not the only people who come an occasional cropper over the vagaries of pronunciation. Schoolmasters and examiners know all about such things as the following incident will show.

Last summer, in a written examination of some thousands of school children in a northern county, the examiner asked the children to write down a word pronounced in the same way as *dew* but spelt differently. The expected answer was, of course, *due*.

In that particular county, however, *dew* is pronounced *do*, and, to the examiner's surprise, he got *do* for the answer. Still, the little folk found great satisfaction in being able to *dew* the question in their own way.



## Weather and Wireless

"Why is it that so much attention is being paid in America to the problem of the effect of weather on wireless?" I asked my meteorological friend the other day.

"Why! is it?" he asked.

"I should think it is. Why!

articles on weather and wireless have recently appeared in two American wireless periodicals and in one American scientific journal. Rather a curious coincidence, is it not, O Further Outlook?"

"Possibly it is. Do the writers of these articles claim any definite relationships between weather and wireless?"

"Not likely. They know too much about the weather for that. They make several interesting suggestions, however."

"As for example?"

"That reception is clearest and strongest when the received waves travel at right angles to the isobars. I should appreciate an explanation of all this."

"You know what a right angle is, don't you?"

"Yes, sir."

"And you know what an isobar is?"

"Well, I once did know, but— Look here, can't you give me an ex-



Travelling parallel to the (iso) bar.

planation without using the word isobar?"

"Oh, yes, quite easily. The idea roughly is this: If the received waves travel at right angles to the main wind current, reception will be at its best. For instance, with a south-west wind over these islands, reception would be better from the north-west or south-east than from the south-west or north-east."

"Thank you. That's clear enough. How about this? Fading occurs when the received waves travel parallel to the isobars."

"Roughly speaking, parallel to the isobars would be dead up or down wind."

"So that when receiving the French stations in England, fading would be worse when the wind was southerly than when the wind was westerly?"

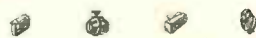
"Provided your American writers are not barking up the wrong tree."

"Just one more question, old fellow. One American writer says that

atmospherics are more prevalent when the isobars are far apart. Translate, please."

"He means the less wind there is, the more atmospherics there will be."

"I think he is right over that. There is very little wind before a thunderstorm at times locally."



## A Useful Loud-speaker

"What do you think of the new Marconi loud-speaker, George?" I asked that man of wireless wisdom one evening last week.

"To which particular loud-speaker do you refer?" he asked.

"The one with the ten-mile range," I replied.

"Oh! that one," said George. "Well! as a loud-speaker I cannot say that I am charmed with it. You see I should hardly care about the prospect of a ten-mile walk every time I wanted to listen to my own loud-speaker."

"George, you —"

"But as a regulator for those of us who have to catch trains in the morning I consider it has great possibilities."

"How would you use such a loud-speaker for that particular purpose, George?"

"I should install one at every railway station where busy men of business, such as myself, have trains to catch. The top of a signal mast would be an excellent position for the loud-speaker. I should place the microphone in the station-master's office, and put the station-master in charge of the spoken word. Most station-masters would be glad of a



A useful loud-speaker!

definite job of work, you know."

"How would the thing be used, George?"

"The station-master would announce through the loud-speaker the position of the incoming train so that one could regulate one's speed to the station. A capable man would give such announcements as these:—



## Halyard's Chat on the Month's Topics

Signal just dropped for the 8.54 up. 8.54 now passing under distant bridge.

8.54 now entering station.

Plenty of time this morning. Bags of luggage and two fat women to be pushed on board.

Hurry up the scratch men; guard about to waggle his flag.

"George, it's one of the brainiest notions you've ever been struck with."

"Thank you kindly, sir."



### A New Hygrometer

Just over a week ago I was compelled to put up a temporary aerial. My new permanent aerial is ready to go up, but I am not at all anxious to take down my temporary aerial, for it has proved to be one of the best hygrometers I have ever seen.

I have borrowed that word hygrometer from my meteorological friend. He has rather a choice collection of beautiful words of that kind, and he is very generous with them.

A hygrometer is an instrument which indicates the dampness of the atmosphere, and I daresay you are quite familiar with that simple hygrometer known as "Jacky and Jenny," in which the "old woman" comes out when the weather is going to be fine, and the "old man" comes out when the weather is going to be wet.

My temporary aerial is as good a weather indicator as any "Jacky and Jenny." The reason is this. One end of the aerial is attached to an insulator which I placed at the centre of a length of rope some twenty-five feet long. This rope is at right angles to the aerial wire, one end of the rope being fastened to the frame of a bedroom window, and the other end to a tree.



A choice collection of words.

When the air is damp, this rope tightens and pulls the aerial wire tight. When the air is dry, the rope slackens and causes the aerial wire to hang quite loosely. About the middle, the aerial wire runs quite close to a tree, and I can easily judge the height of the aerial wire by a branch of the tree. I am sure there

is a variation of at least a foot in the height of the aerial wire just where it passes the tree.

I have got into the way of looking out of my bedroom window at the aerial wire first thing each morning. If the aerial wire hangs loosely, I expect a fine day. If the aerial wire is as high and tight as it can be, I am certain it will rain before the day is out.



### Knobs

Do you think it is an altogether good thing that we should be continually striving after the further simplification of our wireless sets?

These drastic reductions in the number of controls on our panels are all very well in some ways, but I wonder who gets the most enjoyment out of the manipulation of his set, the one-knob man or the multi-knob man?

This simplification of our receiving sets may have a tendency towards



A one-knob man

making wireless reception a little too automatic. The one-knob man can never experience the pleasure of the experimenter who is able to manipulate the controls of his set as skilfully as an organist manipulates the stops of his organ.

A man may be content for a while with a press-the-button set, but the chances are that, when he becomes thoroughly fascinated with wireless, he will want a better and more elaborate form of instrument.

It is said that knobs on a wireless panel are quite out of fashion. I do not believe this. Why! when I was at the Olympia wireless exhibition, wherever there was a knob or a dial to be turned on one of the stands, somebody was turning it. I never got a turn anywhere.

I have seen many a man kept quiet for hours with a few knobs on a panel, turning and turning them again and again, and never getting a single signal. There's a lot to be said, on the quiet, for knobs.

### Another Condenser

When the so-called straight-line-frequency variable condenser appeared on the English market, did you not think that the wireless manufacturer had exhausted all possible types of this particular instrument?

Those of us who started wireless a



Straight-line frequency.

few years ago have passed through three successive stages in variable-condenser design.

First we had the now obsolete straight-line-capacity condenser with its semi-circular vanes. Then we had the square-law or straight-line-wavelength condenser with its peculiarly-elongated vanes. Lastly, we have had the straight-line-frequency condenser with its still more elongated vanes.

Each of the three types mentioned has its own particular disadvantages. In the earliest type with the semi-circular vanes the stations were crowded together at the lower end of the scale on the dial.

In the most recent type, the straight-line-frequency condenser, the stations are crowded together at the upper end of the scale on the dial. Indeed, one of our leading manufacturers of variable condensers told me at the exhibition that he had decided not to make a straight-line-frequency condenser because such a condenser merely transferred the crowding from one end of the dial scale to the other.

The straight-line-wavelength or square-law variable condenser has been described as a useful compromise between the other two types.

One would have thought that, from theoretical considerations, all possible types in condenser design had been used up, but it is not so. There has appeared on the American market a fourth type to which has been given the name, in one case, of the "midline" condenser, and in another case, the straight-line-tuning condenser.

It is claimed for this new type that it possesses important advantages.

## Under My Aerial (Continued)

### Oh! Murder

A schoolboy acquaintance of mine recently had a disquieting experience of wireless, an experience which, I think, would have tried a good many of us.

Coming home one evening he found the family out and the house all locked up. Not knowing quite what to do with himself if he remained out of doors, he decided to act on the bright idea of getting into the house and listening-in with his crystal set until the family came home.

To get into the house, he climbed



"Oh! murder."

up an outbuilding. From the roof of this outbuilding he jumped on to a flat piece of roof over the scullery. This flat roof gave him access to an open bedroom window and the rest was easy.

The boy came downstairs and went into the room where he had left his crystal set tuned-in on Daventry. He placed the phones over his ears and listened with expectancy. This is what he heard:—

*Oh! what shall I do? I've killed him. I've killed him.*

That was all the boy stayed to listen to. Would you have stayed to listen to more of that kind of thing if you had been all alone in a locked-up house?



### A Picturesque Loud-speaker

"George, old man, I very nearly fell this afternoon."

"Banana skin or orange peel?"

"No, not that kind of fall, George. I was sorely tempted to buy a new kind of loud-speaker."

"But you've got three loud-speakers already. Where do you want another one for, the bathroom or the conservatory?"

"I really do not want another loud-speaker, George, and what is more, I cannot afford another one just now. All the same, I very

nearly bought that excellent loud-speaker this afternoon."

"What sort of a loud-speaker was it?"

"One of the new picture loud-speakers. Do you know, George, when I went in that shop I did not know where the music was coming from."

"You should have taken the cotton-wool out of your ears."

"Don't be silly, George. You wouldn't have located the loud-speaker any more quickly than I did. I was astonished when I was told that the loud-speaker was the picture."

"Every picture tells a story, you know."

"That one told its story very well, anyhow. The reproduction was excellent. There was a pretty picture fixed on a gilded canvas mount, and the loud-speaking mechanism was behind the picture, the whole thing being fitted in a pleasing gilt frame."

"Couldn't you tell it was a loud-speaker by the leads to it?"

"No, the leads were the cords by which the picture was hung. I never saw a loud-speaker more skilfully disguised."



"Every picture tells a story."

"What sort of a picture was it?"

"Oh! a pretty little country scene, stream, flowers, trees and hills and that sort of thing. Possibly it would

not be quite your idea in pictures. What do you think would be the best picture for a picture loud-speaker, George?"

"Hum—er—The Owl by er—Whistler, or er—Sunset over the Knobs by Turner, or—er—Crackles by Jove, or—er—er—"

"That will do, George, thank you."



### My Surgery

It's all very well helping somebody else to make a wireless set if it would



Wireless invalids.

only stop at that. My experience, though, is that if you ever do succumb to persistent requests for help in the building of a set, that set will come back to you sooner or later for test and repairs.

At the present moment there are two wireless invalids in my surgery, one a three-valve set and the other a four-valve set.

I do not know when I shall be able to give these invalids my attention, and, really, I am not anxious to have a go at either of them. When you start on a job of that kind, you never know whether it is going to take you an hour or a week.

From what has been told me of the symptoms of these two corks, I have a shrewd idea that they are both suffering from the same complaint, namely, a burnt-out primary in the second low-frequency transformer.

If such turns out to be the case it will be a simple matter to effect a cure.

The funny thing about these two invalid sets is that their owners have recently gone in for high-tension accumulators, and I have been wondering what fool tricks they have been up to with those high-tension accumulators to burn-out the primaries of their transformers.

Have you heard of any similar occurrences amongst your wireless friends?

HALYARD.

### ALWAYS GOOD

*we are yet doing our best to make the Christmas Number of the WIRELESS MAGAZINE even*

### BETTER.

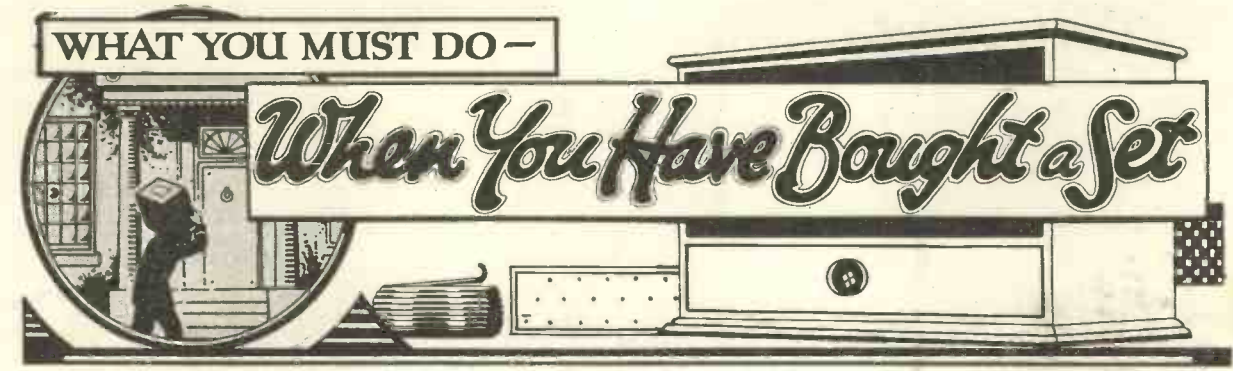
*In the Christmas special issue published next month will be found all the usual popular WIRELESS MAGAZINE features and many special articles as well.*

*In fact, of all Christmas Numbers that of the WIRELESS MAGAZINE will be*

### THE BEST.



## WHAT YOU MUST DO—

*When You Have Bought a Set*

**N**OWADAYS commercial receivers have reached such a high state of efficiency and reliability that very little wireless knowledge indeed is required on the part of the operator to get satisfactory results. In fact, all that the purchaser of an up-to-date set need know is sufficient to enable him to connect up the various batteries and to tune the set to the stations it is desired to receive.

A wireless licence should, of course, have been obtained at a post office before the set was purchased. This will have cost ten shillings—surely not a very large sum to pay for the privilege of listening to the broadcast programmes every night for twelve months.

Whatever the type of set bought, an aerial of some kind will be required. Some sets will work with a frame aerial—a number of turns of insulated wire wound on a wooden frame—but in the majority of cases the set will be provided with two terminals, one of which is to be connected to an elevated wire and the other to earth.

In this latter case the position, length, and height of the elevated wire—the aerial wire—will have a great bearing on the subsequent performance of the set, and so should be given careful consideration.

**Unscreened Aerial**

Preferably the aerial should be erected outside the house and as far away from any buildings, trees, etc., as possible. The wire should be as high as possible above the ground for best results, and must be carefully insulated. The best way to erect an outside aerial, in the majority of cases, is in the form of an inverted letter **L**.

That is, the aerial should consist of a more or less horizontal portion

stretched between a support on the house and a mast, tree, or other convenient object some distance away, and a more or less vertical portion leading from the house end of the horizontal part to the aerial terminal of the set.

The aerial should be insulated at

*You find it difficult to decide on what particular set to buy? Then why not turn now to page 346 and read through our "Guide to the Best Valve Sets"?*

*When you have bought a set there are certain important preliminaries to be attended to before you can listen-in—this article explains what these preliminaries are and how they can best be carried out.*

the far end, at the point where the down-lead joins the horizontal portion, and at the point of entry into the house.

If an outside aerial is impossible, an indoor aerial may be erected. This should consist of a covered wire (not essential in the case of an outside aerial), and the same general principles with regard to height, etc., should be observed. The total length of the aerial must not exceed 100 ft. as measured from the aerial terminal of the set to the far end of the aerial. If space does not permit of a single wire of this length to be erected, two wires, spaced at least 6 ft. apart, may be used.

Note that the limit of aerial length applies to the aerial as a whole, and not to the amount of wire to be used.

The earth connection may consist of a zinc or copper plate buried beneath the aerial and connected to the earth terminal of the set by a length of well-insulated wire of a gauge not

smaller than that used for the aerial proper. Alternatively, this earth-lead may be soldered to a main water-pipe near to the point at which it emerges from the ground instead of to a buried metal plate.

Having connected up the aerial and earth, the batteries must now be attached to the set. There will be at least two batteries, perhaps three. If the set is provided with only three battery terminals, the + (positive) of the H.T. battery is to be joined to one, one side of the L.T. battery to another, while the remaining terminals of H.T. and L.T. batteries are both to be connected to the third. The terminals on the set will be marked. More usually there will be complete sets of terminals for both H.T. and L.T. batteries.

There may be two terminals marked L.T. + and - (negative) respectively, one marked H.T. - and one or more marked H.T. +. If there is more than one H.T. + terminal, each of these terminals is to be connected to a point on the H.T. battery, the best points for connection being found by experiment when the set is in operation. All the H.T. + terminals may be connected together and to the + end of the H.T. battery until a station has been tuned-in.

**Grid Bias**

There may possibly be two other terminals marked G.B. (grid bias) + and G.B. -, in which case a small battery with a voltage variable between zero and six or nine volts (in  $1\frac{1}{2}$ -volt steps) is to be connected to them.

Having inserted the valves in their sockets (and also the coils, if these are of the plug-in type), and having connected up the phones, an attempt may be made to tune-in the local

(Continued on page 307)

# The World's Most Elegant Studio



Rehearsal studio for artists at WSAI, Cincinnati.

**W**HEN I visited WSAI in April of this year, the studio was in course of completion. Mr. P. A. Green, the Studio Director, presented me, I remember, with a souvenir—a packet of beautifully printed playing cards—as a reminder that WSAI is owned and operated by the United States Playing Card Co., of Cincinnati, U.S.A.

The studio is two or three miles from the centre of the city and is a part of the company's works and offices, while the five-kilowatt transmitting station is several miles away in the village of Mason.

### Finest Collection of Playing Cards.

WSAI houses the world's finest collection of playing cards and card literature. Playing cards from countries all over the globe have been brought within its walls, and exhibited in glass cases, to receive which the studio has been specially designed.

These playing cards go back very many hundreds of years, represent most of the countries of the world, and their value must be reckoned in scores of thousands of pounds.

The reception rooms for artists and their friends are graceful and ample, perhaps the finest broadcasting reception rooms in the world.

Their comfortable furniture, built-in cases, and original paintings on the walls (designed in the first case for the backs of playing cards) serve to beguile the artists during their somewhat anxious and always nervous moments when waiting to broadcast.

WSAI puts out quite a special programme. It re-transmits most of the important New York chain programmes, as do some 15 or 18 other stations in the United States, and in addition it has its own concert arrangements and broadcasts programmes of high quality and not a little originality, in which work Mr. Fred Smith (who as an author has made his bow to the readers of the WIRELESS MAGAZINE) regularly plays a part.

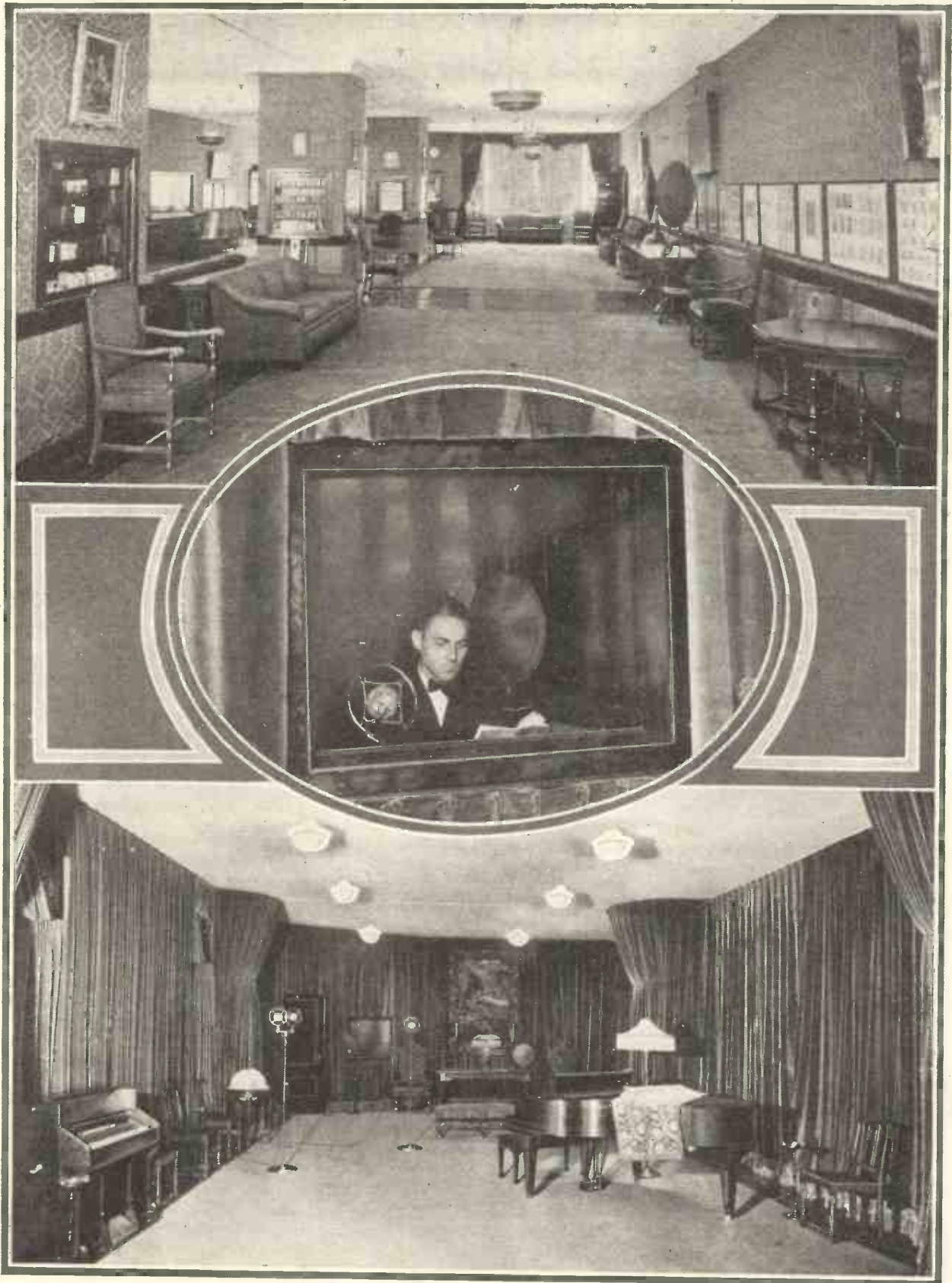
By the way, we have heard the grumble that 2LO will not be really complete until it has a light-refreshment bar for the convenience of artists. No such sin of omission can be debited to WSAI.

### A Cafeteria.

In the same building, and within a few yards of the entrance to the studio, is a cafeteria (help-yourself-and-pay-as-you-go restaurant) capable of seating several hundred people.

*The Editor*

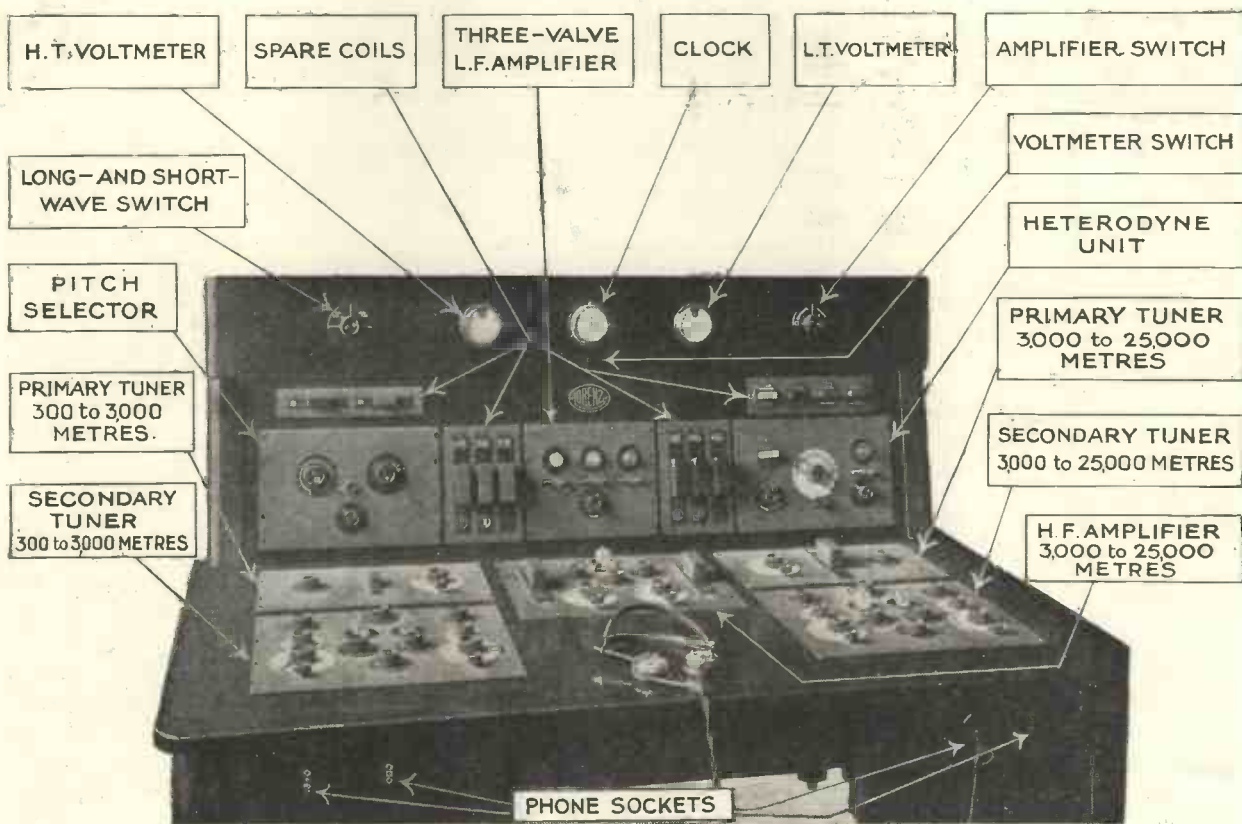




(TOP)—Reception room at WSAI; note the collection of historical playing cards, ranged in frames round the walls. (CENTRE)—The controller can watch what is going on in the main studio through a glass window. (BOTTOM)—Main concert studio at WSAI, Cincinnati.

# Collecting the News by Wireless

An Account of a Receiving Station Owned and Operated by a Group of German Newspapers. By Dr. ALFRED GRADENWITZ



WHAT is probably one of the most elaborate receiving stations in existence is to be found in the Rudolf Mosse building in Berlin. From this office of the Mosse Publishing Co. are issued the *Berliner Tageblatt* and some other dailies. The station is intended for the direct reception of press news by wireless telegraphy from both home and foreign correspondents.

### Separate Parts

The receiver comprises two separate parts, one for reception on wavelengths of from 300 to 3,000 metres, and the other for reception on wavelengths of from 3,000 to 25,000 metres. As can be seen from the photograph, the whole of the apparatus has been accommodated in a mahogany desk, designed and installed by the Lorenz Co. The double-wire aerial is T-shaped, being approximately 150 ft. long and sus-

ended about 45 ft. above the roof of the building. Tungsten-filament valves are used throughout, the power for these being supplied by a 6-volt accumulator and a 50-volt high-tension battery.

The arrangement of the main receiver can be seen from the photograph. It comprises two primary circuits, one with a range of from 300 to 3,000 metres and the other with a range of from 3,000 to 25,000 metres. Each primary is made up of three interchangeable coils, tuned by a condenser with coarse and fine adjustments. Variation of the inductive coupling with the receiver is effected by means of a knob on the left-hand side.

Used in conjunction with these two primary circuits are two identical secondary circuits.

Should signals be too loud the intensity of the sound can be reduced by a device which effects artificial

damping of the aerial. Moreover, this damping device is also useful for preventing objectionable self-oscillation.

Included in the receiver is a one-valve high-frequency amplifier intended for reception of wavelengths from 3,000 to 25,000 metres. This range is covered in three stages.

### C. W. Reception

So that undamped (continuous wave) signals can be received a heterodyne unit is incorporated to produce the necessary beats. This unit is calibrated for various ranges of wavelengths, any one of which can be obtained at a moment's notice.

An interesting point about the low-frequency amplifier (which contains three valves) is the pitch selector. Selection of a suitable pitch in the phones is effected by acoustic means. This is a great advantage in reception as it enables the operator, by suitable



## The International Set Competition

adjustment, to cut out a great deal of interference. It can be used to cut out entirely the sound of generator hum.

Though an ample wavelength range has been provided it may happen that the adjustments for several stations lie so close together that separate reception of any particular transmission is difficult. This is remedied by working with preliminary and intermediate circuits and the pitch selector. In case reception should fail even then frame aerials are used in place of the outside roof aerial.

For use with the frame aerials a special separate receiver has been installed. This resembles the general receiver already described, but it contains three high-frequency amplifiers instead of only one. Reception can be carried out on the frame-aerial set even when atmospheric disturbances (such as thunderstorms) are at their strongest.

### More About the 1927

#### Five (Continued from page 298)

tive potential to the grids of both H.F. valves. The way in which this is accomplished is shown in the circuit diagram of the two H.F. valves, and it will be seen that the negative terminal of a  $1\frac{1}{2}$ - or 3-volt dry battery is connected through the aerial coil (in the case of the first H.F. valve) or through the grid leak (in the case of the second valve) to the grids of the valves.

This is a refinement which normally is hardly necessary, but in some cases where high plate voltages are used it may be found beneficial.

On p. 297 is a list of the long-wavelength stations received on the 1927 Five. These were received, as before, at a distance of 7 miles west of 21.O, and the reception was carried out on an outdoor aerial.

For short-wave reception, inductances should be built so that the turns of wire are as self-supporting as possible; condensers should be well made and without small pieces or bushes of ebonite to act as leaky paths for oscillating energy; and the valves should, if possible, be of the low-capacity type in which the electrode connections are not all brought out through a narrow "pinch."

THE International Set Contest has taken place in two parts—in New York and in Chicago. Unfortunately, at the moment of going to press the Chicago results have not reached us, but we are very happy in saying that in the New York contest four prizes have been awarded to

competitors whose sets went through the British Elimination Competition.

Among the judges were Dr. Alfred Goldsmith (chairman), Lloyd Jacquet, Lawrence M. Cockaday, C. Warfield Koefer, David G. Casem, and Edgar K. James (secretary).

In the class for one-valve and two-valve sets, prizes have been awarded to:—

Wm. H. Dorling of 70, Finlay Street, Fulham, S.W.6, for a set which was described in the June (1926) issue of the WIRELESS MAGAZINE under the title "The Lightweight Portable Three."

Wm. Fricker of 7, Red Rice Estate, nr. Andover, Hants, for a two-valve set comprising a tuned-anode high-frequency stage and a detector.

John Edward Llewellyn of "Elmfield," Baldock Road, Letchworth, Herts, for a one-valve set of original design, of which many of the components were home made.

And

George. P. Searle of "Bella Vista," King's Road, Paignton, Devon, for a three-valve single-dial receiver.



*This fine cup has been presented to the Editor of the WIRELESS MAGAZINE by the Americans for organising the British Elimination Contest.*

## When You Have Bought A Set

(Continued from page 303)

station, if this is transmitting at the moment.

The filament resistances should be adjusted until the valves are glowing at their proper brightness (according to whether bright- or dull-emitter valves are used), and the variable condensers adjusted.

There may be one or more variable condensers in the set; the fewer there are the more simple will tuning be. If there is only one, it must be rotated slowly until the local station is heard, when it is a simple matter to so adjust it that the station is heard at the greatest possible strength. When there are two condensers they must be rotated simultaneously, one with either hand, until the greatest strength is obtained.

If the station is some distance

away it may be necessary to use reaction (supposing the set to be provided with a reaction adjustment) in order to obtain the signal strength desired. The reaction should be increased very slowly, and, after a little movement of the reaction control, the variable condensers should be re-adjusted, as the effect of altering the reaction coupling is to alter the tuning of the circuits.

Reaction should be used very cautiously at first, as too much reaction will cause the set to "oscillate," when it will interfere with the reception of near-by listeners. The reaction coupling should be loosened a little at the first sign of distortion. As long as the reproduction of the set is perfectly pure and undistorted, there is no danger of interference being caused.

G. N.

# THE INVERSE DUPLEX

*What It Is and  
What It Does*

A Special Article by J. F. JOHNSTON

THOSE people who have been reading wireless periodicals for the last two or three years cannot fail to have noticed that of the large number of reflex circuits published only a very small proportion make use of dual amplification in more than one stage.

For this reason those reflex circuits

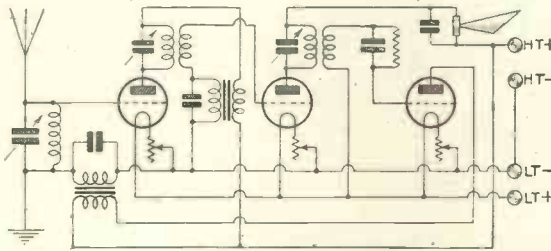


Fig. 1.—Ordinary Reflex Circuit.

employing one valve and a crystal are by far the most popular as, for the results obtained, the saving in valves is half. When more valves are used in the set without increasing the number of reflex stages the saving is not so great.

For instance, in a three-valve reflex set comprising only one stage of dual amplification, a valve detector, and one straight L.F. stage, the results to be expected are theoretically the same as those given by a straight four-valve set with one H.F. stage, detector valve, and two L.F. stages. Actually they will not be quite so good.

The saving in valves effected in this case is only a quarter, which many will consider not worth the increased complexity and difficulty of handling.

Besides the fact that reflex circuits incorporating more than one stage of dual amplification are rather difficult to operate, it is not at all easy to choose suitable valves for use in them, which is another reason why such circuits are very seldom used.

The choice of valves for use in reflex circuits is always a more important matter than when the circuits are straight. This will readily be understood when it is remembered that a valve in a reflex stage is called upon to perform two quite different duties.

It is easy enough to obtain valves especially suited for H.F. or L.F. amplification, but it is quite a different matter to find a valve which will do both kinds of work efficiently.

In fact, special H.F. valves and power valves differ considerably in their construction. Whereas the former have small electrodes to keep the inter-electrode capacity low, the latter have large ones to enable a great amount of energy to be dealt with satisfactorily.

When only a single H.F. stage is to be employed the difficulty is usually solved by employing a good general-purpose valve, but this would hardly answer in such a circuit as is shown in Fig. 1. This is a three-valve circuit which includes three stages—two of H.F. amplification, two of L.F. amplification, besides the detector.

The signals produce weak oscillations in the grid circuit of the first valve, which are amplified and passed on to the second valve. These stronger oscillations are further amplified by the second valve and passed on to the detector for rectification. The rectified signals will be fairly strong, owing to the two H.F. stages, and these are returned to the first valve for amplification at low frequency.

After passing through this valve again they are amplified yet once more (still at L.F., of course) by the second valve before reaching the phones or loud-speaker, which are connected in the plate circuit of this valve.

Now to choose suitable valves for the reflex stages: One of the general-purpose type will, no doubt, be satisfactory in the first position as here; in addition to the unamplified H.F. oscillations, there are only the

rectified impulses straight from the detector to be dealt with.

But a difficulty at once arises when we come to select a valve for the second position. Not only are the H.F. oscillations of considerable magnitude at this point, but the L.F. impulses are also very strong. The signals which are reaching the grid of the valve for the first time have already been amplified once, while those which have passed through the detector have been amplified no less than three times.

Assuming that the original signals were of fair strength, no general-purpose valve could be expected to fill the second position without being greatly overloaded. This is the last thing we want, meaning, as it does, horrible distortion. What are we to do then? Use a power valve in the second stage?

This would mean sacrificing the H.F. efficiency of this stage, and it would obviously be better to omit the H.F. portion of this particular stage and revert to a three-valve circuit with only one reflex stage.

The inverse-duplex circuit is designed to solve the problem. It changes the order in which the signals pass through the various valves, and makes it possible to use general-purpose valves in both reflex

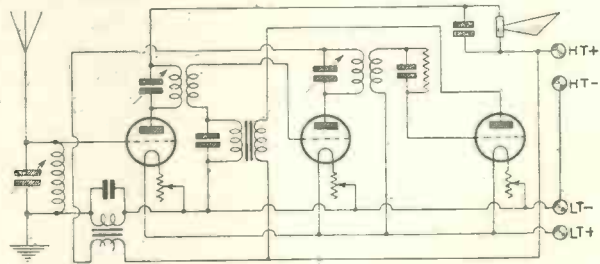


Fig. 2.—Inverse-duplex Circuit corresponding to Fig. 1.

stages without overloading either of them. The inverse-duplex circuit corresponding to the circuit given in Fig. 1 is shown by Fig. 2.

It is very interesting to compare these two circuits. Up to a point they function in the same manner. In both the oscillations due to the received signals are applied to the grid of the first valve, amplified by this, passed on to the second valve,



again amplified, and then handed on to the detector.

But in the first circuit the rectified impulses are now handed back to the first grid circuit. In the inverse duplex they are not. They are passed back to the *second* valve instead. And after being amplified at L.F. by the second valve they are sent back further still to the grid circuit of the first valve for the final stage of amplification. So that in this circuit the phones or loud-speaker are connected in the plate circuit of the *first* valve.

Now let us see how the inverse-duplex circuit helps us in the choice of suitable valves. The first valve of the set, as we have just seen, has to carry out the second stage of L.F. amplification, but in addition to the fairly powerful L.F. impulses applied to its grid it has to amplify as well only very feeble H.F. oscillations — the unamplified oscillations due to the received signals. It is thus worked very slightly harder than the first valve in the Fig. 1 circuit.

The second valve of the inverse-duplex circuit has stronger H.F. oscillations applied to it than has the first valve, but the L.F. impulses are not so strong. The H.F. impulses reaching the second valve have been amplified once, but the L.F. signals come straight from the plate circuit of the detector valve. So that the second valve of the inverse duplex is not so hard worked as is the corresponding valve of the ordinary reflex circuit.

In the first circuit the first valve has an easy time while the second one is badly overloaded. In the inverse duplex both valves are worked

to approximately the same extent — the first dealing with weak H.F. and strong L.F. signals and the second with strong H.F. and weak L.F. impulses.

This more even distribution of the load on the two amplifying valves makes it possible to use general-purpose valves in these positions without overloading either of them. The sole object of the inverse-duplex arrangement is to enable valves suitable for reflex work to be used in the amplify-

## Ugly Aerials

HAVE you taken any particular notice of the aerials in the country districts you have visited during your holiday rambles this year?

If so, I daresay you will agree with me when I say that an aerial whose irregular lines makes it an eyesore in a town or suburb, may look almost a thing of beauty in a country setting.

Much has been written of the ugliness of town and suburban aerials, but it seems to me that the ugliness of an unsymmetrical aerial erected in a row of symmetrical aerials is like the ugliness of a man in a crowd. Take your ugly man out of a crowd and place him in pleasant surroundings, and wherein lies his ugliness?

Does not the ugliness of a crudely-erected aerial lie as much in the monotonous regularity of the symmetrical as in the irregularity of the asymmetrical?

George says I have had to look up three words in the dictionary

for that last paragraph. He is quite wrong. I only had to look for two. I guessed the last one.

I have seen some delightfully crude yet picturesque aerials during my recent rambles in a country district well known to holiday-makers.

Most of the listeners in this district have adopted the plan of using, as an aerial mast, a rough pole secured to a tree, the bottom of the pole being fitted in the tree some feet above ground level.

AERIAL.

## JUST THE SET FOR THE CHILDREN!



*Why not make something like this for a kiddie you know?*

ing stages without any risk of their being worked beyond their normal capacity.

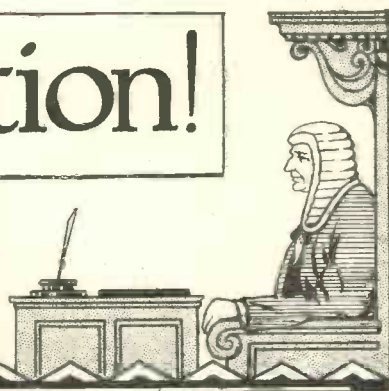
FROM 2LO a whaler has been describing some of his catches. Members of local angling societies are still bearing up under the shock.

THE Italian stations now broadcast a daily news bulletin; so-called, we believe, because it usually mentions some attempt to put a bomb or bulletin Signor Mussolini.

# Trial by—Audition!



A special article written by  
J. GODCHAUX ABRAHAM



"DON'T, for the love of Mike!" gasped the engineer on duty. Now, to my mind, this remark was unnecessarily rude, for all I had suggested was that I should sing to the B.B.C.'s vast unseen audience; it could only be excused by a technician's doting affection for his pet microphone. He had never heard my rendering of *Vesti la Giubba*; had he done so, possibly his remark might have been couched in even less complimentary terms!

"Very well," I reluctantly observed, "then must I hear others?"

## At Savoy Hill

And so it came about that I was present at an audition given at Savoy Hill to would-be broadcast artists.

On this afternoon it was being taken in studio No. 2, on one side of which is the echo room, and on another, a partitioned-off portion which, for the time being, was filled with sound-producing contrivances of every description. Leading out of this studio was a small amplification and control chamber to which the judge could go from time to time to hear how an artist would come over the ether.

The accompanist sat herself at the piano, the judge at a small table on which he had placed his list of applicants, and I, near him, in an arm-chair, drawn up in a corner of the room from which I could take in the whole scene.

## Opportunities

It is to the credit of the B.B.C. that every opportunity is given to either professionals or amateurs to display their talents before the microphone; until quite recently, it has been a fixed rule that an audition shall be granted to every applicant.

It may interest you to know that as many as three hundred would-be broadcasters have been heard in one

week, and it may equally surprise you to learn that notwithstanding this fact, only a small number of singers and others could be chosen.

I am told that in a rash moment the B.B.C. intimated that it suffered from a dearth of broadcast artists; during the week following this announcement 1,000 applications were sent in from the United Kingdom, and auditions were granted to each in turn. Of this large number, barely three per cent. were found to be of value to the company.

In order, therefore, to lighten the work of the judges, it has now been found necessary to require from each applicant a letter of recommendation or certificate emanating from a music or dramatic academy or private "coach" to the effect that the candidate is worthy of a hearing. In this manner a preliminary sitting takes place, thus avoiding the granting of an audition to a hopelessly incompetent performer.

## Rare Broadcast Talent

It is not that the B.B.C. has set itself such a high standard of quality that the average artist *cannot* be included in the programme, but for the simple reason that of the many individuals who present themselves for the test, but few possess the necessary attributions for successful broadcast, albeit the daily programme includes a variety of entertainments.

You must bear in mind that the consumption of artists for broadcast purposes is an abnormally heavy one, inasmuch as at the London and Daventry stations *alone* transmissions are to all intents and purposes continuous from 11 a.m. until 11 p.m. and even later nightly.

Moreover, there is a limit to an artist's repertoire, which prevents his or her appearance at the studio at too-frequent intervals; in the case of the stage, the matter is different, for

the daily audience being a small one, the same play or entertainment may run for a large number of consecutive performances.

## Fictitious Names

Although for illustrative purposes I have given names to some of the artists, I want it to be perfectly understood that these are entirely fictitious.

"Miss Flossie Bryan," announced the call boy. Entered a lady of majestic proportions, flanked by two gentlemen whose very appearance spelt "agency."

"I am all of a flutter," she exclaimed. "Do I sing to that box?" Being assured that the "meat safe" was the microphone, she discarded some of her outer garments and settled down to work. Hers was a coster song, of the true third-rate music-hall type, with asides and a running accompaniment of interjections contributed by a male friend who, presumably, provided the necessary atmosphere.

The voice was one which you will have heard burlesqued in many a revue. The dialogue, to say the least of it, was vulgar, and although such a turn, no doubt, would have aroused considerable enthusiasm in a garrison or seaport town, it was evident from the first verse onwards that it was in no way suited to broadcast transmissions.

## Courteous Judge

I looked at the judge; his face retained a look of stolid indifference, but in the words of Harry Fragson "he thanked her most politely," enquired regarding her stay in town, and with considerable courtesy showed her out of the studio.

*Exit Flossie. Enter a dramatic soprano.*

In this case, the lady stated that she would sing in Italian, a fact



which I endeavoured to remember during her performance, as although acquainted with the language, not a single word could I understand. Her voice was unpleasantly shrill, her high notes recalling to my mind an oscillator's crowning attempt to disturb the ether.

### Interrupted!

The last bars of the melody were brusquely interrupted by the judge's "Thank you ever so much" and I settled down to listen to further applicants.

"Mr. Lancelot Rembrandt," monotonously drawled the call-boy. As the newcomer struck a stage attitude, so I felt instinctively that his choice had fallen on "Devil-May-Care," "Gunga Din," or "The Green Eye of the Little Yellow God" and I was right. He mouthed his words, chewed them, gargled them and would have shouted himself to an inarticulate hoarseness, but for the fact that the judge's interruption jerked him to a standstill.

"Self-taught," I murmured. My companion smiled. "We do not often get them quite so bad as that," he observed. "He must have given you a particularly nasty jolt."

Followed a young pianist, who in the course of a few minutes had treated us to a very brilliant display of musical fireworks. Parts of his performance, similar to the curate's egg, were good, but as a whole it was far below the standard acceptable to the average British broadcast listener.

However, when requested to play something of a more sober character, his style considerably improved and I gathered from the judge that he had classed him amongst the "possibles."

The next in turn was a young girl of some eighteen years of age. Her choice of a song was an unfortunate one; it was far beyond her capabilities, added to which a bad attack of nerves robbed her of all voice control.

Over and above the somewhat uncomfortable feeling usually inherent to the passing of any examination, the

would-be broadcasters had no cause for nervousness. They were not performing before a large audience, as, counting the accompanist and the singer, the studio contained four people only.

I feel that every encouragement is given to the applicant. When beginners suffer from stage fright everything is done to put them at their ease. They are encouraged to choose the songs which suit them best, and the professional accompanist at the piano does much towards giving them a helping hand.

But why will young and inexperienced singers invariably choose either excerpts from oratorios or showy songs from operatic scores which demand long and careful study?

By so doing they must, of a certainty, spoil their chances of an engagement.

As many as thirty-nine "artists" were heard in the course of some two

stage felt more at home in the studio.

### Theatres Differ

It might be thought that for the purposes of broadcasting both the legitimate and music-hall stages could be freely drawn upon to supply the requisite material, but without going into the question of contracts which debar performers from appearing before the microphone it must here be stated that what might constitute a good entertainment in a theatre will fail to please the wireless listener. This, therefore, restricts the field from which the studio can draw its artists.

It is seldom that a star is discovered, but you must not think that it is essential to own a powerful voice to be a successful broadcaster. As a matter of fact, some of the singers who have become popular with the unseen audience do not possess voices of sufficient volume to appeal to a concert-hall public, but they have in their notes a certain richness and purity of tone which makes them peculiarly suitable for radio transmissions.

The vocalist who is inclined to force his production in order to make his voice carry considerably mars its purity, and were he capable of listening to his own song would be surprised to find how badly it is reproduced by wireless receivers.

During the audition I attended it struck me as an outstanding feature that, in most instances, the words of the songs were inaudible; yet, where the listener does not see the artist, it is essential that every word should be heard. Outside most of the studios and in the rehearsal rooms will be found posters emphasising the fact that the words of a song are all important, and that the artist should concentrate his efforts on good delivery and enunciation.

As already explained, the audition is not limited to a mere hearing of the performer in the studio but, to make the test an efficient one, the voice is actually picked up by the microphone and conveyed to another room; in other words, the test itself,



Auditions are no longer given indiscriminately to all who ask for them and scenes like the above (which shows a B.B.C. official testing broadcasting aspirants) do not take place nowadays.

hours, most of them, unfortunately, being classified as "unsuitable"—hopeless, in many instances, would have been a better word.

Where it was evident that the singing of a melody, or the execution of a pianoforte composition had been marred by the bashfulness of the applicant, and where, in the judge's opinion, there were possibilities in the artist's performance, a request was made for a song or piece of a different character, in their option—"some small thing you like." In most cases the second test went in favour of the applicant, who at that

## Trial by — Audition! (Continued)

by the judge, constitutes a sample of the actual transmission heard later by the outside audience.

### Whetting the Appetite

It may be that on some occasions you have listened to the relay of a musical play from the theatre, and that, a few nights later, your appetite, having been whetted by the samples broadcast, you have in person visited that house of entertainment.

Has it ever struck you that by means of your phones or loud-speaker you were able to hear spoken words more distinctly than from your seat in the theatre? It has been a frequent experience of mine, and I attribute the superiority of the relay to the fact that the microphone is placed *between* the stage and the orchestra.

### Vocal Defects

In the case of the broadcast performance, the orchestra remains in the background. When you are at the theatre you hear the singer *through* the orchestra. It is due to this fact that slight defects in the voice are not so apparent in a musical play as when the artist sings to the microphone. This receiving instrument is of high sensitivity, and can be as uncharitable to a performer as may be, say, the untouched negative produced by a photographic lens.

### High Standard Necessary

For this reason a high standard of quality is required for the broadcast performance; all failings on the part of the artist are uncomfortably magnified by the microphone.

On the other hand this instrument is fortunately insensitive to everything but sound, and this quality has proved a godsend to the many talented entertainers who, through physical handicaps or other disabilities, could not hope to command success on the stage or concert platform.

### Talent Counts

Talent alone counts, and the studio is frequently visited by such artists who have to-day become endeared to the listening public, and to whom a cherished vocation has been vouchsafed by radio.

When, at an audition, some applicants have been judged to attain the necessary standard, or even, if

classed as "possibles" a further chance is given to them to make good, by their inclusion, at an early date, in the morning Daventry programme.

Such a performance, as a rule, gives them more confidence to face the ordeal of the microphone at a later period.

\* \* \*

"Not a bad afternoon's work," said the judge, as he rose and collected his list with the pencilled remarks.

"Four certainties and eight possibles."

"Is that good?" I enquired.

"Very satisfactory! Why, a few weeks ago I interviewed forty-eight people, and not one was of any use to us."

"Yes," he added thoughtfully, "quite a good afternoon's work."

I have decided to spare the feelings of the British public; I shall *not* broadcast!

J. GODCHAUX ABRAHAMS.

## SPECIAL ALBERT HALL BROADCAST CONCERTS

THE B.B.C. recently offered an important opportunity to young and lesser known composers of British birth when it proposed a great musical festival at which original musical compositions, for which prizes amounting to £1,000 will be

awarded, will be performed. Thus the young British composer could no longer be said to suffer from lack of opportunity for gaining a first public hearing.

It has now been decided that this festival shall form part of the plan for holding twelve concerts at the Albert Hall, which are to be simultaneously broadcast from all stations of the B.B.C.

Distinguished conductors have been engaged for these performances, which will include not only the prize-winning attempts in the B.B.C. competition, but other works of international fame.

Among the conductors are Sir Hamilton Harty, Albert Coates, Richard Strauss, Sir Edward Elgar, and Otto Klemperer.

### Ten More Concerts

The first two concerts took place on September 30th and October 21st, and the remaining ten in the series will be performed on November 9th, November 25th and December 16th, 1926, and January 20th, February 3rd and 17th, March 3rd, 17th, and 31st, and April 14th, 1927.

This is perhaps the most important effort yet made to bring good music into the homes of the people, and at the same time of providing the public with an opportunity of hearing the concerts actually performed in the Albert Hall.

B.B.C.

### LET US HELP WHEN YOU ARE IN DIFFICULTY

*Even the most experienced amateur at one time or another comes up against some little difficulty—some little problem of which the solution momentarily escapes him. Have you any such problem? No matter how trifling or how important the point is we are always ready to help you out of your trouble—we keep a special staff just for that purpose. Moreover, we make no charge whatever—we are glad to do it! Just write your query on one side of a sheet of paper (this small point greatly facilitates the handling of your question) and send it, together with the coupon on page iii of the cover and a stamped envelope addressed to yourself for return, in an envelope addressed to The Editor, WIRELESS MAGAZINE, La Belle Sauvage, E.C.4.*



"Let Your Friends Listen!"

# NATIONAL WIRELESS WEEK

WHAT IT MEANS TO YOU




WE have to thank a well-known member of the electrical industry—Mr. Borlase Matthews—for an idea that we hope and believe will commend itself to wireless people throughout the country.

It is that the period from November 7 to 13 inclusive should be regarded as National Wireless Week.

### B.B.C.'s Birthday

Happily, this period coincides with the B.B.C.'s birthday, and already there are indications that the programmes to be broadcast during that week will have something of the birthday-party feeling about them.

The idea is distinctly good. Although it cannot be denied that wireless as a social factor has made more rapid strides than any other movement in the history of man, there are yet—difficult as it may be for WIRELESS MAGAZINE readers to realise—hundreds and thousands of people who never listen-in and to whom wireless remains a complete mystery.

One of the objects of National Wireless Week is that the keen listener should do missionary work and see that people who up to the present have taken no interest whatever in the subject are invited to hear some of the very excellent programmes which will be put out during that period, in the hope that in due course they will have their own sets and become in their turn devoted and keen followers of the art.

### Remember the Slogan

The slogan for the week is, "Let Your Friends Listen," an expression that should be taken to heart by everybody who has a set—and neighbours. The ideal is for every keen wireless man to make up his mind that he will make at least one convert during that week.

The B.B.C. has thrown itself into the movement with vigour. It has gone to the expense of providing some very fine programmes. The trade—the manufacturers' and the retailers—are getting enthusiastic, and all that remains is for the listener to do his best to make the week a success.

It is expected that local dealers will make special window displays and that, wherever possible, wireless societies will arrange special meetings and possibly organise wireless dances and parties.

Of course, everything hinges upon the programmes to be broadcast, and, speaking exclusively of the 2L.O. programmes, we can say that they will be at least notable.

On Sunday, November 7, Caroline Hatchard will be singing in the *Messiah* in the afternoon, and in the evening there will be a Star Ballad Concert, in which Elizabeth Schumann, Pouishhoff and other celebrated artists will take part.

On the evening of Monday, No-

vember 8, massed bands will play, and there will be a star variety concert, in which Milton Hayes will take part. On Tuesday there will be a National Concert, and on Wednesday the Chenil Chamber Orchestra will play in the afternoon, the Piccadilly Follies will entertain between 6 p.m. and 7 p.m., and there will be a musical comedy, *The Little Michu*, probably with George Graves, in the evening.

### Armistice Day

Thursday, November 11, is Armistice Day. In the morning the Canterbury Cathedral service will be broadcast, in the afternoon the Westminster Abbey Evensong from 3 p.m. to 3.45 p.m., and in the evening there will be a special "In Memoriam" programme.

On Friday, November 12, there will be a Ballad Concert in the late afternoon and a play, *The Yellow Jacket*, will be performed from 7.30 p.m. to 8.55 p.m. Late in the evening there will be a performance of *I Pagliacci*, in which Miriam Licette, Frank Mullings, Harold Williams, and Dennis Noble will sing.

### Last Day

On the last day, Saturday, November 13, there will be a performance by the Wireless Military Band and the London Radio Dance Band. A revue will be given from 7.30 p.m. to 8.30 p.m., followed by a special birthday programme and song recital.

This will be a wonderful week in which to interest and welcome newcomers to wireless, and the more listeners we have the better for everybody.

Let us hope that every keen listener will do his best to promote the success of the National Wireless Week. "Let Your Friends Listen!"

## DO YOU WANT TO BUY A SET?

Tell us how much, roughly, you wish to spend; where you are situated; what stations you wish to receive; whether you intend to use phones or a loud-speaker, and we will advise you as to the general lines of sets that will answer your purpose.

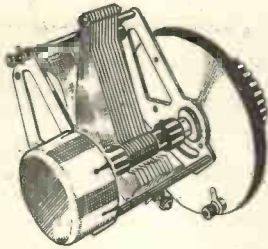
Send your inquiry with coupon (p. iii cover) and stamped addressed envelope to—

"Buyers' Advice Bureau,"

WIRELESS MAGAZINE,

La Belle Sauvage, E.C.4.

# Novelties and New Apparatus Tested and Approved by Our Technical Staff



This sketch illustrates the Ormond straight-line-frequency condenser fitted with their well-known slow-motion device.

The fixed plates are held in two places and are insulated from the moving plates and the frame by four point-contact ebonite insulators, the total amount of insulating material used being extremely small.

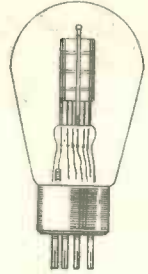
The moving plates are electrically connected to the frame and also to a circular aluminium shield which is fitted behind the knob and dial to eliminate hand-capacity effects. Both finish and construction are well above the average.

The Ormond Engineering Co., of 199, Pentonville Road, King's Cross, N., are the manufacturers.

For real power amplification we can recommend the new Burndept valve, type LL 525.

In external appearance the valve is a larger replica of the L 525, but is able to deal with greater grid voltage variations. It possesses a low impedance and takes a filament current of .25 ampere at 5 volts.

The makers are Burndept Wireless, Ltd., of Aldine House, Bedford Street, Strand, W.C.2.



Where an extra stage of low-frequency amplification in an existing receiver is desired without the necessity of altering the wiring or the panel layout, the unit illustrated may be used and will give excellent results.

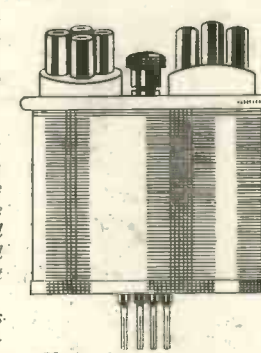
It is known as the Penton Xtra-tone Plus Valve Unit and it consists of two valve holders mounted on top of a cylindrical ebonite case containing a resistance-capacity coupling system.

A very efficient balancing condenser is shown in the accompanying sketch.

The variation in capacity is obtained by a large coarse-threaded screw working in between a helix of brass wire wound in a separate groove.

The minimum capacity is very small and the maximum is sufficient to neutralise any valve.

The makers are L. McMichael, Ltd., of Hastings House, Norfolk Street, Strand, W.C.2.

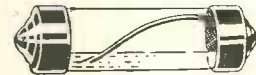


The whole is plugged into the last valve holder of the receiver from which the valve has been removed and is inserted with an extra valve in the unit.

The unit is made by The Penton Engineering Co., of 15, Cromer St., W.C.1.

A grid leak which has a novel means of varying the resistance is illustrated in the accompanying sketch.

The length of the resistance path between the two metal contact caps is



varied by means of a wire bent in a special manner, dipping into a viscous liquid. By rotating the leak, which must be mounted horizontally, the length of wire immersed in the liquid is varied.

The component is called the Nonoise grid leak, and is obtainable from the American Radio Corporation, of 18, Conduit Street, W.1.

In the space at our disposal it is possible to give only very brief particulars of the components illustrated. For fuller details readers are recommended to write to the manufacturers concerned; in all cases the appropriate addresses are given. Mention of the WIRELESS MAGAZINE will ensure a prompt reply.

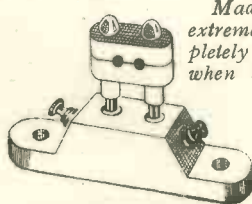
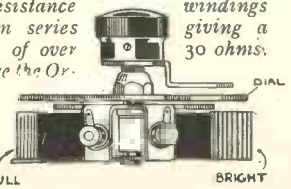
In constructing a receiver it is always advisable to remember that at some future time a change of valves may be desired, and in some

cases this may mean a change of filament rheostats for the usual high maximum resistance rheostat will not carry the filament current of many valves on the market.

A solution to this problem is to use the dual type of rheostat, having two separate resistance windings. Such a rheostat is the Ormond, illustrated here.

The two resistance windings are connected in series giving a total resistance of over 30 ohms.

The makers are the Ormond Engineering Co., Ltd., of 199, Pentonville Rd., N.



Made of porcelain, this aerial earthing is extremely efficient in that the receiver is completely isolated from the aerial and earth when the plug (to which the aerial and earth terminals of the receiver are connected) is removed.

The Athol Engineering Co., Ltd., of Cornet Street, Higher Broughton, Manchester, are the manufacturers.



# The Miniwave Two-valver

A SET FOR THE SHORT WAVES

"Miniwave" is a special term used by the WIRELESS MAGAZINE to designate those wavelengths below 250 metres, and this Miniwave Two-valver is a set built by our Technical Staff specially for short-wave reception.

On test the Miniwave Two-valver has received KDKA, WQO, WIR, and 2XAF, American short-wave stations, on a 30 ft. indoor aerial in London.

Putting finishing touches to the Miniwave Two-valver before testing it for "W.M." readers.



WINTER is almost upon us—that season of the year when the amateur has a better chance than at any other time to receive, over immense distances, stations that transmit on very short wavelengths and that use comparatively small power.

## Special Problems

In the design of a good short-wave receiver the problems which confront us are very different from those encountered when dealing with the higher wavelengths.

In the first place, high-frequency amplification appears to be useless on the short wavelengths. Thus we have to rely solely on the efficiency of our tuning system and detector valve. Even the tuning systems commonly used for ordinary broadcast reception must undergo a drastic revision.

The use of a reaction coil of the adjustable type, for instance, produces such a considerable change in wavelength that reception cannot be carried out with any degree of certainty.

On the other hand, pure capacity-reaction results in the introduction of stray capacities rendering tuning difficult.

For the best results the circuit should be such that the oscillating point is practically constant over the entire tuning range, and it is essential that the change from the stable

to the oscillating condition is gradual and not sudden.

Bearing these points in mind, let us study the circuit diagram of the short-wave receiver described in the article.

To avoid very critical tuning small coils are used so that the wavelength band covered is not too large. If it is desired to cover other wavelength

stations separated by a fraction of a kilocycle may be tuned-in.

A smooth control of reaction is obtained by a combined magnetic and capacity coupling, the magnetic coupling being fixed and the capacity coupling being variable.

In order to confine the H.F. oscillation to the detector valve an impedance, in the form of a high resistance, is placed in series with the reaction coil and the L.F. transformer primary; this effectively prevents the H.F. currents from passing through the H.T. battery and so back to the valve.

At the same time, however, the resistance allows the potential of the H.T. battery to be applied to the plate of the valve.

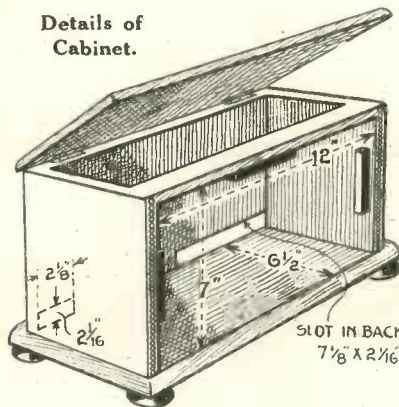
The low-frequency valve has the conventional connections and one of the new R.I. multi-ratio transformers is employed so that the best results can be obtained by experimenting with the seven different ratios and impedances available.

## Maximum Sensitivity

A grid condenser of small capacity and a grid leak of comparatively high resistance ensure maximum sensitivity from the detector valve.

Fixed filament resistances have been employed, and have been found quite satisfactory. If it should be desired, however, a variable rheostat may be used in conjunction with the detector valve.

Details of Cabinet.



bands more coils will be required, and these can be plugged into the sockets as shown in the photographs and diagrams.

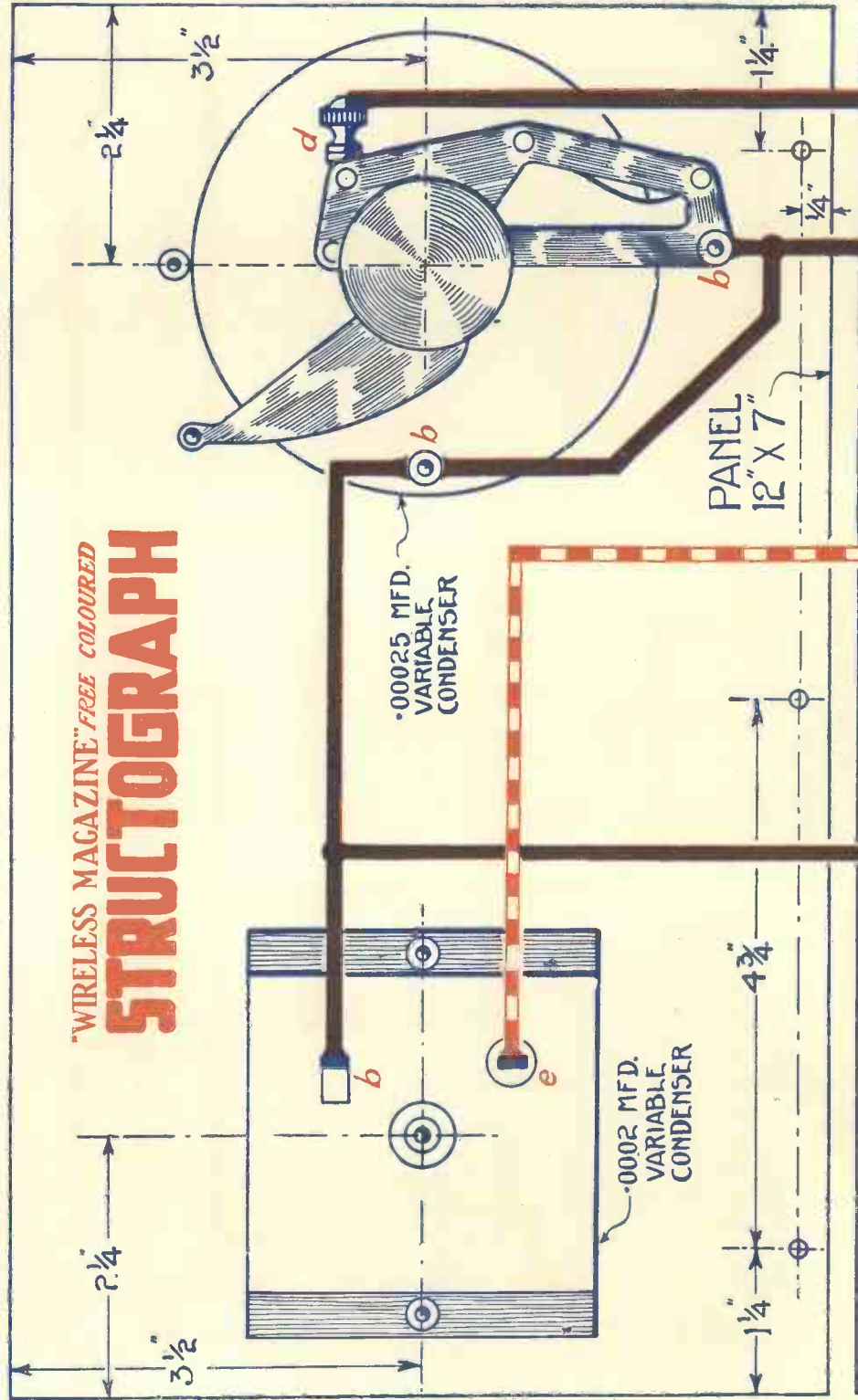
Although the wavelength range of the coils is small, the frequency range is large, and it is imperative that, for tuning the grid coil of the detector valve, a variable condenser of the slow-motion type is used so that

Free Coloured STRUCTOGRAPH Supplement to the WIRELESS MAGAZINE, November, 1926.

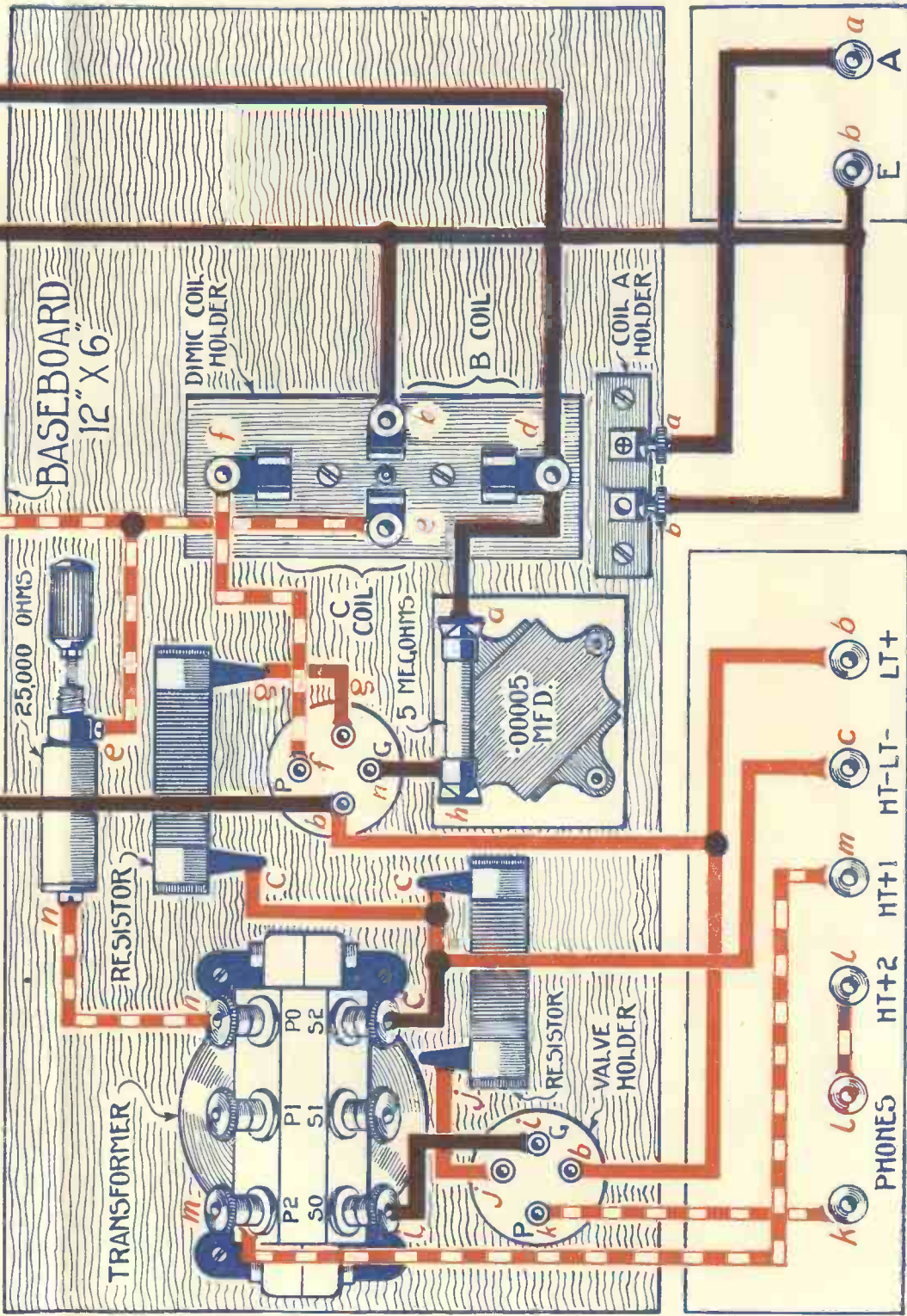
# THE MINI WAVE TWO-VALVER :: A Set for the Short Waves.

Structograph (Two-thirds Scale) Layout, Wiring Diagram and Drilling Guide.

For full particulars see article in the "Wireless Magazine" for November, 1926.







There is a choice of three ways of using the Structograph for wiring:—(1) Follow the wiring lines, red lines indicating the filament-lighting circuits; red-and-white lines the H.T. or plate circuits; and black lines the grid circuits. A black circle at the intersection of two wires indicates that the two are soldered together. At all other intersections there is no connection between the two wires. (2) You can ignore the lines of the wiring if you

like, and work entirely by means of the red letters shown at the various terminals. You just connect all like letters together with one wire or with as few wires as possible, thus: all the a's together, all the b's together, and so on, and you should do so in alphabetical order, the a's first. By this method you cannot go wrong if you are careful. (3) The ideal method is to combine (1) and (2).

CASSELL & CO., LTD., London. Toronto. Melbourne and Sydney

## The Miniwave Two-valver (Continued)

The components required for this receiver are as follows:—

Ebonite panel, 12in. by 7in. (Becol or Radion, Trelleborgs.)

.00025-microfarad variable condenser, slow-motion type. (Ormond S.L.F. or Igranic, Dubilier, G.E.C.)

.0002-microfarad variable condenser. (Polar or Ormond, G.E.C., Igranic, R.I., Dubilier.)

L.F. transformer. (R.I. Multi-ratio or Marconiphone, Pye, M.L., G.E.C.)

500-300,000 ohms variable resistance. (Bretwood.)

Two baseboard-mounting valve holders. (Peto-Scott or Burne-Jones.)

.00005-microfarad grid condenser, air spaced. (Ormond.)

Variable grid leak. (Nonoise.)

Two fixed filament resistances with mounting bases. (Magnum Resistors.)

8 engraved terminals. (Belling & Lee.)

Dimic coil-mounting base. (McMichael.)

Fixed plug-in coil socket for baseboard mounting. (Clackson.)

Ebonite terminal strips 7in. by 2in. and 2in. by 2in.

Cabinet. (Unica Cabinet Co.)

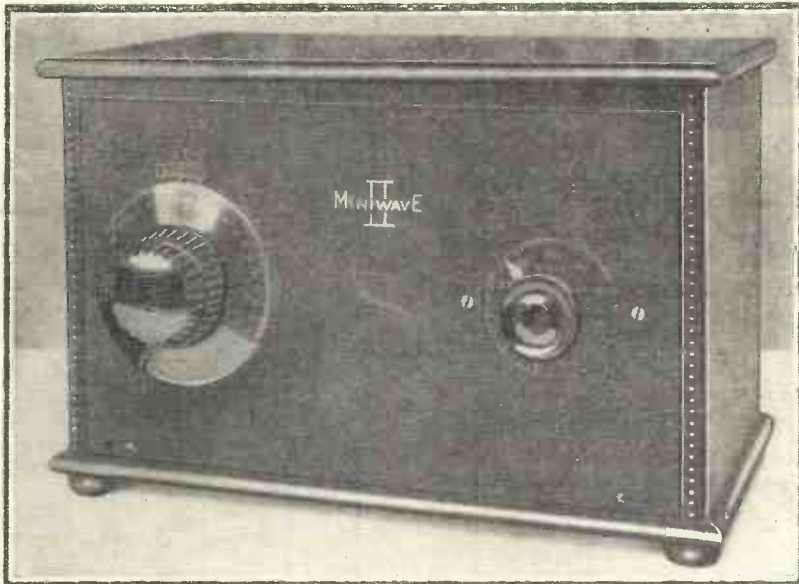
Baseboard, 12in. by 6in. by  $\frac{3}{8}$ in. thick. (Unica Cabinet Co.)

Dial indicator marked "Aerial." (Belling & Lee.)

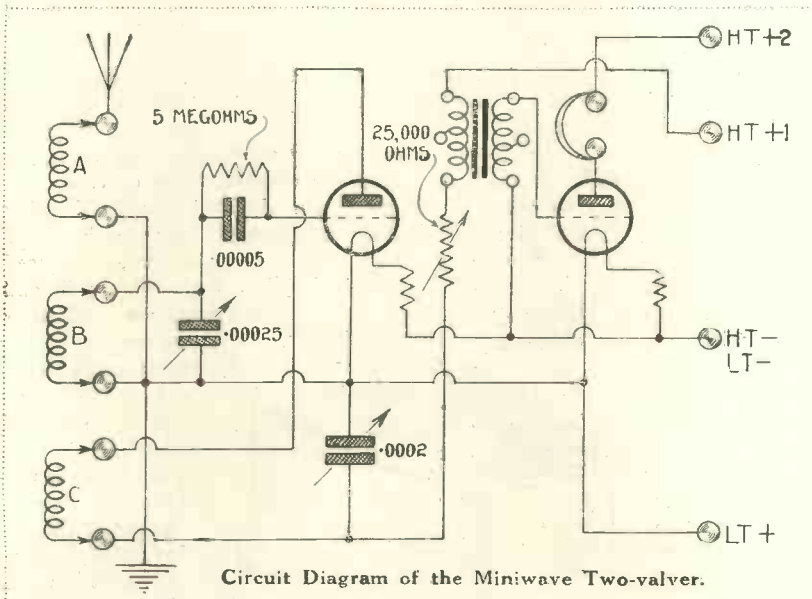
*NOTE:—The particular components shown in the photographs and allowed for in the Structograph are in each case mentioned first.*

As there are only two components mounted on the panel, the drilling of the latter is very simple. The aerial-tuning condenser has a one-hole fixing device and is mounted on the left of the panel, looking at the front.

The reaction condenser is mounted on the right; six holes are required



Photograph of the Completed Miniwave Two-valver.



Circuit Diagram of the Miniwave Two-valver.

for fixing it and the dial. Two more holes, drilled at the bottom of the panel, are necessary for attaching the panel to the baseboard.

The sizes of the holes required and their positions on the panel can be seen from the Structograph (which is two-thirds scale).

The remainder of the components are mounted on the baseboard in the positions shown in the photographs and the Structograph.

It should be noted that the Dimic coil holder is raised about  $\frac{3}{8}$ in. from

as possible for greatest efficiency.

In design the variable grid leak is very novel and is particularly efficient. A variation in resistance is obtained by a wire bent in a special manner, and dipping into a viscous liquid contained in a glass cartridge-type case. The electrical path is lengthened, and the resistance is consequently increased by rotating the whole in one direction. A fixed leak can be substituted, as shown in the circuit and wiring diagrams.

For proper working of the variable

the baseboard so that the Dimic coil and the closely-coupled aerial coil are concentric. Both coil holders are mounted so that the axes of the coils are at right angles to the panel. Sufficient space must be allowed for the movement of the plates of the aerial-tuning condenser.

Both terminal strips are screwed to the back edge of the baseboard, the smaller strip carrying the aerial and earth terminals on the right, and the larger strip on which the battery and phone terminals are mounted, on the left.

The detector-valve holder and the grid leak and condenser are mounted practically in the centre of the baseboard, and close together, so that connections from the coil to the detector valve through the grid leak and condenser are as short



## A Special "W.M." Set for the Short Waves

leak it is essential to mount it horizontally, and this can be done conveniently by mounting the component in two small clips bolted to the two set plates of the grid condenser.

### Low-frequency Transformer

The low-frequency transformer is screwed to the baseboard immediately behind the reaction condenser.

Wiring should be carefully carried out in conjunction with the coloured Structograph.

The connections shown in red denote the filament-lighting circuit, those in black the grid circuits; the remainder are shown in red and white.

Furthermore, every terminal is marked with a small letter of the alphabet, indicating the order in which wiring should be carried out. All those terminals marked *a*, for instance, should be connected up first with as few and as short connections as possible. Then all those marked

*b* are joined together in a similar fashion, and so on.

Connections to the L.F. transformer should be made with short pieces of flex so that experiments may be made with regard to the best ratio of transformation.

The variable resistance need not necessarily be mounted to the panel or baseboard, but can be held in position by the No. 16-gauge tinned-copper wire that should be used for wiring.

### Suitable Valves

Having completed the construction of the set the next step is to learn how to operate it. In the first place suitable valves must be used. For the detector valve we recommend the Osram DE8 H.F. or DE5B, or the Mullard PM5 for use with a 6-volt accumulator. For a 2-volt accumulator the Mullard PM1 H.F., the Osram DE2 H.F., or the Cossor Red Top give good results.

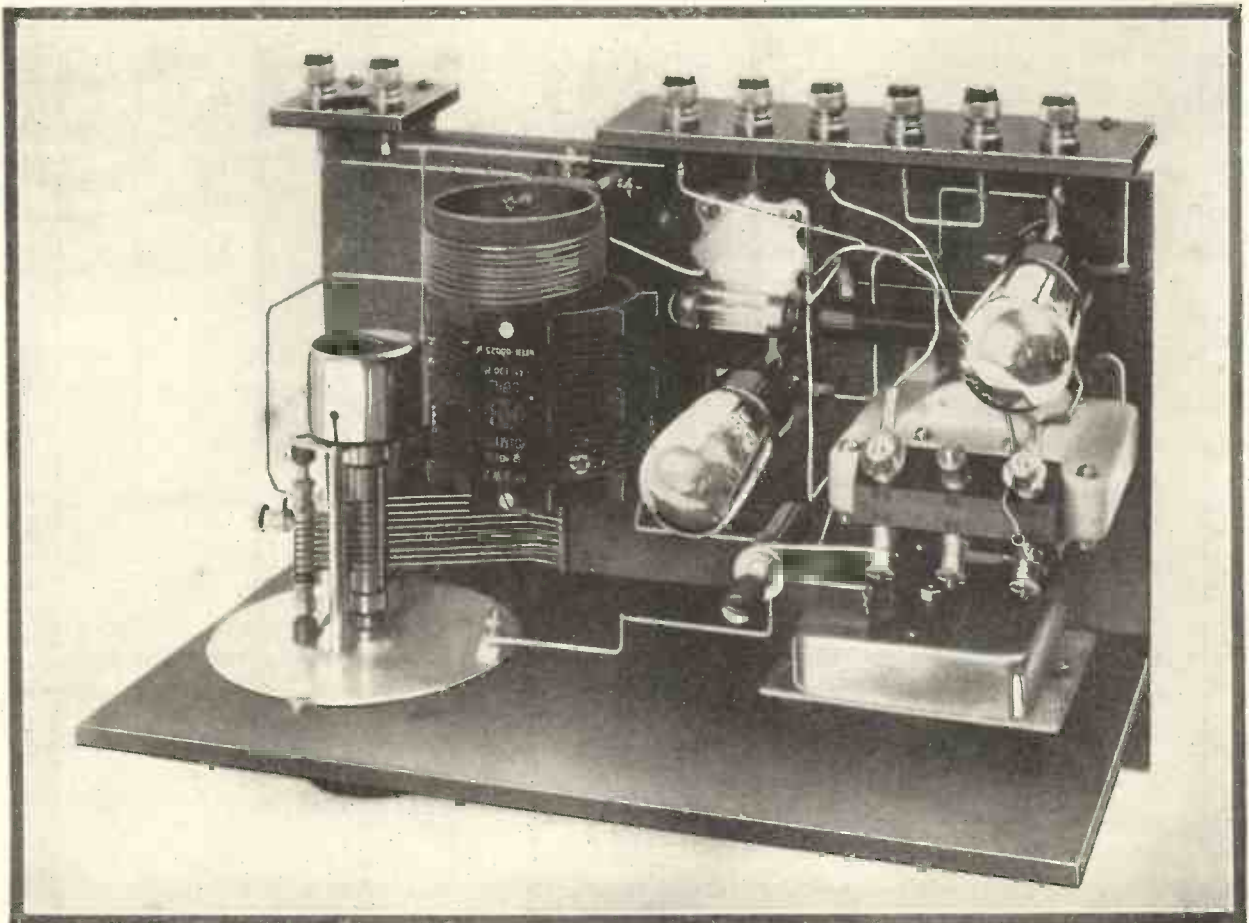
The low-frequency amplifying valve may consist of an Osram DE8 L.F., or DE2 L.F., Mullard PM6 or PM1 L.F., or the Cossor Stentor Two.

### Tuning Coils

With regard to coils, the aerial coil should consist of eight turns of No. 16- or 18-gauge wire wound on a 2in. former, and attached to a plug.

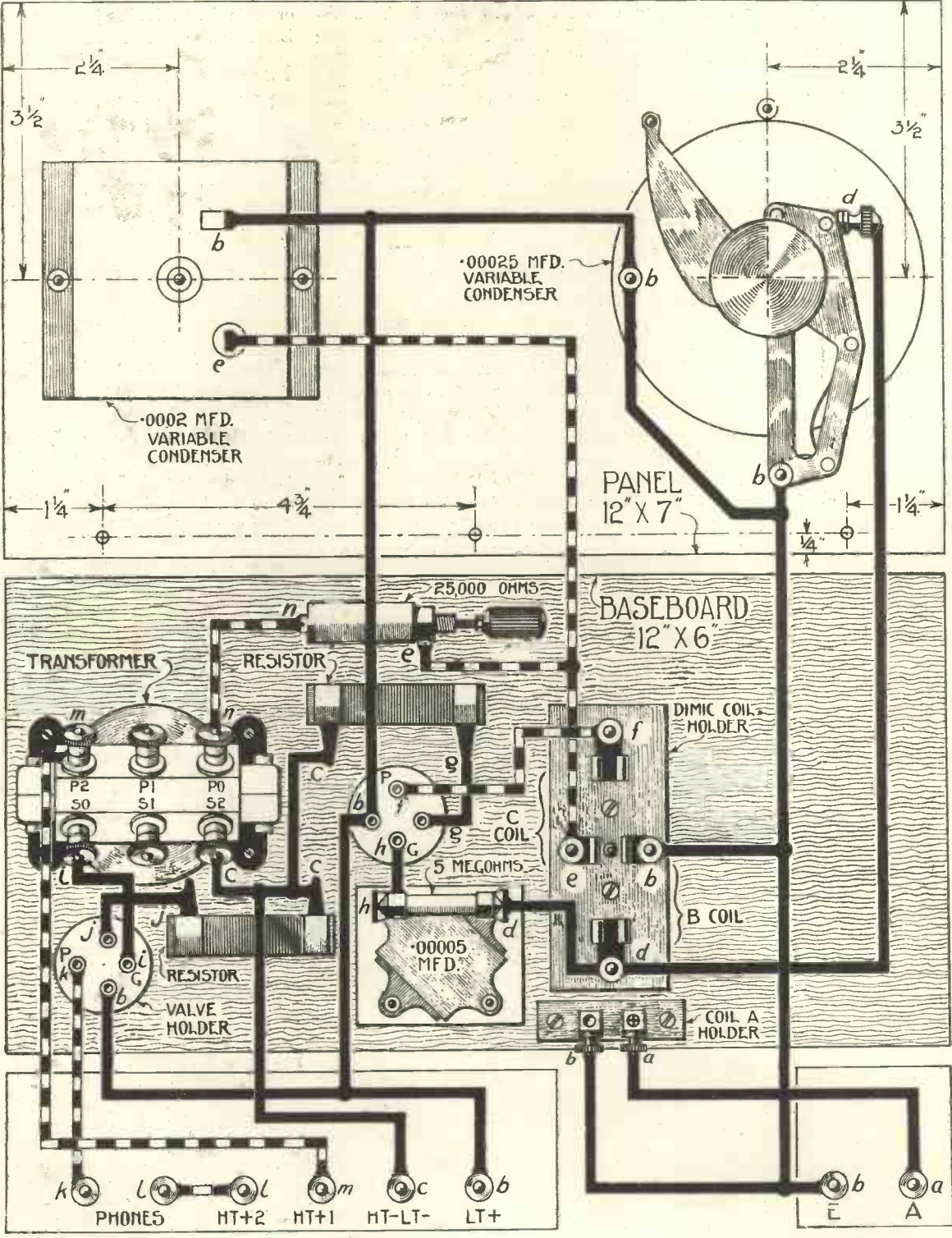
The grid and reaction coils consist of the two halves of a Dimic coil, No. SW1, the wavelength range in metres, with the .00025-microfarad variable condenser, being approximately 35 to 70 metres. For shorter wavelengths (20 to 50 metres) the No. SW2 Dimic coil should be used.

The aerial should consist of a single wire, the total length of which, including lead-in, should not exceed 50ft. for the best results. An indoor aerial 25ft. long will serve excellently. Remember that bad connections are more detrimental to the reception of short waves than with long waves.



Photograph showing Arrangement of the Components of the Miniwave Two-valver on the Baseboard.

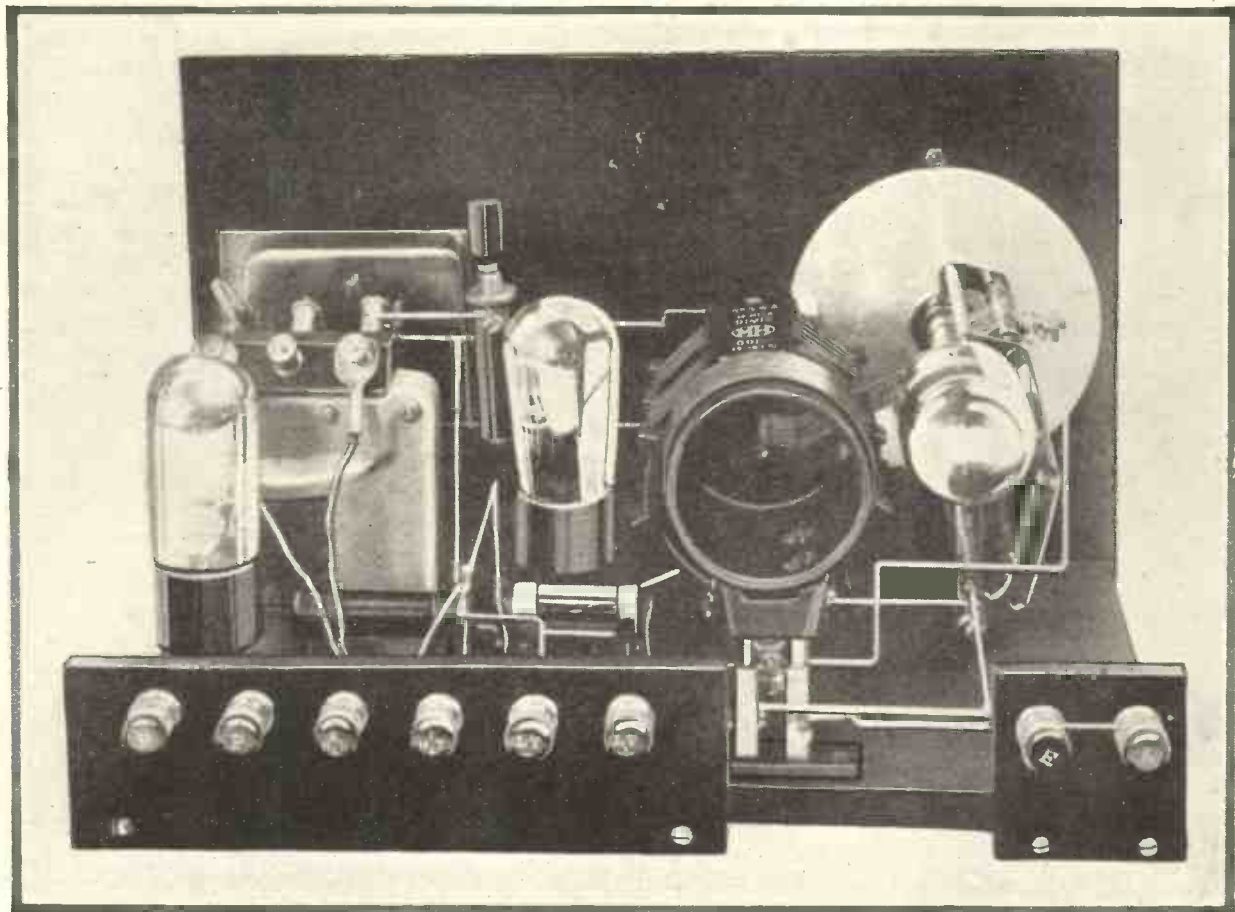
# THE MINIWAVE TWO-VALVER (Continued)



Reduced Reproduction of the Coloured Structograph Plate Given Free with this Issue.



## A Special "Wireless Magazine" Design



Another Photograph showing the Construction of the Miniwave Two-valver.

Tuning is accomplished in the following manner: Set both dials and turn the reaction dial (on the right) until the set begins to oscillate. Now turn the tuning condenser through-out its 180 degrees; the set should be oscillating at every setting of this dial.

If some difficulty is experienced in producing oscillations separate the

aerial coil from the Dimic coil a fraction of an inch.

If points on the tuning dial are found where oscillation ceases it is probably due to the fact that the aerial circuit is in resonance with the grid circuit, and is therefore absorbing energy from the latter.

To receive broadcasting it is essential that the set should not be oscillat-

ing, but just short of it. The H.T. voltage on the plate of each valve must be carefully adjusted until the correct values are found.

The sensitivity of the receiver is such that it has received KDKA, WQO, WIR and 2XAF of America on a small indoor aerial about 30ft. in length and a water-pipe earth in London. Can you do better?

## Short-wave Stations for Which You Should Listen

Wavelength in metres.	Call Sign.	Name of Station.	System.	Wavelength in metres.	Call Sign.	Name of Station.	System.
13	POF	Nauen (Germany)	Telegraphy	25.3	AGA	Berlin (Germany)	Telephony
18	POF	Nauen	"	30	F8GA	Clichy (France)	"
20	POX	Nauen	"	32.79	WGY	Schenectady (N.Y.)	"
20	JIPP	Tokio (Japan)*	Telephony	35	JIPP	Tokio (Japan)*	"
21	U2XAD	Schenectady (N.Y.)	"	40.2	AGC	Berlin	"
23	FFW	St. Assise (France)	Telegraphy	44	—	Königswinterhausen (Germany)†	"
25	PCMM	The Hague (Holland)	"	52.7	KDKA	East Pittsburg (U.S.A.)	"

\* Relays Tokio broadcast programmes.

† Relays Berlin broadcast programmes.

# The Human Side of Broadcasting

A special article by G. DARE FLECK, Programme Director of KDKA

SOME of our wireless experiences are very thrilling. Broadcasting has become a vital human experience and some of the personal contacts formed through this agency are very interesting. A series of incidents in connection with our broadcasts from station KDKA to the Far North combine themselves into a story more fascinating than many tales of fiction.

About Christmas time, 1924, we were requested to broadcast a message concerning the ill-fated Nutting Expedition. This consisted of a small party of courageous men whose enthusiasm for exploration was apparently much greater than their working knowledge of Arctic navigation. In an attempt to follow the course of the early Norsemen to this country, they were lost completely.

The message we were requested to give was directed particularly to the Hudson's Bay Posts and Canadian Mounted Police in East Baffinland, asking for information regarding bits of wreckage, or any other clue to the fate of this expedition which might be received from the Eskimos along that coast. Several times during the early weeks of 1925 this message was sent out. Imagine our surprise one day when a visitor to the office of KDKA handed in his card—which read "Rev. Blevin Atkinson, Lake Harbour, Baffinland."

## Great Surprise

With the word Baffinland already impressed upon our consciousness as a vast, bleak, uninviting waste, the realisation that here was someone from that part of the world came as a great surprise, and was the first of a series of remarkable coincidences.

The reverend gentleman and his wife, who accompanied him to our office, are missionaries stationed at Baffinland, but were home on furlough, and at that time visiting relatives of Mrs. Atkinson in Pittsburgh. They had heard of our appeal to Baffinland for information regarding the Nutting Expedition, and came to our office to assure us that station KDKA is heard throughout this northern country wherever receiving sets are installed, which is in the

occasional post of the Hudson's Bay Company or at the temporary camp of the police who may be assigned there for duty.

The Atkinsons told of their joy at having heard the service from Calvary Episcopal Church, Pittsburgh,

*KDKA needs little introduction to readers of the WIRELESS MAGAZINE—it is sufficient to remind them that the call sign is that of the Westinghouse Electric Co.'s station at East Pittsburgh, Pa. We are glad to have this opportunity of bringing the station's activities into closer touch with British listeners and we are sure that this special article by G. Dare Fleck, Programme Director, will be read with great interest*

by radio, the only English service they had listened to for months, as all services conducted by them were of necessity in the Eskimo language. The receiving set by which they heard this service belonged to a member of the police, but when they returned the Atkinsons expected to take with them a radio set by which they could maintain this contact with civilisation.

It was a very interesting call, and when the Atkinsons left our office we felt we had a real interest in the great North where they are serving and where we might help to brighten some of their days with our radio programmes once they were back again.

Some time in July, about six months after this visit from the Atkinsons, we were requested to send another message to the Hudson's Bay Posts in the far north. It was news of a disaster. The *Bayeskimo*, supply ship to these posts, on its annual trip north, had been crushed in the ice. All supplies had been lost, though the human freight had been saved and later transferred to another vessel.

The posts were assured that another supply vessel would be equipped at once, and would be on its way with the necessary supplies in about three weeks. These posts were thus

assured that winter would not find them in danger of privation and starvation. Several evenings this message was repeated to make sure that it might be received by those interested.

A week after this message had been broadcast a letter came from Canada. It was from the brother of the Reverend Blevin Atkinson, thanking us for the message which we had broadcast assuring those interested of the safety of all the persons on board the unfortunate *Bayeskimo*.

This letter told us that the Reverend Blevin Atkinson and his wife were returning to Baffinland on the *Bayeskimo*, and it was a great comfort to the relatives and friends of this couple to know they were safe although their personal baggage had been lost.

The summer passed and the chill days of autumn arrived. On the night of Hallowe'en, in the midst of dance music and revelry, another message was broadcast to these men above the Arctic Circle. It gave the information that one of the posts had not been reached by the supply vessel on account of the closing in of the ice.

"Send Supplies!"

It requested other posts in that region to attempt the transportation of supplies across the ice by means of dog teams in order that the needed supplies might reach those waiting at this lonely post. It was a message which carried with it a thought of distress, privation and possible starvation if it failed to reach those for whom it was intended.

Night after night this message was driven out across the ether waves, carrying with it the prayer that it might be successful in its mission. Eight thousand miles away, in South Africa, it was heard so clearly that it was published in one of the newspapers of Johannesburg, South Africa.

During the latter part of November other messages were broadcast to those members of the Royal Canadian Mounted Police and Hudson's Bay Posts beyond the Arctic Circle on a schedule which had been supplied these men when the annual mail went to them.



### Pleasing News

When the supply boat returned from its annual trip it brought us the pleasing news that the radio set taken back to Baffinland by the Atkinsons had been installed, and in the brief time before the return of the boat had proved successful in receiving station KDKA. This encouraged us in the belief that the messages sent during the winter were reaching these far-away listeners.

The last of these scheduled broadcasts was on February 20, which in those places marked the time when

the sun reappeared after its long absence, and although no thought of this was in our minds when the schedule was made up, we inadvertently assisted in celebrating the return of the sun, an event of great importance in the lives of those in that northern region.

Some of the messages were for our friends the Atkinsons, two of them carrying the news that relatives had passed into the Great Beyond. One contained a touch of comedy. It came from a class of Sunday school girls in Canada, and assured the

Atkinsons that an artificial Christmas tree was being sent to replace the one lost with the *Bayeskimo*. Imagine sending an artificial Christmas tree right into the home territory of Santa Claus!

### Not the End

Of course, this isn't the end of the story. We expect to hear from these friends again when the supply boat comes back this year. And on their next furlough we trust they will visit us. But isn't it a real human-interest story?

## Microphones Do Not Respect Persons!

**A**N unusual incident occurred at St. Martin - in - the - Fields Church, London, in September, during the broadcast of a service. A woman member of the congregation began to pray aloud, apparently in an ecstasy of religious fervour. Her prayer was broadcast with the rest of the service, to the surprise and bewilderment of listeners.

The microphone is no respecter of persons or of words. Dropped *h*'s are passed on to the listener; discords are not taken out, they are passed on to the other end.

While talking about broadcasting to a few of my friends I was taken aback by the assertion of one who stated that he had broadcast from a particular hall in the North of England. I knew he had never broadcast, and asked him to explain.

He was a heckler at a political meeting addressed by one of

our leading statesmen during the last general election. The address of the statesman was broadcast, and the interjections of the hecklers. He shouted a question across the hall, and as it came when there was a pause in the speech of the politician, it had the microphone to itself and reached the listeners.

There are many more similar

broadcasters; although they have never appeared on the programme, their voices have been heard in homes and halls hundreds of miles away.

Recently, a sketch was being broadcast from the London studio. The prompter, although he did not take one of the parts, and although he only whispered, was clearly audible, and many of his sentences

tion, "How do you pronounce your name?" and my answer to it. The announcer might have said something not meant for listeners. Luckily he did not.

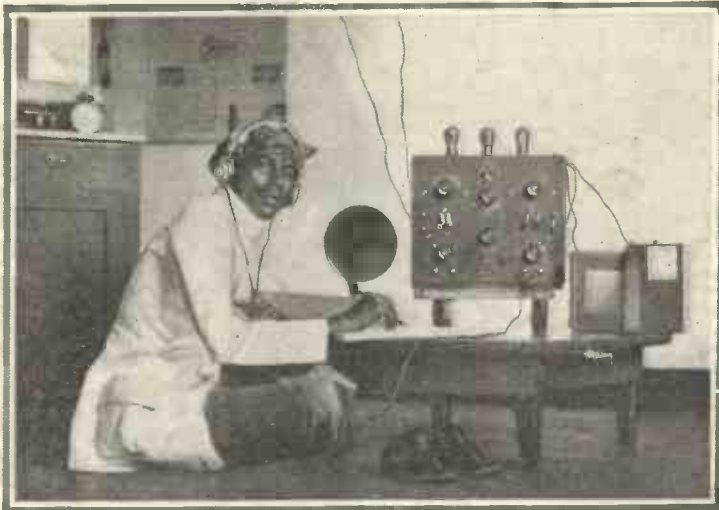
On another occasion, however, an announcer did say something that would have annoyed many listeners had they heard it. He was on pins, while I was talking, for he did not know until later that what he had spoken was not broadcast.

Perhaps the occasion when the microphone revealed that it was no respecter of persons or of words was during a banquet when the speeches were broadcast. Persons of great fame were present on that occasion — journalists, artists, lawyers, and statesmen. The principal guest of the evening was Lord —. When he got up to respond to the toast, another statesman, whose voice the microphone did not alter in transmitting

it, said: "It's a pity he hasn't as much brains as he has hair."

One wonders what the statesman and the chief guest said of each other when they found that the sentence was broadcast! E.B.R.

Are you thinking of buying a set? If so, turn to the "Guide to the Best Valve Sets" on p. 346.



The wireless craze has reached as far as Penang, as this photograph shows: note the Brown loud-speaker.

came through before they were spoken by the party in the sketch. Announcers' whispers often reach the ears of listeners.

When I visited one of the B.B.C. studios for the first time, to broadcast, my wife was at home eagerly listening. The moment for my talk had arrived, the previous item ended. Then she heard a whispering ques-

*Newcomers, but Already Popular—*

NAT LEWIN AND HIS NEW VERREY'S  
DANCE BAND

SLADE





Mrs. H. A. L. Fisher writes on—

# Broadcast Education

## And Its Wondrous Possibilities



ONLY a very little time ago wireless, to most of us, was a mystery, possibly quite exciting, but so remote, so unknown, so unlikely to come our way or to affect us that we gave it but little thought. And now, to-day, here it is, part of the furniture, and a very considerable part, of every-day life.

Moreover, it comes into the lives not only of city dwellers, or the man who works with others and is part of a great world, but even more into the every-day experience of country people and of women whose work keeps them in their homes.

Because, therefore, it touches those who have hitherto been but slightly affected by social developments, it is perhaps destined to have even more influence than the other marvellous things that have come upon us of late years. But it has come so silently, and so swiftly, as well as so completely, that we have had but little time as yet to think out its possibilities and its implications.

### Our Most Pressing Problem

Not the least of these is the relation of wireless to education. For, as we are beginning to understand, though not even yet as fully and as fervently as we ought to understand, education, the training of the young for the duties and responsibilities of adult life, above all for citizenship, is the most urgent, the most pressing, of all the many problems that confront us.

A wise, well-educated democracy should be the best and surest of all methods of government, but an ill-educated, or imperfectly educated, democracy is exposed to very grave dangers. And as the world becomes more and more a democratically-

*Mrs. H. A. L. Fisher, wife of the ex-President of the Board of Education, is well known for her interest in educational matters, and in this article she has new light to throw on the fascinating subject of broadcast education.*

governed world, so clearly it behoves us all to give our very utmost to the problem of planning and providing the best education for the citizens of the future.

Now the majority of these citizens will certainly receive their training in the public elementary and secondary schools of the country. It is only the few, even if an important few, that are educated elsewhere. So that the first question I want to ask about wireless and its possible contribution to the problem of education is, what can it do for the public elementary and secondary schools? What has it to offer that they can accept, what can it do for the children which is not already done, and which is worth doing?

Our schools are institutions of which we have every right to be extremely proud. They are not perfect, as those who work them are the first to tell us, but they are, upon the whole, extremely good, and they are staffed by teachers who do splendid work.

But teachers, like mothers (also people who play an important part in education), cannot often be specialists. They have to teach, particularly in the smaller schools, a number of different subjects, and they teach them extremely well. But wireless can do what the ordinary school cannot do, and that is command the services of the specialist.

It is perfectly easy for even a very-busy person to go to a central studio, probably in London, where such a person is quite likely to be anyhow, and to speak, through wireless, with the minimum of effort, to children all over Great Britain.

With the best will in the world such a distinguished person, or indeed any person, can only reach a few groups of children in the ordinary way, but by wireless he or she can reach them all. Therefore here is one extremely obvious and extremely important way in which wireless can help education.

### Expert into Every School

It can bring the expert into every school, it can enable every child to hear the voice, to come into some sort of contact with the mind, of the

## Broadcast Education and Its Wondrous Possibilities (Cont.)

best teachers, the most distinguished exponents, of almost every subject.

All this wants working out. Its technique needs much study, not only on the part of the distinguished, who may not be experienced in the art of talking to school children, but also upon that of the ordinary teacher, who has to work out, so to speak, a new aspect of school life, the helping of the children to get the best results from listening, not to a present human being, but to a loud-speaker which, whatever its merits, certainly lacks personality.

*There Is Personality*

Yet no one who has listened to lectures of various kinds with the aid of the loud-speaker can deny that a considerable amount of personality does come through, and it may be surmised that the people who can best hold the children's attention will be the people who can give personality to their broadcasting.

In any case, here is one certainly undoubted and surely important thing that wireless can do. For every one who gives thought to the matter understands how extraordinarily valuable it is to the developing mind to come into contact with the ripe experience of greater minds, and here is a method by which any child, in however remote or small a school, can obtain that experience, if not in the most complete way yet surely in one which is well worth while.

Another advantage that seems fairly obvious applies more particularly to the smaller schools, and that is the greatly increased variety of teaching which can be provided by wireless means. Children gain tremendously by, and appreciate enormously, variety in teaching.

A child who has had only one or two teachers, however good, misses a great deal of the stimulus and interest obtained by the child in a larger school who learns from a number of different people.

The teacher in a small country school has a very close personal relationship to the children, closer possibly than that of the teacher in a big school, who only gets them for one subject, or while they are in one or two classes or years.

But in future, when the possibilities of wireless are fully developed, the

teacher in a small school, while preserving that close relation, can also give to the children a useful and refreshing change of teachers, a change which will probably help not only the children but the teacher as well.

In the same way children who through illness or for other reasons

experts should give their minds to the question of wireless and education. Quite certainly it is all still in the experimental stage, with as yet an imperfect technique probably both in the schools and at the microphone.

Lecturing to many thousands of school children of varying ages is an art which requires a good deal of thought and care, making sure that the children follow the remarks which fall from the loud-speaker, making them fit into the other lessons, making them a real part of the child's experience and training also needs much thought and care.

But it is worth while, for by its means the children's experience can be immensely widened, the teacher's work supplemented and helped.

It is also clear that much needs to be done before the lectures given at the central studio can be completely adapted to the needs of children of varying ages and attainments. The relation between the schools and those who organise school wireless is still rather vague and sketchy, and it is far from easy to be sure that the kind of teaching provided is that which is most required.

As more and more schools come into touch with the broadcasting authorities, so all this can be worked out in detail, and a greater variety of lectures arranged.

*Older Students*

Nor is it only elementary schools that may profit in this way from wireless teaching. One can imagine all sorts of possibilities for older students, of secondary-school age, or older still. It all needs a great deal of thinking about, and a great deal of combination and co-operation.

But that it can be done, should be done, and is well worth doing, that by the aid of wireless a very large number of children can get teaching from men and women who are the greatest authorities upon or exponents of their own subjects, that older people can continue to learn and to enjoy learning, that a greater variety as well as a greater richness and depth can be added to the general mass of educational experience—all this seems to me indubitable. The whole thing is new, experimental, imperfect, but it is full of possibility and of hope. LETTICE FISHER.

### *Simultaneous Talks Worth Listening For*

*MUSIC AND THE ORDINARY*

*LISTENER*, by Sir H. Walford Davies, Mus. Doc., on Tuesdays, November 2, 9, 16, 23 and 30, at 9.30 p.m.

*HISTORICAL SKETCHES*, by Col. W.

P. Drury, on Wednesdays, November 3, 10, 17 and 24, at 7.10 p.m.

*ATOMS AND WORLDS*, by Sir Oliver

Lodge, on Wednesdays, November 3 and 10, at 9.30 p.m.

*THE MIND OF ANIMALS*, by Prof.

J. Arthur Thomson, M.A., LL.D.(Edin.), on Thursdays, November 4 at 7.10 p.m., and November 11 and 18 at 7.40 p.m.

*SIX GREAT ARTISTS AND WHAT*

*THEY STAND FOR*, by Mr. C. Lewis Hind, on Thursdays, November 11, 18 and 25, at 7.10 p.m.

*COMPANIONABLE BOOKS*, by Prof.

G. Gordon, M.A., on Wednesdays, November 17 and 24, at 9.30 p.m.

*SPANISH TALKS*, by Mr. W. Bletcher,

on Tuesdays, November 2, 9, 16 and 30, at 7.10 p.m.

*FRENCH TALKS* by M. Stéphan on

Tuesdays, Nov. 9 and 23, at 7.10 p.m.

are taught at home can have lessons from a number of outside teachers, and command a far greater variety of experience than is obtainable by any other means.

Here, then, are two possibilities, which even if there were no more—and to my mind there are many—must surely mean that educational



# Charging Your Batteries *from* A.C. MAINS

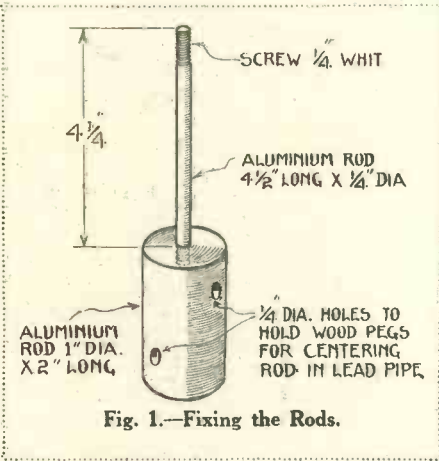


Fig. 1.—Fixing the Rods.

favour on account of differences of opinion as to the best electrolyte to be used with it.

These notes describe how to make a perfectly good rectifier, the data being those used by the writer in making his own.

In brief, the apparatus is a combination of cells, each containing two plates, lead and aluminium, immersed in an aqueous solution of ammonium phosphate.

The materials required are:—

- 4 lengths aluminium rod,  $\frac{1}{4}$  in. dia. and 2 in. long.

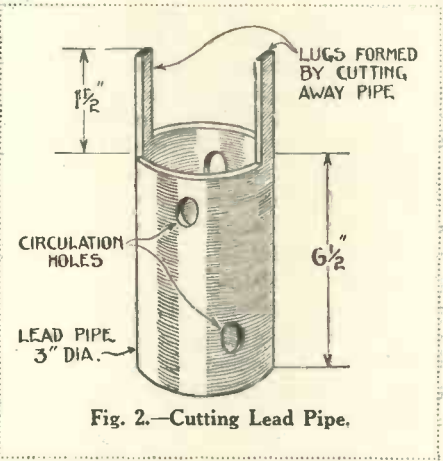


Fig. 2.—Cutting Lead Pipe.

ARRANGEMENTS for charging accumulators from direct-current lighting

mains are simple, but when the supply is alternating some form of rectifier must be used, because one can charge only with D.C.

The simplest and cheapest form of rectifier for the purpose is the Nodon valve; though quite satisfactory, it appears to have fallen somewhat into dis-

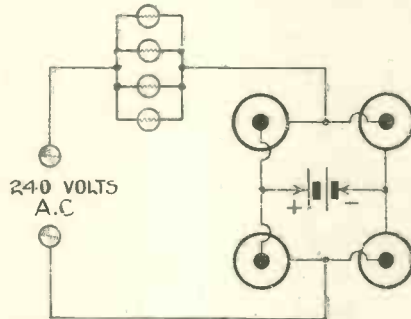
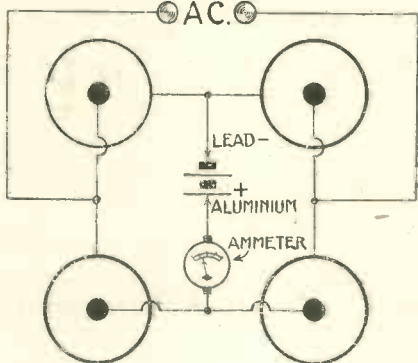


Fig. 4 (left).—Cell Connections.

Fig. 5 (above).—Resistances in Mains.

Whitworth nuts. Drill the  $\frac{1}{16}$  in. diameter rods also to take the eight wooden plugs which are for centering these rods in the lead pipes.

With a hacksaw cut the lead pipes as shown in Fig. 2 so as to leave two lugs  $1\frac{1}{2}$  in. long, and cut circulation holes as shown. Slot and drill the pieces of wood to receive the leaden lugs (Fig. 3), bending the lugs over as shown, one being fitted with

- 4 lengths aluminium rod,  $\frac{1}{4}$  in. dia. and  $4\frac{1}{2}$  in. long.

- 4 Leclanché jars, 3-pint size (about  $4\frac{1}{2}$  in. sq. and  $8\frac{1}{2}$  in. high).
- 4 pieces lead piping, 8 in. long and  $\frac{3}{4}$  in. dia.
- 8 hard-wood pegs, the length of the internal diameter of the lead piping and  $\frac{1}{4}$  in. dia.
- 4 lengths rubber tube to cover  $\frac{1}{4}$  in. aluminium rods.
- 4 pieces of hard wood,  $\frac{1}{2}$  in. wide by  $\frac{3}{4}$  in. by  $4\frac{1}{2}$  in. long.

With regard to this wood, accept a word of warning. Do not use ebonite instead, in the hope of making a better job. Ebonite does not suit so well as wood, for reasons the writer has not discovered.

Drill and tap the  $\frac{1}{16}$  in. diameter rods to take the  $\frac{1}{4}$  in. diameter rods (Fig. 1). Screw the other ends for two  $\frac{1}{4}$  in.

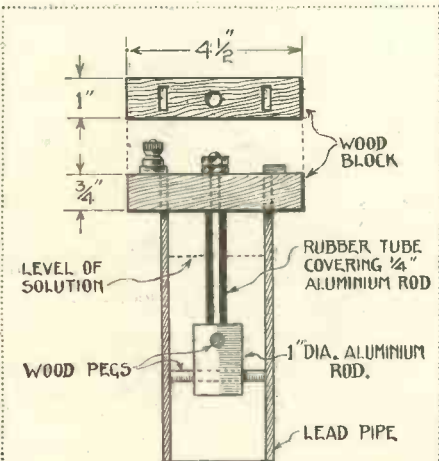


Fig. 3.—Assembly of Cell.

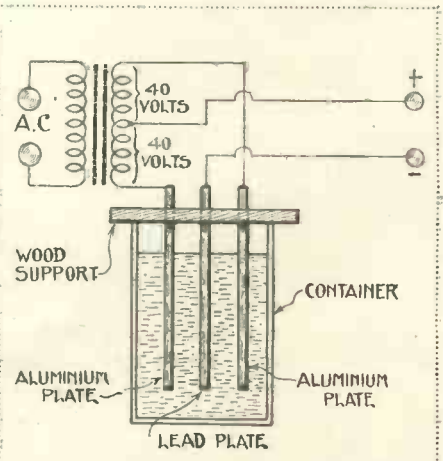


Fig. 6.—One Rectifier Cell with Transformer.

## Charging Your Batteries from A.C. Mains (Continued)

a screw terminal and the other being used merely as a support.

The electrolyte must be prepared from chemically-pure ammonium phosphate,  $\frac{1}{2}$  lb. per pot being dissolved in enough water to fill each pot to the level indicated in Fig. 3. Ordinary tap water will serve.

Connect up the cells as shown in Fig. 4. The accumulator when on charge can be connected with its negative terminal to lead and its positive to aluminium. An ammeter can usefully be inserted in series with either terminal of the accumulator and its corresponding rectifier electrode, for observation of the charging rate.

Now comes the question of the supply voltage. A step-down transformer gives the greatest efficiency, but as a standard transformer for this purpose cannot be purchased the writer uses lamps or other forms of resistance in the A.C. mains, as shown in Fig. 5.

The lamps at present in use (for the voltage shown) are four 200-volt

250-watt carbon lamps of the sausage type, as used in glowlamp radiators. The resistance is, of course, varied to suit the particular accumulator being charged.

The rectifier described will operate

### YOUR QUESTIONS ANSWERED

*At some time or other you are certain to come up against some difficulty in wireless that you cannot solve unaided.*

*Instead of worrying yourself with knotty problems, let the Technical Staff of the WIRELESS MAGAZINE answer your questions for you.*

*Write your question on one side of a piece of paper, attach to it the coupon on cover iii and send it, with a stamped addressed reply envelope, to The Editor, WIRELESS MAGAZINE, La Belle Sauvage, E.C.4.*

at 2-3 amperes output, and has even been run satisfactorily for several hours at 5 amperes output, though with too much heating.

A curious point about this heating effect was observed which may tempt

readers to hazard experiments and theories. It was found that if the accumulator was switched off while the pots were very hot it was impossible to start charging again until 15-20 minutes of cooling had elapsed, otherwise *the current was reversed*.

If a transformer be preferred to resistances, each half of the secondary should deliver about 40 volts (see Fig. 6).

Further, when a transformer is used it is advisable to have only one double-wave rectifier, of about 3-pints capacity (Fig. 6). Although the transformer method is the more efficient it will be found that regulation of the charge is much more stable when four rectifier pots are used with a resistance in the mains.

The single-pot rectifier is made up of one leaden plate and two aluminium plates, taken through slots to screw terminals in a piece of hard wood which rests across the top of the pot. Suitable dimensions for these plates are 4in. long by 2in. wide.

E. BLAKE.

### Dr. E. E. Fournier d'A'be Explains—

## HOW THE MOON AFFECTS TRANSMISSION

THAT the changes of the moon have any perceptible effect upon the weather is a fallacy which has been exploded long ago. But it is by no means certain that the moon has no influence upon wireless transmission.

### Properties Besides Light

Moonlight itself, being only one-millionth of the intensity of sunlight, can have no perceptible effect analogous to that of sunlight. But there are other properties of the moon which may come into play.

Professor Marcel Brillouin, of the Collège de France, pointed this out at a recent meeting of the Paris Academy of Sciences.

The density of the moon is 3.3 times that of water, and is therefore about the same as the density of the earth's crust.

There is every reason to suppose that the material of the moon is derived from the earth, and consists of the same elements.

It must, therefore, contain uranium, thorium, and all their progeny of radio-active elements, including the "emanations," which are really gases in a state of radio-active disintegration.

Now the behaviour of these emanations must be affected by the enormous changes of temperature undergone by our satellite month by month. The dark side of the moon falls to the neighbourhood of the absolute zero of temperature, which is at some 460° of frost.

When the sun shines overhead the temperature must, in the absence of an atmosphere, rise to somewhere near the boiling point of water. The distribution of the radio-active gases

must be profoundly influenced by these changes.

The helium atoms and electrons given off by them, as well as the penetrating radiations, may well reach the earth's atmosphere in a little over a second. They will then contribute to the ionisation of our atmosphere and the density of the Heaviside layer.

### Discoverable Effect

This effect should be quite discoverable by careful systematic observations. Not only would wireless transmission be affected by moon-rise, but the earth's magnetism and the absorption of starlight should also show some effect.

Such observations could then be supplemented by laboratory experiments on the light fusible silicates of which the moon probably consists.



# The COSMOPOLITAN NINE



A  
THREE-  
UNIT  
SUPER-  
HET

3—The  
Low-  
frequency  
Amplifying  
Unit

*Although specially designed for the Cosmopolitan Nine this unit is suitable for use wherever an amplifier is needed*

**I**N this article we are describing the third and last unit which completes the nine-valve super-het which we have called the Cosmopolitan Nine. This unit consists of a two-valve low-frequency amplifier, the first stage of which is transformer and the second stage resistance-capacity coupled.

The only control on the panel is a filament rheostat which adjusts the filament current of both amplifying valves. Immediately below this control is a two-point jack into which the loud-speaker is plugged. The filament rheostat forms a convenient volume control.

By using a good make of transformer followed by a resistance-capacity unit the best reproduction of speech and music is obtained.

A resistance-coupled valve will amplify nearly every note with a

constant amplification, and it should therefore be seen that a transformer is used which has similar qualities, although there is no transformer made which will give such constant amplification as the resistance coupling.

The transformer, however, will give much greater total amplification than the resistance method, and that is why we have used one stage.

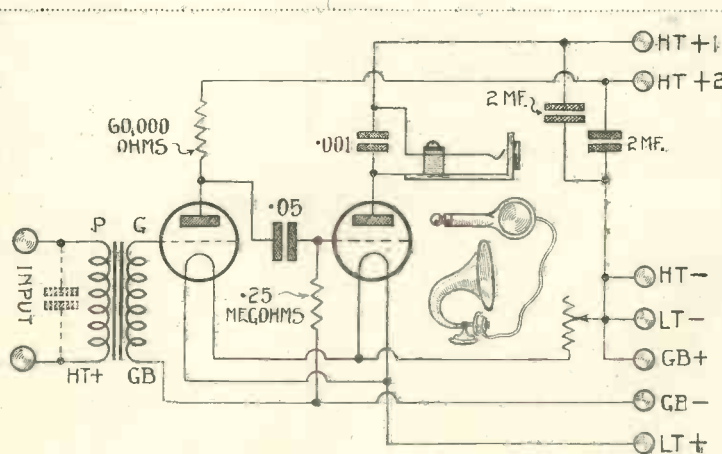
It is essential that a good loud-

speaker is used if the amplifier is to be given a fair chance. The best amplifier cannot convert a poor loud-speaker into a good one. This fact is overlooked by many who give every care to the making of a good set and spoil it by buying an inferior loud-speaker.

Returning to the amplifying unit, let us study the circuit diagram. It will be seen that the two input terminals are connected to the primary terminals of the transformer, and, when wiring up the unit, it should be seen that the plate of the detector valve in the second unit is connected to the terminal of the transformer marked "plate" in this unit.

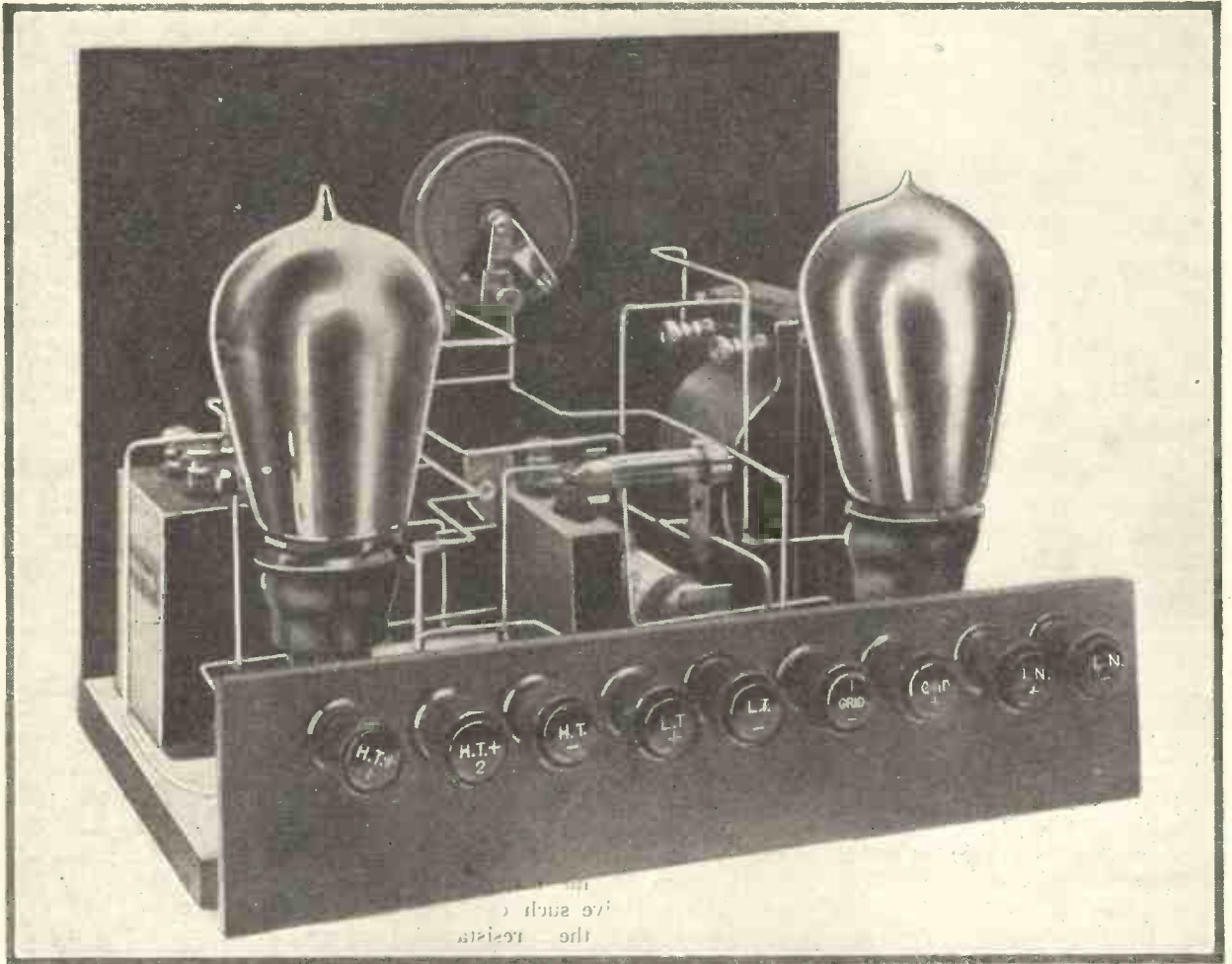
The secondary terminals of the transformer are connected to the grid of the first amplifying valve and to a common negative grid-bias tapping.

In the plate circuit of the first valve the wire-wound resist-



Circuit Diagram of the Amplifier Unit.

## The Cosmopolitan Nine (Continued)



Photograph showing Disposition of Components in the Amplifier Unit of the Cosmopolitan Nine.

ance is inserted, and the coupling condenser between the plate of this valve and the grid of the last valve prevents a high positive potential being applied to the grid while, at the same time, it allows the passage of low-frequency oscillations.

#### Low Capacity Best

The size of this condenser is not critical, and it is good practice to keep the capacity at as low a value as is consistent with good results. We have used one having a capacity of .05 microfarad.

Two H.T. + tappings are provided, enabling the correct voltage being applied to the plate of each valve. Each H.T. + tapping and H.T. — is shunted with a 2-microfarad fixed condenser.

The grid leak, connected to the grid of the last valve, should have a lower

resistance than is usual with H.F. work. To some extent the value depends on the capacity of the coupling condenser, but the actual value is not very critical, and a leak having a resistance of .25 megohm (250,000 ohms) will be found satisfactory.

All the components needed for the amplifier are given in the following list:—

Ebonite panel, 9in. by 7in. (Radion or Becol).

Baseboard, 9in. by 5½in. by ½in., and cabinet (Unica Cabinet Co.);

30-ohm filament rheostat (Lissen or Ormond, G.E.C., Penton, R.I., etc.).

L.F. transformer (Ferranti A.F.3 or Marconiophone).

2 baseboard-mounting valve holders (Magnum or Benjamin, Lotus).

60,000-ohm wire-wound anode resistance (Varley or Dubilier, Mullard).

.25-megohm grid leak (Dubilier or Mullard, Ediswan).

2 2-microfarad fixed condensers (Dubilier or T.C.C.).

.05 - microfarad fixed condenser (Dubilier or T.C.C.).

2-point jack and plug (Bowyer-Lowe or Igranic).

.001-microfarad fixed condenser (Wates or Mullard, Dubilier).

9 engraved terminals (Belling and Lee).

Ebonite terminal strip, 9in. by 2in.

NOTE.—The particular components shown in the photographs and allowed for in the dimensioned layout are in each case mentioned first.

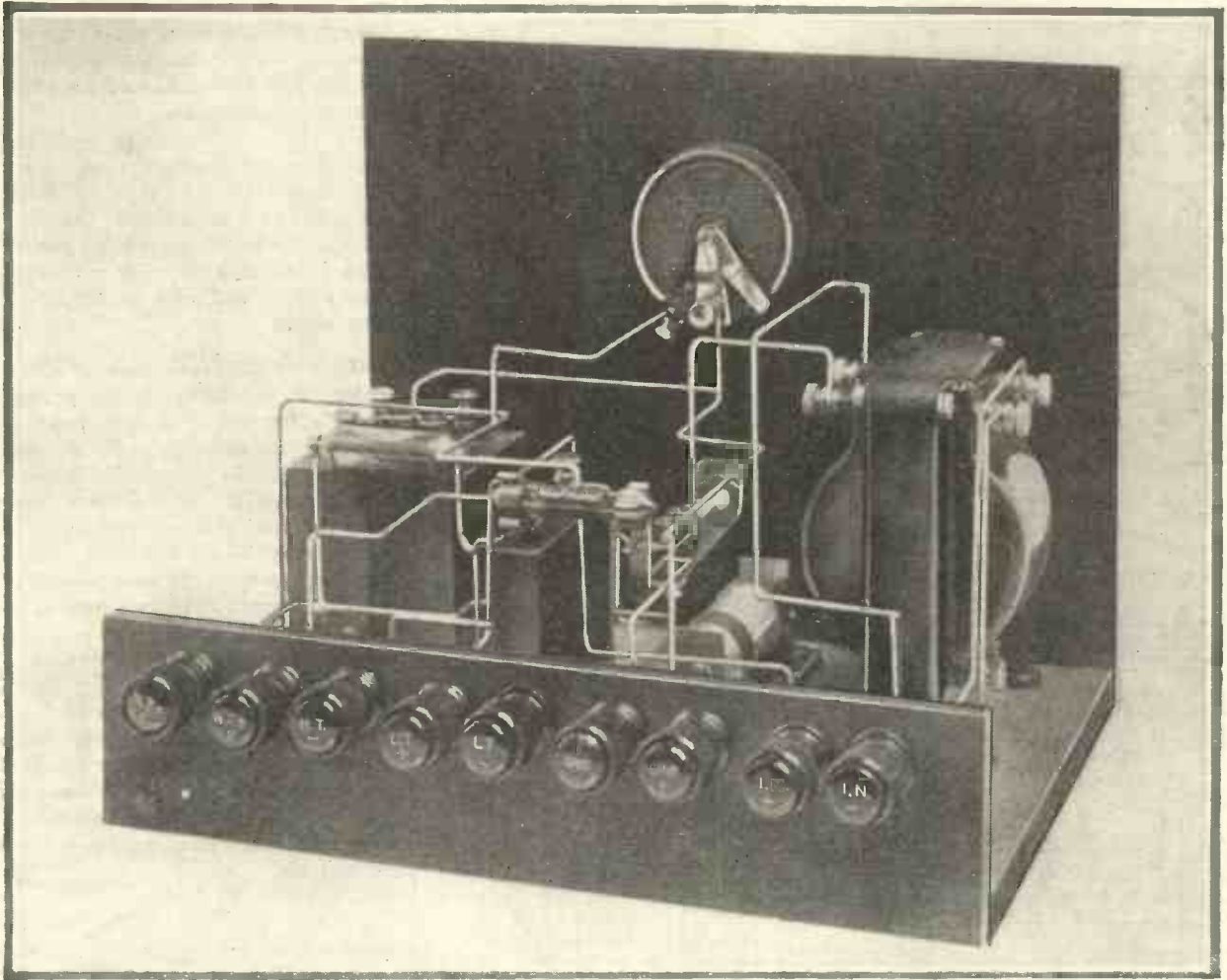
Four holes only are to be drilled through the panel, one for the filament rheostat, one for the jack and two for fixing the panel to the baseboard. The dimensions of the holes and their positions are clearly indicated in the wiring diagram.

#### On the Baseboard

On the baseboard the transformer is mounted on the right (looking at the back) and the two 2-microfarad fixed condensers on the left. The



## A Special "Wireless Magazine" Design



Another Photograph showing the arrangement of the Amplifier Unit of the Cosmopolitan Nine.

two valve holders are mounted directly in front of the transformer and fixed condensers and close to the back edge of the baseboard, while the anode resistance, coupling condenser and grid leak are seen between these components, in the centre of the baseboard.

Along the back edge of the baseboard the terminal strip is mounted, carrying the nine terminals. Reading from left to right these terminals are as follows:—H.T. +1 (supplying the last valve), H.T. +2, H.T. -, L.T. +, L.T. -, grid bias -, grid bias +, input +, input -.

Wiring is quite simple, and should be tackled in conjunction with the wiring diagram. This diagram is sufficient in itself, and any explanation as to how the wiring is carried out is superfluous.

The grid leak should be fitted into

two metal clips and the connecting wires should be soldered to them.

If thick-gauge wire is used for connecting purposes there is no need to fix the grid leak either to the panel or baseboard.

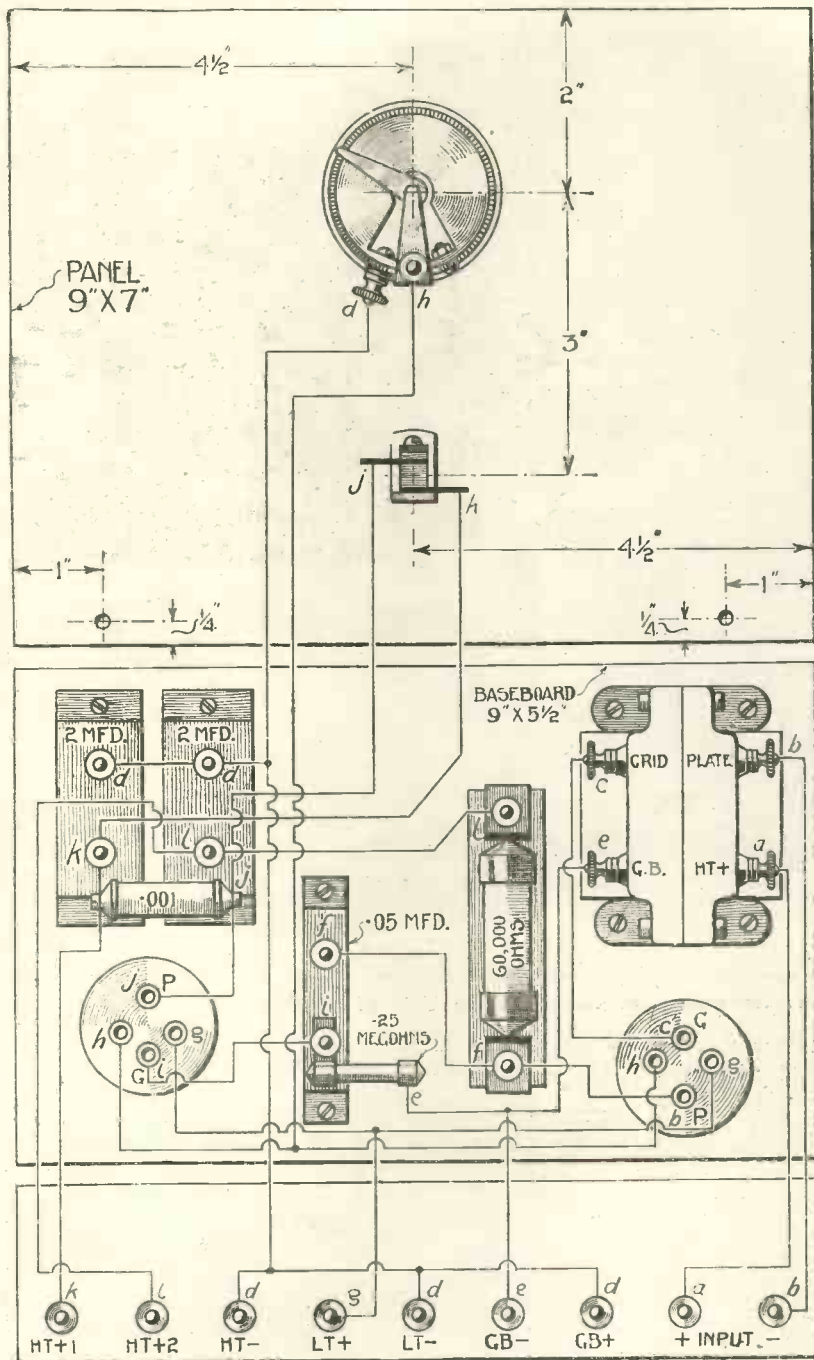
The wiring itself is sufficient to hold it in place.

In any case the connecting wires must on no account be



Completed Amplifier Unit.

## The Cosmopolitan Nine (Continued)



Combined Panel Layout and Wiring Diagram of the Amplifier Unit of the Cosmopolitan Nine.

soldered direct to the metal clips of the leak itself or the latter may be damaged.

The small .001-microfarad condenser shunted across the loud-speaker jack may also be held in position by the wiring.

The next point is the important

one of the choice of valves. For a 6-volt accumulator the constructor can do no better than use the Osram or Marconi DE8 L.F. followed by a DE5A or an LS5A for the last stage.

For a 4-volt accumulator we can recommend the Mullard PM<sub>4</sub> and

DP<sub>425</sub>, whilst with a 2-volt accumulator the Cossor Stentor valves or the Mullard PM<sub>1</sub> L.F. and PM<sub>2</sub> will give excellent results.

The H.T. voltage which will be applied to the plates of these valves will depend on the type of valve used, but we recommend the constructor to buy a 120-volt battery tapped in steps of 2 or 3 volts—this will be sufficient to supply all nine valves.

### Accumulator H.T. Advisable

An accumulator H.T. battery should, if possible, be used, but if a dry-cell type of battery is obtained one of extra large capacity is practically essential. It will be realised that the total plate current of nine valves may be considerable, adding with certain valves to something over 50 milliamperes (.05 ampere), a current which would put considerable strain on a small dry battery.

Although this unit has been designed primarily for the Cosmopolitan nine it can be used with almost any type of receiver provided the latter does not already possess two stages of L.F. amplification. The unit is an ideal amplifier for a crystal set.

Assuming that the two units previously described are by now in good working order all that remains to be done is to connect the output terminals of the second unit (containing the I.F. and detector valves) to the input terminals of this unit.

Make sure that the plate of the detector valve of the second unit is connected to the "Input -" of the third unit.

### Inserting the Valves

Insert the valves, turn the rheostat till the filaments reach a suitable temperature, and tune-in any station on the first unit. Now adjust theappings on the H.T. battery and the grid-bias battery until the maximum volume is obtained together with a minimum of distortion.

Reproduction should be exceptionally clear and free from distortion, and provided that good use has been made of the time during the last two months to perfect the first two units, the result should be a nine-valve receiver which brings in every station with ease, volume and true reproduction.



# How Radio Helps Sport

RADIO helps sport in the same way that it helps any other branch of human activity—by making its appeal wide reaching. Indeed, properly directed, broadcasting could easily become the most potent factor in the encouragement of sport.

## Listening to Talks!

Even those who dislike sport listen to talks about it—such a large number of people are psychologically incapable of switching off their receivers for five minutes even when a talk that is intolerably boring (to them) is being broadcast! In time the talks are first taken as a matter of course (that is, they are not actively resented), and later they are listened to with real interest.

In almost every other country that has an organised broadcasting service sport takes a more important part in the programmes than it does in England. I do not refer only to the broadcasting of talks on sport, but to the instantaneous transmissions of actual events or of a "running" description by a qualified broadcaster.

Such broadcasts are in a state of highly organised develop-

ment in the United States, for example, and "running" descriptions of sporting events are a popular part of many programmes; they provide people who are unable to see the event for themselves with the

next best thing—an accurate account by an expert observer on the spot.

English listeners who made special efforts to do so were able to pick up most of the broadcast of the Tunney-Dempsey fight—an occurrence that is proof in itself that radio does help sport by widening its appeal.

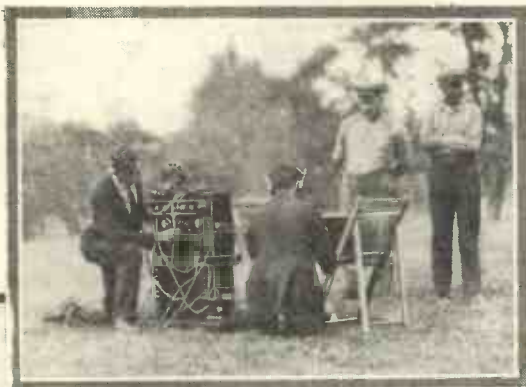
Andrew White, a well-known American sports announcer, getting ready to broadcast the story of a baseball game.



tion of the thing as it goes on) must lead many people to see future events for themselves rather than merely hear them. And anything that encourages an active interest in sport can be said to help it. In any case, it is much more satisfying to hear a thing than merely to read about it.

What a pity it is that the B.B.C. cannot broadcast "running" descriptions of important sports events in England. It is strange that we, who are more interested in sport than any other nation, have almost the poorest sports broadcast service in the world!

BM/PRESS.



Moreover, by means of talks and instantaneous broadcasts not only is new sports talent encouraged, but enthusiasts who are no longer in the first flush of youth are kept in touch with a world from which they would otherwise be shut out.

The mere fact of listening to the broadcasting of a sports event (even without a descrip-

## BROADCASTING SPORTS EVENTS

Thousands of people who were unable to witness the Yale-Harvard boat race rowed on the Thames River, near New London, Connecticut, in June, heard Douglass Rigney broadcasting a description from the course; the photograph on the left shows him talking into a microphone connected by wireless to station WRMU.

The picture above shows American engineers testing an amplifying outfit for the broadcasting of the description of an important tennis match direct from the courts:

# Sandy's Wireless Party

A dinna think thae cookies wull stau mair than three days afore they petrify.



A Wireless Story by  
**RICHARD CAROL**

Illustrated by  
**WILL OWEN**

Maggie. In the furrst place A dinna think thae cookies wull stau mair than three days afore they petrify, an', in the second, we maun hae a representative program."

Sae A lookit up the paper an' got a guid all-roon kind o' affair, illustratin' furrst-class music, common musical coamedy sort o' stuff, philosophy, an' aagriculture.

Then A went roon tae about a dizen o' the non-wireless inhaabitants o' Clumtochty an' requested the pleasure o' their society tae *light* refreshments, music, an' entertainin' coanversation.

Wad ye believe it? They a' accepted a'most afore the yurds were oot ma mooth. A was awfu' pleased wi' ma success, an', on ma way hame, A estimated the proafit on the entertainment, aifter deductin' the cookies, etsaytera, at cost price, at no less than five pun.

They a' duly arrived, an' Maggie, followin' oot the instructions A had read oot o' the wee book on etiquette, received them maist deegnified an' sat them doon on chairs, for the furrst few, an' the coonter frae the post-oaffice on twa soap-boxes for the later arrivals.

Straicht A cud see yin or twa castin' anticipatory glances at the dresser where the light refreshments were tastefu'y arranged; but A ignored the implication.

"Noo," A explained, assumin' a coanfident an' experrt aatitude, "A'm gaun tae illustrate tae ye the wunner o' wireless an' its mony advantages. Ye see A juist turrn up the lights an' rotate thae two discs wi' a simultaneous movement, an' . . ."

An' there was a maist awfu' howl. They lookit at ane anither, an' A felt the openin' paragraph had missed. Hooever, A turned on the

**T**HERE'S mony a mysterious ebullition o' concatenatin' circumstances, as oor young meeinster maist beautifully remarrked the ither Sawbath. Which is a rale guid moothfu' tae starrt wi'. An' though at furrst A pit it doon juist because o' its inherent beauty, A see noo that it's a maist appropriate beginnin'.

The concatenatin' circumstances aforementioned were: (1) lemonade that had loast it's ebullition (see above), no' mysteriously, but through the passage o' time; (2) some cookies I cudna dispose o' at ony price; an' (3) a tin o' preserved frooit that A was feart was no' sae guid as it micht hae been.

A accordin'ly suggested tae Maggie that tae encourage the wire-

less department o' ma flourishin' establishment in Clumtochty, an establishment which, A may say wi'oot boastin', hasna its equal in the village (it bein' the only shop), A wad gie a bit party an' invite poossible customers alang tae demonstrate the wunners o' wireless an' persuade them, wi' the gentle taact sae symptomaatic o' the McNabs, that nae hoos is hame wi'oot a wireless set, purchasable coomplete at Sandy McNab's, general proveesion merchant an' wireless experrt.

"Thaat's a rale guid idea," said Maggie. "Mebbe A'll hear a bit music for yince."

A ignored her implied sarcasm, an' continued tae expound ma ggreat idea.

"We'll hae tae be carefu',



aerial an' resumed ma flow o' oratory.

"We are noo listenin' tae the agricultural report. Angus McPhee, ye'll nae doot be interested tae hear that faat soos are sellin' at a shillin' the pun."

"A'm no'," said Angus, "A' hae nae use at a' for soos."

This was no' a'thegither accordin' tae plan; but A juist smiled guid-naturedly an' let the coanversation become general for a few meenits.

Then a bit o' a concert was wafted tae their astoanished ears; an' A cud see they were clearly affected. The furrst item was ca'ed a "violin solo."

"Is it no' juist fine?" A murmured tae the assembled coangregation.

"Och," said Miss McCosh, "it's only a skirlin' wee cockie-bendie fiddle at a'."

But the ithers were muckle impressed.

Next there was a bit o' oratory frae a big denner what was bein' held in Glesgae.

The chairman got up and made a few verra laudatory remarrks about the society, an' finally proposed its health, which was greeted wi' aacclamation. We cud hear the clinkin' o' glasses an' the cascadin' o' the liquor. Och, it was awfu'.

For Tammis McKay startred smaackin' his lips in a maist indecently suggestive mainer, an' the ithers took him up an' startred tae fidget an' cast maist pointed regards at the dresser wi' its edible garnishin's.

Sae A nodded tae Maggie, an' straicht the atmosphere brightened. They a' were maist obleegin' wi' their "ayes," an' accepted wi' nods o' unnerstandin' ma explanation that the drink was ca'ed "still" lemonade an' was verra poapular at a' the big dances in Glesgae.

A' this time the music was continuin', but ye cudna hear muckle owin' tae the snappin' o' the cookies.

When the edible garnishin's had entirrely disappeared, A endeavoured to draw their thochts, which had been preVIOUSLY distracted, intae mair profitible channels.

"Noo, you see," A declaimed, "the great advantages o' this moaderen product o' human trial an' endeavour. You, Miss Kirsty, can learn hoo tae kill the slugs that eat up hauf yer gairden."

"But, Meester McNab," said Kirsty, "A can dae thaat fine wi' a shovel wi'oot bein' tellt."

"Och," A retorted, "A was juist gie'in' ye an exaample." Then A carried on quick as quick, for A didna want ma illustrations coantra-dicted, "You, Miss Anderson, wad juist rejoice in the wee talks on philoasophy (that yin went doon fine). Again, there's the fairy stories for the bairns at a suitable hoor, educational talks for them wha desires, as ye a' aucht tae desire, mental uplift. There's music o' a varrieties. In fac', there's nae braanch o' arrt, or literature or science or . . . or onythin' else, that's no' dealt wi' by the wurld's best exponents. (A got that oot yin o' the papers.) A micht point oot that A'm an expertt masel, an', as we're

a' guid freends, A'll fit ony o' ye up for—a verra reasonable sum."

Hereupon Miss McCosh adjusted her bonnet, an' said:

"Weel, thank ye kindly, Meester McNab, an' A'll be awa'."

An' the ithers followed, juist fa'in' ower theirsels. A' except Miss Kirsty, wha hung baack.

"Weel," A said, smilin' tae masel in aanticipation, "is there onythin' A can dae for ye?"

"Aye," she said, saftly, an' A smiled again.

"Dae ye think ye—ye—cud ask me in ae night when they're playin' the uleleke. A've read about it—an' A wad juist lo'e tae hear it yince."

Ma net loss on the party, calculatin' the refreshments at cost, was yin an' fowerpence happenny.

# WAVELETS

A DICTIONARY tells us that a "fan" is something that gets the breeze up. Especially in Kilmarnock, when the authorities announce a new anti-pirate campaign.

A WOMAN prisoner who escaped from jail has been recaptured through the agency of radio. Her husband is understood to have become an enthusiastic convert to wireless.

## WHEN YOU ARE IN TROUBLE—

*do not forget that the Technical Staff of the WIRELESS MAGAZINE is always at your service to help you out of your difficulty and put you on the right path.*

*If you want advice on buying a set, address your query to the Buyers' Advice Bureau, not forgetting to mention how much, roughly, you wish to spend, where you are situated, what stations you wish to receive, and whether you intend to use phones or a loud-speaker for listening-in.*

*In all other cases, address your letters to The Editor, and not to the Buyers' Advice Bureau. Our address is the WIRELESS MAGAZINE, La Belle Sauvage, E.C.4.*

*When sending a query, write on one side of the paper only, and do not forget to enclose the coupon on page iii of the cover and a stamped addressed envelope for a reply.*

FRENCH listeners are having a periodical talk entitled "Financial Notes." Promissory Notes, we suppose, as usual.

THOUGH wavelengths are always in metres, most aeriels are still in yards.

THE ex-Maharajah of Indore has had a wireless set installed. No doubt with an indoor aerial.

A WOMAN listener complains that the B.B.C. talks on poultry make no appeal to her. Obviously she is one of the few women who don't go to hen parties.

ONE of the Continental stations has broadcast a lecture on work. Some people think we get too many talks on these theoretical questions.

INMATES of lunatic asylums are now provided with wireless sets. And so are ordinary oscillators, worse luck!

A D.X. enthusiast complains that many of the American programmes are rather dull. Surely he does not expect much spirit in them under Prohibition.

No other country can touch Britain at wireless, says a politician. But they all seem able to "touch" us where money is concerned.

If you are thinking of buying a set, you should read carefully the "Guide to the Best Valve Sets" on page 346.

# What Are Series & Parallel Connections?

*An Easily-understood Article for the Beginner*

THE precise significance of a "series" as distinct from a "parallel" connection sometimes gives rise to unsuspected difficulty, such as, for example, when it becomes necessary to compare the result of

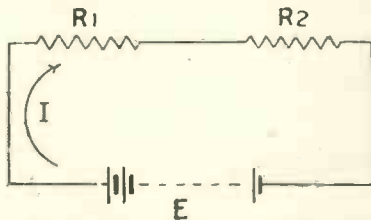


Fig. 1.—Two Resistances in Series.

connecting two resistances or two condensers in one or other of these ways.

There is something distinctly anomalous and confusing in the fact that the effective resistance of two resistances in parallel is less than each individual resistance, whilst the resultant capacity of two condensers in parallel is the sum of their separate capacities.

At first sight the beginner is naturally inclined to consider a series connection as similar, say, to a team of horses drawing a vehicle in tandem, whilst he similarly compares a parallel connection to a team hauling side by side.

On this reasoning it appears that the result should be much the same whichever arrangement is adopted. But in point of fact the result obtained by a series connection in electrical circuits is always very different to that of a parallel arrangement.

## Series Resistance

Considering the case of two resistances,  $R_1$  and  $R_2$ , arranged in series as shown in Fig. 1, the important point to note is that the same current ( $I$ ) must flow through both the resistances. The voltage across the resistance  $R_1$  is by Ohm's law  $R_1 I$ , and that across  $R_2$  is  $R_2 I$ , and the sum of these two voltages must be equal to the applied battery voltage  $E$ .

Consequently  $E = I (R_1 + R_2)$ ; or in other words the resultant resistance is  $(R_1 + R_2)$ , the sum of the separate resistances.

If, now, the resistances are connected in parallel, as shown in Fig. 2, we cannot assume that the currents are the same in both, although it is evident from the diagram that the same voltage  $E$  from the battery is applied across both. Applying Ohm's law to the resistance  $R_1$  we know that  $E = I_1 R_1$ , whilst for the resistance  $R_2$ , the same battery voltage,  $E = I_2 R_2$ .

Now the current  $I$ , supplied by the voltage source  $E$  must be the sum of  $I_1$  and  $I_2$ . Therefore

$$I = I_1 + I_2 = E \left( \frac{1}{R_1} + \frac{1}{R_2} \right).$$

Adding the two fractions

$$I = E \left( \frac{R_1 + R_2}{R_1 R_2} \right), \text{ or } E = I \frac{R_1 R_2}{R_1 + R_2}$$

The effective resistance is therefore the product of the two separate resistances divided by their sum.

Comparing the two arrangements it will now be seen that for the

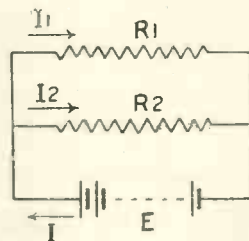


Fig. 2.—Two Resistances in Parallel.

series connection, Fig. 1, only a fraction of the applied voltage  $E$  is available for driving the current through  $R_1$ , the remaining fraction being spent in driving the same current through  $R_2$ . Consequently the net current must be less than if either  $R_1$  or  $R_2$  were connected separately across  $E$ .

With the parallel connection of Fig. 2, however, the whole voltage  $E$  is connected across both resistances. If the source  $E$  is capable of maintaining its voltage constant, each resistance carries as much current as if it were connected alone across the source  $E$ , and the total current taken is therefore greater than either would be taken separately.

The two methods may be compared with crowded traffic passing along a road. Fig. 1 merely adds a second restricted passage  $R_2$  to the existing

narrow road  $R_1$ , and thus impedes the flow of traffic. On the other hand in Fig. 2 a by-pass road  $R_2$ , is made available, thus diverting some of the total traffic and relieving the congestion on the road  $R_1$ .

So far, the voltage source  $E$  has been taken to be direct, but the result is precisely the same if the source is alternating, provided that the resistances are non-inductive. In this case the traffic must be considered as moving to and fro, each vehicle reversing its direction at periodic intervals.

## Series and Parallel Impedances

Turning now to the more difficult problem of impedances connected in series and parallel across an alternating voltage source, we will first consider the case of inductance coils, and to avoid complication it will be assumed that the coils have no appreciable ohmic resistance.

Such coils offer very small obstruction to the direct or continuous flow of electrons set up by a battery connected across the coil. But the electron stream in such a coil has very decided objections to making sudden stoppages and reversals, such as are caused by the application of an alternating voltage. The more rapid the alternations of voltage, the greater this objection becomes.

In fact the "choking" effect is proportional to the inductance  $L$  of the coil, and if two coils of inductance  $L_1$  and  $L_2$  are connected in series, so that all the alternating current has to pass through both coils, the total resultant inductance is  $L_1 + L_2$ , the argument being

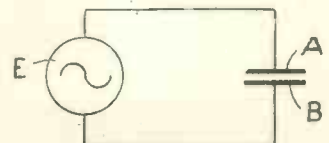


Fig. 3.—Condenser Across a Source of Fluctuating Voltage.

precisely the same as with resistances.

Similarly if one of the coils acts as a by-pass to the other, that is, in parallel with it, then the resultant inductance (just as with resistances) is less than either separately, being



equal to the product divided by the sum of their separate inductances ( $L_1 L_2 \div L_1 + L_2$ ).

When a condenser is placed in an alternating current circuit as shown in Fig. 3, the action of the source E is to drive electrons into the upper plate A by withdrawing them from the other, B, and *vice versa*.

### Voltage Difference

During the half-cycle in which electrons are flowing into the upper plate A, that plate becomes negatively charged relative to the lower plate B, and a voltage difference is created between the plates. This builds up until the voltage difference is the same as that applied by the source

E, whereupon there is a balance of voltages and the current momentarily ceases.

This stage is followed immediately by the withdrawal of electrons from the upper plate as the applied voltage is reversed.

Now the number of electrons that are required to raise the voltage on the condenser to the same value as the applied voltage is proportional to the size or capacity of the condenser. Consequently the greater the capacity, the greater is the electron flow or current.

In other words the impedance or choking effect of a condenser is small when its capacity is large, and *vice versa*, for a given frequency. This

result is the direct opposite of what happens in the case of an inductance coil, where, as we have seen, the choking effect is in direct ratio to the inductance of the coil.

### Series Capacities

When, therefore, two condensers are connected in parallel, their effective capacity is increased to  $C_1 + C_2$ , and the impedance of the combination is correspondingly reduced. Finally when two capacities are connected in series, the effective capacity of the combination is less than either taken separately (being equal to  $C_1 C_2 \div C_1 + C_2$ ), whilst the effective impedance of the system is increased.

M. A. L.

## WHY YOU SHOULD USE SQUARE-LAW CONDENSERS

QUITE a number of those who build short-wave receiving sets do not, I am sure, realise the great advantages of the square-law variable condenser when properly used. This advantage comes from the fact that this form of condenser does not give straight-line tuning.

### Dials and Wavelengths

If dial readings are plotted against wavelength on a large scale on squared paper, it will be found that at the beginning of the scale a large movement of the condenser will give a small wavelength change. This is the exact opposite to the ordinary form of condenser, where, at the beginning of the scale, a small movement of the condenser gives a large wavelength change.

With the square-law type the straight-line tuning starts somewhere about the tenth division in a scale graduated to 100 divisions, and continues to about the eightieth or ninetieth division.

To take full advantage of this characteristic for short-wave reception, a small-capacity condenser should be used and the inductance so arranged that the most used part of the condenser scale is the low-reading end. In my own receiver I

have arranged the coil so that with a good variable condenser of .0002 microfarad maximum capacity the tuning starts at 40 metres with the condenser dial set at 0.

The first eight divisions on the scale tune through one metre. The next metre is covered by about five

that a sharply tuned D.C. note spreads over a remarkably small frequency band.

One evening a short while ago I counted ten amateur stations working with D.C. notes between 44 and 45 metres. They were, all but two, well separated, and it was possible to read them all without interference. Then a French amateur, using raw alternating current, started up and seven of the ten D.C. stations were obliterated or rendered unreadable.

In the centre column is the table to which I refer.

TABLE OF WAVELENGTHS  
AND FREQUENCIES

Metres	Kilocycles
40	7,500
41	7,317
42	7,143
43	6,977
44	6,818
45	6,667
46	6,522
47	6,383
48	6,250
49	6,122
50	6,000

British amateur band 2 metres = 296 kc.

divisions, and then the straight-line tuning starts and the divisions are three per metre. Thus I have a very open scale, the more open part being where the frequency is highest.

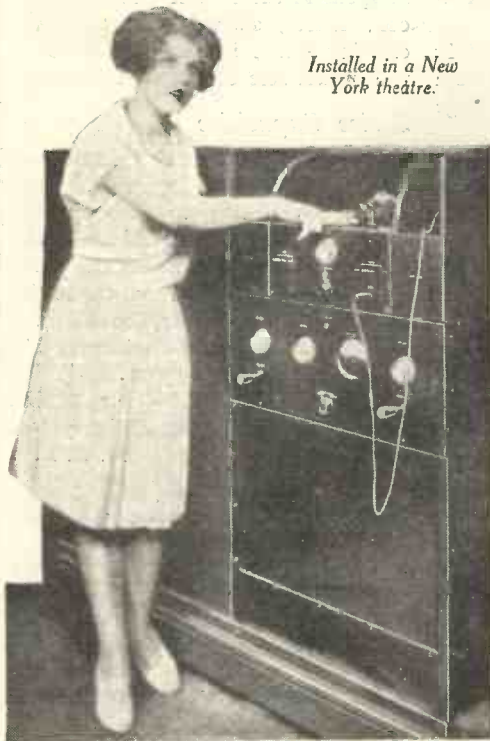
In this regard it is useful to look at a table showing the relationship between wavelength and frequency on these short waves, remembering

### Necessity for Open Scale

The necessity for using an open scale on the condenser will be understood when it is seen that though the British amateur band only covers two metres from top to bottom, it contains nearly 300 kilocycles. Therefore, in this band, well over a hundred morse stations, using pure and unmodulated C.W., could work without interfering with one another in the slightest.

On the other hand, only something over thirty telephony stations could be accommodated and only about two stations using the saw-edged A.C. that is inflicted on us by some continental stations.

5 Y M.



Installed in a New York theatre.

# The Chorus Girls' Electrical Voice!

"For the first time I am at last able to complement the splendid efforts of my chorus with incomparable voice renditions—thanks to science!" said Mr. Florenz Ziegfeld, the well-known theatrical personality.

"It is my belief that this marvellous device has untold possibilities as an accessory to the other scientific aids now in the hands of the modern theatrical producer."

**E**LECTRICAL lungs and throats of parchment will compose the theatrical chorus of to-morrow. At least, there is a good indication that the chorus of to-morrow will have to maintain only the high standard of beauty, grace, and good dancing which it has established—it need not have even a single voice! Electrical lungs will provide the breath for the parchment throat that will do the actual singing.

This revolutionary change in the theatrical art has been brought about by that enterprising *metteur-en-scène*, Florenz Ziegfeld.

After a number of years of research, in which the sciences of electrical, radio, and sound engineering were linked in a most remarkable way, out comes the "super-panatope," a means of recording and reproducing sounds that is so perfect that even trained dramatic and music critics could hardly tell the difference between it and the original at the first demonstration in New York recently.

The main problem the engineers had before them was perfect reproduction of voices at great power. Reliability of the apparatus came next, and perfect control by the orchestra leader followed.

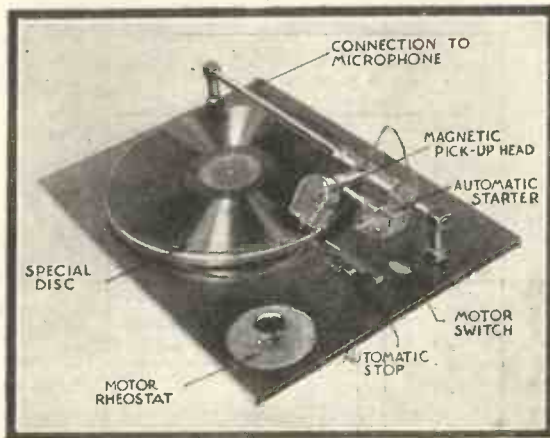
Great volume could be had by increasing ten-fold the power of an ordinary low-frequency amplifier of the type used by the average listener. Even this was insufficient, and a power increase of several hundred times was studied, and applied to the system. This overcame the rather large absorption of sound by the

The process of making the records is an interesting one. The speed and flexibility of the light rays do away with the purely mechanical process represented in the old-fashioned gramophone records.

A tiny aluminium cone,  $\frac{1}{16}$  in. in diameter, at the centre of a small curved plate facing the music, is the pick-up end of the apparatus. This drives a diminutive mirror, which oscillates more or less violently, according to the intensity of the sound waves. By thus oscillating, this mirror directs a series of light rays more or less concentrated on a small electric cell which controls another circuit, connected to a low-frequency amplifier, of the type used in wireless circuits.

It is this current, upon which variations of voice and musical frequencies have been superimposed, which controls accurately an electric tool cutting the serpentine groove in the soft wax record. In general appearance these records look like regular phonograph records; but they are far different in performance.

In the instrument, which is called by the engineers the "super-panatope," the records and driving mechanism are provided in duplicate to ensure positive performance. There are two units of everything—



The Record whence the Superpanatope gets its Music.

scenery, seats, carpet, and even the audience.

The finest vocal talent is used to make the master records in the quiet of the recording studio, the final polished performance being also recorded by means of a new light-ray process which ensures the registration of the most delicate shades of music and voice.



two records, two turn-tables, two magnetic pick-ups, two low-power amplifiers, two high-power amplifiers, two power sources, and two sets of reproducing cone "speakers."

### Synchronised "Pick-ups"

The two pick-ups are synchronised so that they are playing the same thing at the same time, and one record can be instantly shifted to the other without break.

The reproducing process is simplicity itself. The needle that follows the grooves in the record transmits the vibrations to a magnetic pick-up, where they are converted into electrical impulses varying as the intensity of the sound from the needle. It is an easy matter to amplify this electric current hundreds, or even thousands, of times, and conduct them to loud-speakers that will reconvert them into sound waves.

### Keeping Time

In actual working, an operator is in charge of the entire reproducing plant. He sets the records and the pick-up systems, and at a touch of the button from the orchestra leader's desk the apparatus is started. With the downward stroke of his baton the leader can direct his orchestra, and keep time with the "chorus girls" in a surprising manner.

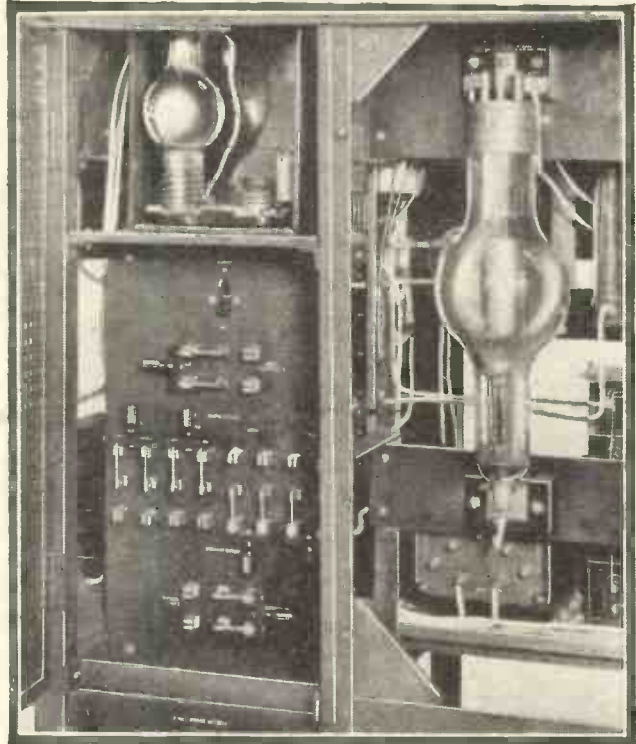
### Flexibility

The flexibility of the device is such that it can, at the will of the orchestra leader, supplement the orchestra, a solo, or

sing with the chorus according to plan. A volume control in the hands of the orchestra leader permits him to adjust it to any intensity from a whisper to a thunder roll!

Indeed, at a demonstration recently the rendition was so powerful that the music could be heard distinctly seven miles away! In the theatre, of course, the limit is never needed, although there is available at least a half-kilowatt of energy in the amplifier system alone.

Just think what a wonderful system this superpanatrope would make to hitch on to a small single-valve regenerator!



Part of the Superpanatrope Outfit.

### Dressing Up in the Studio

**M**ENTION of costume in the theatre reminded me how any broadcasting studio once again exemplifies the old truth, never believed by men, that women dress to please themselves as much as to attract the opposite sex.

I've noticed again and again that concert artists arrive at the studio to broadcast dressed just as showily and expensively as if they were mounting a concert platform in full view of a large audience. And I myself have never been able to go through the ordeal of broadcasting a ten minutes' talk without the moral support of wearing my very nicest outfit.

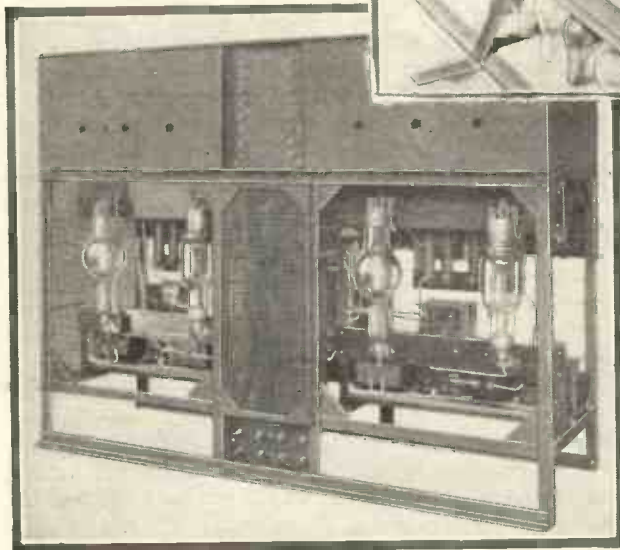
I suppose it is that the consciousness of looking one's best gives one self-confidence—the quality needed most of all before the microphone.

A. M. M.



(Above).—Under the netting are the electrical "voices"—two loud-speakers that are powerful enough to be heard seven miles away out of doors.

(Left).—A view of the Superpanatrope outfit, showing the rectifier and amplifier in duplicate.



You will be badly behind the times if you have not read "More About the 1927 Five"—it is the first article in this issue. Turn back to it now!



Wireless "Lighthouse" at the Entrance to the Firth of Forth; it was Built by the Marconi Wireless Telegraph Co., Ltd.

**T**HE time is rapidly approaching when the systematic erection of wireless "lighthouses" at numerous points along our coasts will have begun. Already there are two such "lighthouses" in constant operation at the entrance to the Firth of Forth and at South Foreland, in the Straits of Dover. Others will follow in due course as the system of transmission on which they are based becomes more and more perfect.

#### *South Foreland Installation*

The installation at South Foreland embodies certain technical processes which represent a marked improvement on the design of the Inchkeith installation in the Firth of Forth, and which are, in fact, chiefly the outcome of experience gained in the operation of the latter installation. No doubt the third "lighthouse" will be a still more efficient affair.

It should not be long, however,

before we arrive at a stage when further improvement in design may not reasonably be expected; or, at any rate, when the existing design will be such as to justify the erection of a wireless "lighthouse" at each of the many "danger points" with which our island coasts abound.

The function of the wireless "lighthouse" is, as its name suggests, to help ships to steer a safe course in the neighbourhood of land. This, of course, is what the ordinary lighthouse does: but whereas the latter is often rendered quite useless during periods of foggy, or very misty, weather, the former operates in complete independence of "visual" conditions.

In fact, it is only when the ordinary lighthouse is put out of action by bad weather that the wireless "lighthouse" is of any very great value.

The number of occasions on which this occurs, however, is considerably

greater than most people imagine, particularly during certain months of the year.

The wireless "lighthouse" at Inchkeith consists of a "reflector," an aerial, and the necessary electrical plant for charging the latter. The reflector is made up of a number of short vertical wires, arranged in the form of a parabolic curve, and the aerial is placed at the focal point of this curve.

#### *Concentrating the Waves*

The object of the reflector is, of course, to concentrate the waves (emitted by the aerial) into a narrow "beam." The whole system is rotated by special machinery.

When in actual operation therefore, the "lighthouse" sweeps the waters of the Firth of Forth with a rotating wireless beam, in much the same way as the ordinary lighthouse sweeps them with a beam of light



during normal periods of good visibility. It is interesting to remember that the fundamental nature of the transmitted waves is the same in each case. That is to say, both the waves that comprise the beam of light and the waves that comprise the wireless beam are ether waves.

The chief difference between them is *in length*. Whilst the former are sufficiently short to be capable of detection by that wonderful receiving apparatus *the human eye*, the latter are so long that they can only be detected with the aid of an artificially-constructed receiving apparatus.

### Principle of Reflection

The principle of the reflector is, of course, extensively employed in connection with all kinds of lighting systems. We need not go to lighthouses, searchlights, etc., to witness its application. Perhaps a more apt illustration is provided by the ordinary bicycle lamp.

A bicycle lamp is invariably fitted with some kind of reflector—usually a metal one. Apropos of this it is interesting to recall that Senatore Marconi's first experiments in connection with the transmission of wireless beams were conducted with curved metal reflectors.

Wireless waves and light waves being of the same fundamental nature it was natural to assume that they should lend themselves to the same method of reflection.

It was while conducting important researches during the late war that Senatore Marconi developed the wire reflector. As previously stated the reflector at Inchkeith consists of a number of short vertical wires, spaced at definite intervals apart and arranged in the form of a parabolic curve. (The actual length of the wires varies according to the wavelength used.)

It has been demonstrated, however, by recent experiments that better results can be obtained with the aid of "plane" reflectors. That is to say, instead of erecting the vertical wires in the shape of a curve, the reflector of the future will be flat.

It may be asked: How can a wireless beam render any more assistance to mariners than a beam of light during foggy weather, since both are equally powerless to make the coast visible?

This question can only be answered by a brief explanation of the very

ingenious method of signalling that has been devised for wireless "lighthouses." In the first place, when a "lighthouse" is in action the whole system revolves at a uniform speed.

### "Raised" Letters

As it does so, the base of the aerial makes contact with a large metal ring on the surface of which are "raised" letters in the morse code. These letters are set round the ring at regular intervals, and it is only when the aerial is in contact with them that the aerial current is automatically switched on and transmission takes place.

In other words, a series of letters is automatically transmitted as the system rotates through 360 degrees. Thus each letter represents a certain *direction* of the beam.

When listening-in for the beam, therefore, the operator on board ship hears a certain letter at regular intervals. He only hears *one* letter, —that is, the particular letter that is being transmitted as the beam sweeps past his ship. At any rate, he hears only one letter clearly. He may hear others faintly, as the beam sweeps *towards*, and *away from*, his ship. But there will be one predominantly loud letter, which will be his "key" letter.

Each ship carries a special kind of compass card, usually called a "bear-

ing corrector," which is fitted with two movable pointers. Letters, corresponding to those sent out for various angles of the beam, are printed all round the circumference of this card.

On receiving his "key" letter, the operator sets one of the movable pointers to the corresponding letter on the bearing corrector. After an interval he takes a second bearing, using the other pointer. The mid-point between these two bearings indicates his real bearing from the lighthouse.

Another application of this branch of wireless consists in the use of steady beams for the purpose of guiding ships and aircraft along definite routes.

### Parallel Beams

Two parallel beams, "playing" across the English Channel, for instance, would be invaluable to cross-Channel shipping during foggy weather.

Ships going in one direction would follow the path of one beam, whilst those going in the opposite direction would follow the path of the other, thus reducing the chances of collision to a minimum.

A practical development of this "safety first" device may be anticipated in the very near future.

M. E.

## TEN CABINET HINTS

- 1.—If you are a poor carpenter and want a handsome cabinet, buy one ready-made.
- 2.—Alternatively, buy the parts cut to size and put them together according to instructions.
- 3.—If you are not fastidious as regards the cabinet, or if the set is to be placed in a dark corner, it is wonderful what can be done with an ordinary sugar box. Sandpaper, floor stain and two coats of shellac varnish make an amazing difference; and, after all, the wood does not show much.
- 4.—Always buy the panel first and build the box round it. It is not safe to rely on the foot-rule.
- 5.—When sawing the wood, make each piece a trifle larger than it need be. It is easy to plane a bit off, but impossible to add any.
- 6.—Three-ply is quite suitable for the back of the set, and strips of three-ply make useful stops for the edges of the panel.
- 7.—Three-eighths wood is best for the bottom, sides and top, but if the set is to be of the American type, use stout wood for the baseboard, and see that it is not warped.
- 8.—Glue (or seccotine) and small "panel pins" make a neater job than screws or nails.
- 9.—Wood-beading is very cheap and gives a finish to edges that have not been very carefully planed.
- 10.—Meccano strips make useful supports for a vertical panel used with a baseboard.

H. P.



# A Combined Crystal Set and Wavetrapping

*Specially Designed, Built and Tested by the "W.M." Technical Staff*

**A** STUDY of the circuit diagram will show that this piece of apparatus is a very useful adjunct to the "gadgets" that every amateur possesses.

As a crystal set, the instrument will give excellent results and will serve admirably as an emergency receiver when the valve set is out of action. It can always be relied upon to give clear reception of the local station (or Daventry).

Because of the low-loss construction of the coils and condenser, the efficiency of the instrument is high, and it would be hard to find a crystal set to beat it from the standpoint of signal strength.

A feature that will appeal to many readers, however, is the use of the set as a wavetrapping when attached to a valve receiver.

## Cutting Out 2LO

For those who, living in London, find it difficult to cut out 2LO and tune-in another station, a solution to the problem of increasing the selectivity of their receiver will be found by connecting the aerial to the aerial terminal on the crystal set and the earth terminal on the latter to the aerial terminal of the valve receiver, at the same time switching the crystal detector and phones out of circuit.

By tuning the coil of the crystal set to the wavelength of the interfering station the latter may be eliminated although the wavetrapping will offer no hindrance to the station it is desired to receive.

All the controls on the combination instrument consist of a tuning con-

denser, a crystal detector, and a double-pole single-throw switch, which cuts the phones and crystal detector out of circuit and leaves the instrument in a condition suitable for use as a wavetrapping.

By plugging-in a larger coil the reception of Daventry is rendered possible and with the use of this larger coil the wavetrapping portion of the set will, in conjunction with a valve receiver, separate Daventry from Radio-Paris.

Components required for the construction of this set are as follows:—  
.0005-microfarad straight-line-frequency variable condenser. (Raymond or Ormond, Igranic.)  
Dimic coil and holder, No. 1. (L. McMichael, Ltd.)

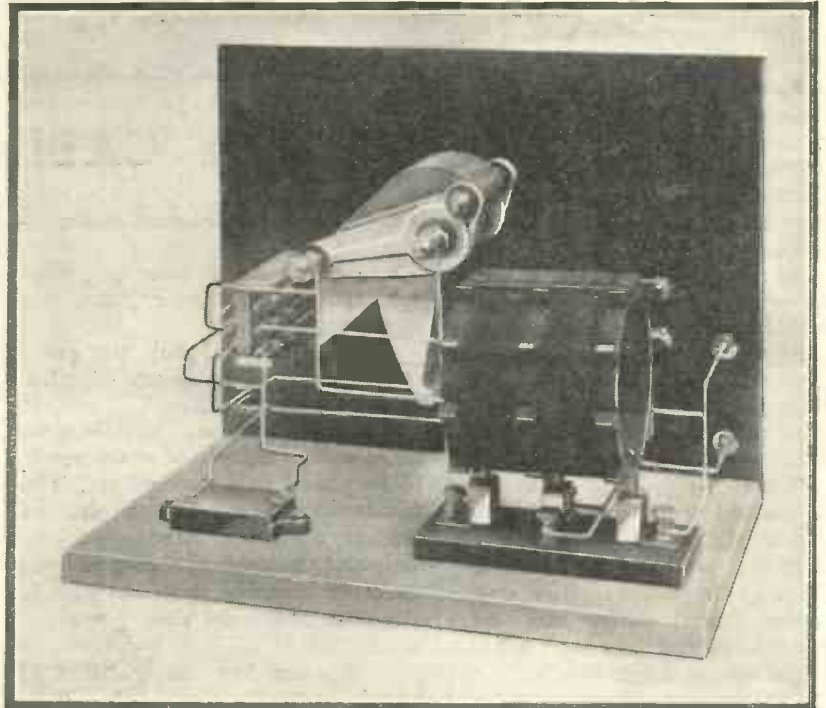
Double-pole double-throw panel-mounting switch. (Dubilier or Utility.)  
4 terminals. (Belling-Lee type M or Eastick.)

Crystal detector. (Wates K.)  
Ebonite panel, 9 in. by 7 in. by 1/4 in. (Siemens or Becol, Radion, Clayton.)  
Baseboard, 5 1/2 in. by 9 in. by 3/8 in.  
.001-microfarad fixed condenser. (Dubilier or T.C.C.)  
Cabinet, American type. (Unica.)

*NOTE:—The particular components shown in the photographs and allowed for in the dimensioned layout are in each case mentioned first.*

The panel is a standard size supplied by most of the manufacturers specified. This saves time and labour in cutting and trimming.

The panel should be laid flat on



Photograph showing Disposition of Components of Combined Crystal Set and Wavetrapping.



the bench and positions for the holes marked with a sharp tool. The hole for the switch is marked more sharply than the others.

The switch is mounted on the panel with two 6 B.A. screws.

When the switch has been mounted the variable condenser is fixed in position. The angle at which this is mounted can be seen from the photographs.

The terminals and crystal detector can now be mounted and the panel

*This unit is just the thing for every owner of a valve set; it can be used for reception when the batteries from the main set are being charged and, when the main set is in commission again, it can be used for cutting out interference.*

*Tested within a mile of 2LO in conjunction with a three-valve set the London transmission was cut out completely and Bournemouth tuned-in.*

*The unit can be converted for use as a wavetrapp by merely altering the connection to one terminal and moving the lever of a simple key switch.*

fixed to the baseboard. Two round-headed brass screws are used for this.

Only two components are mounted on the baseboard, the coil-holder and fixed phone condenser. The positions for these can be seen in the photographs and wiring diagram.

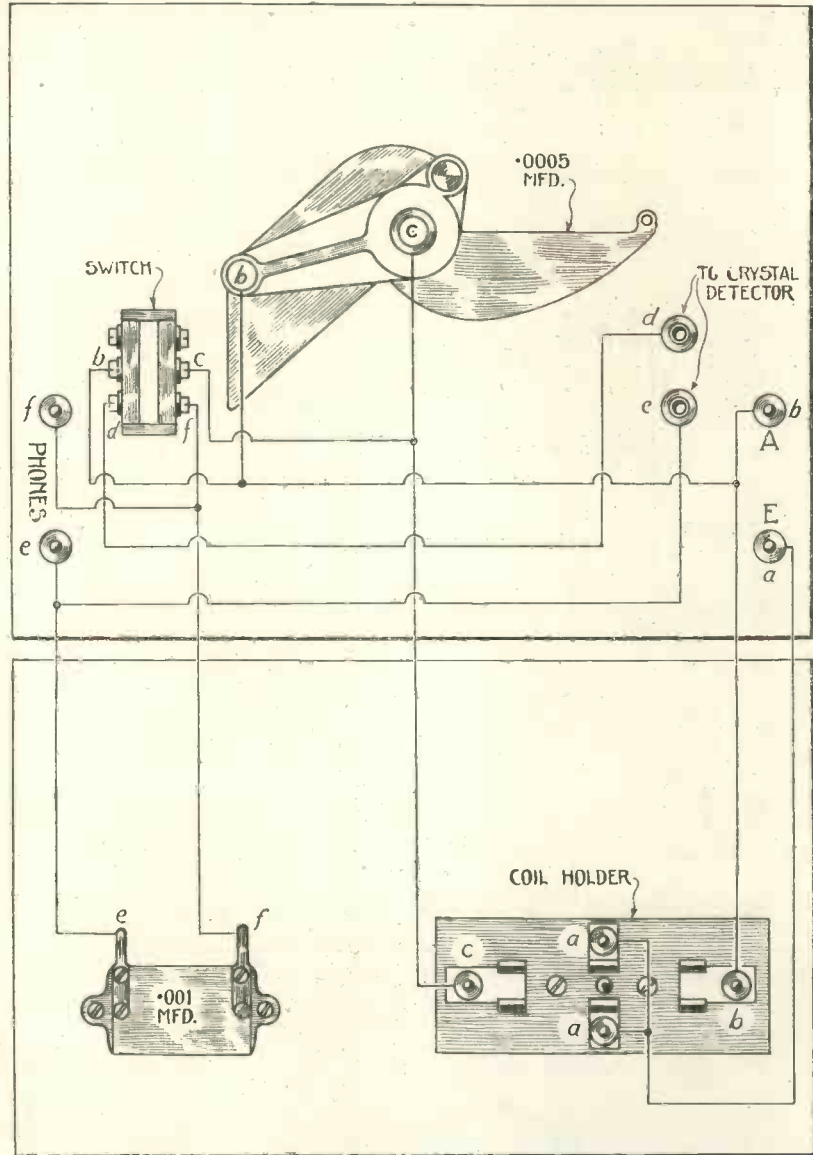
The wiring is rather more complicated than that of an ordinary crystal set, but if the wiring diagram is followed closely no trouble should be experienced.

**Soldered or Screwed**

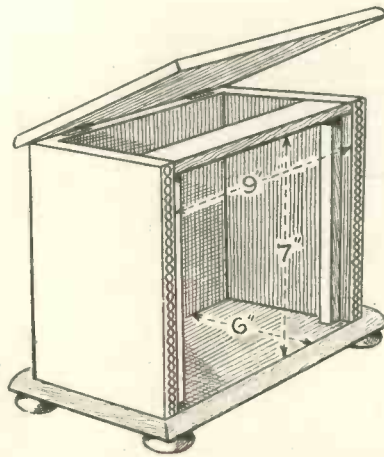
It will be noticed that the connections to the terminals and crystal-detector sockets are soldered; these can be fixed by means of the nuts provided.

The cabinet should be of the American type, that used having a hinged top so that the coil was readily accessible for changing.

Plug in the coil and attach aerial, earth, and phones to their respective terminals. With the switch lever up the local station should be tuned-in quite easily, a slight adjustment of the crystal detector only being necessary.



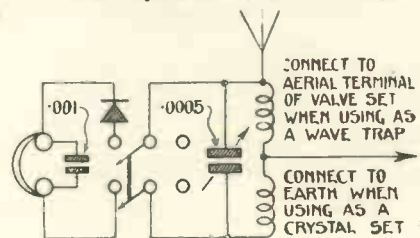
Wiring Diagram of the Combined Crystal Set and Wavetrapp.



Details of Cabinet for Combined Crystal Set and Wavetrapp.

**DETAILS OF THE COMBINED CRYSTAL SET AND WAVETRAPP**

(Below).—Circuit Diagram of the Combined Crystal Set and Wavetrapp.







# A Cheap Set for Jim!

"AND how much did this cost?" asked Beryl, holding the new valve between her finger and thumb in a way that set my heart pulsing with apprehension.

The box in which the valve had been packed lay on the table, and the box clearly indicated that it was a power valve working a 12 amperes. Beryl had heard me yearning for one of these many times. So it was no good improving on the truth. "22s. 6d.," I answered.

Beryl put the valve down with an unfriendly lack of comment, and turned to the door. The cost of components is almost the limit of her interest in wireless.

"That makes £3 5s. you have wasted on wireless this month," she said at last, "and yet you *know* how faded the drawing-room curtains are. When it comes to wireless you are utterly conscienceless, George."

I made a rapid calculation, and thanked my stars that arithmetic had never been Beryl's strong point.

"But it will last for months," I said. "If you average out the price over its probable life it costs less than a penny a day."

She gave me a quick glance.

"How much a day would new curtains cost?" she demanded.

"Oh, we'll probably be able to run to new curtains next month," I answered evasively.

"We'll run to them to-morrow," she replied with decision. "If I buy the material, and have it made up at home, it won't cost more than £3, and with the rest you can take me to a matinée and stand me a cup of tea afterwards. I'll call for you at your office just before lunch."

What that valve cost me, before I had finished paying for it, would have provided an unmarried experi-

menter with all the components he wanted for six months. In fact, it very nearly convinced me that new parts were beyond my means for the future.

But one cannot even listen-in without spending an occasional shilling, and the only course was to temporise.

really happy. I simply could not have run to the expense of two of them!

"As a matter of fact," I lied, "I only bought that because it was such an extraordinary bargain. I got it almost for nothing."

"How much?" repeated Beryl, in an unyielding tone.

"A mere 5s." I said—and Beryl noted down 5s.

That was my first step on the downward path. If it had not been so easy it might not have mattered. But to have got a high-tension battery like that one, and peace, for only 5s. above the usual price, was too great a temptation.

By the end of the month I had found it necessary to buy most of the parts for a new five-valve circuit. And Beryl's list had mounted to 16s. 6d.

She seemed satisfied.

Next month a couple of valves "went west," and I burned out an ancient L.F. trans-

former. However, new ones were a decided improvement, and 7s. 4d. over and above the market price was not much to pay.

"Things have dropped in price quite amazingly, if you know where to buy them," I explained.

And so for a spell wireless and domestic bliss flourished side by side. I felt that I had made a discovery second only in importance to the thermionic valve. I began to study morse in earnest, and made enquiries about a transmitting licence.

But I might have known that it was too good to last.

I had forgotten Beryl's brother. He dropped in one night, and despite his casual manner, I fancied I detected a wink to his sister that hinted at a previous understanding.

"I'm going to add a couple more

## ALMOST AS GOOD AS A MONOMARK!



This letter found its way to the Igranic Electric Co., Ltd., without delay.

"I'll strike a bargain, dear," I proposed after a few days' thought.

"We will keep a list of all the wireless stuff I buy, and at the end of each month you shall have chocolates, or a pair of gloves, or a sealskin coat to the same value."

Beryl masked her surprise and agreed gratefully.

"We'll start with that black box affair you brought home last night," she said.

"Oh, the new high-tension. That's not a new part; it is only a renewal."

"But it's not worth an argument, dear," she returned sweetly. "How much did it cost?"

Now that H.T. was a real H.T. of reliable make, adequate voltage, and a good deal more than ordinary strength. I had been coveting it for months before I had made up my mind to blow the price and be

## A Cheap Set for Jim! (Continued)

valves," he said, "and I want to ask you about the kind of thingummies to buy, and how to fix them up. In fact, I wondered if you'd give me a hand at the job."

"Delighted," I assured him, insincerely.

"Well, first of all, what parts shall I have to get? Here's the circuit."

I looked at it, and once again I felt vaguely suspicious. It was the very circuit I had just put together for myself.

"There are two of these intermediate transformers," he pointed out. "Are they outrageously expensive?" Then Beryl butted in.

"Everything has gone down amazingly, Jim," she said, "provided you know the right places to go to. You must let George get the things for you. He's used to it. I can tell you what it will cost."

From the interior of the blue ginger-jar on the sideboard she produced four lists, and while I looked stonily at the decanter that Jim was gently emptying, she read:

"Two intermediate frequency transformers, 4s. 3d.; square-law condenser, 1s. 9d.; L.F. transformer, 2s. 2d.; dull-emitter valves, 2s. 7d.;

dual rheostat, 7d.; poten—potenti—"

"Look here, Beryl," I interrupted, "some of those were special prices."

### DO YOU WANT TO BUY A SET?

*We shall be glad to advise you as to which types of sets are the best for your personal use.*

*Tell us how much, roughly, you wish to spend; where you are situated; what stations you wish to receive; whether you intend to use phones or a loud-speaker, and we will advise you as to the general lines of sets that will answer your purpose.*

*Send your inquiry with coupon (p. iii cover) and stamped addressed envelope to—*

*"Buyer's Advice Bureau,"*

*WIRELESS MAGAZINE,*

*La Belle Sauvage, E.C.A.*

A friend of mine was able to put me in the way of a few things."

"By Jove, I should think he was!" exclaimed Jim.

I have never really liked Jim.

"You don't mean to say," Beryl

demanded, in an aggrieved voice, "that you wouldn't go to as much trouble for Jim's sake as you would for your own!"

"No, no," I admitted. "I'll do the best I can, of course."

Jim seemed pleased.

"But look here, old dear," he added, as though with sudden inspiration, "I know you never stick to the same circuit for more than a few weeks together. How would it be if you let me have that one you've just put together? I'll hand over what it cost you, and then you can start on the next box of tricks with everything fresh from the makers."

He must have seen a certain lack of enthusiasm in my expression, for his eyes travelled from my face to his sister's.

"Of course George will," said Beryl. "It's a splendid idea. And, George dear, as you are being so nice to Jim, I'll only take half the price of the new things you buy this month!"

My lips parted for speech but—well, what was there to say?

And that explains why I am satisfied with a detector and one L.F. amplifier these days. H. P.

## WHERE TO PUT THE FILAMENT RHEOSTATS

THE principal function of a filament rheostat is, of course, to regulate the amount of current flowing through its particular valve filament. This it would do equally well whether it were connected in series with the filament between this and the negative terminal of the L.T. battery, or in series with the filament between it and L.T. positive.

### Another Factor

There is, however, another factor to be considered. This is the voltage drop across the rheostat winding. There will always be such a voltage drop as a rheostat can only be used when the voltage of the L.T. battery exceeds that actually required by the valve.

For instance, suppose a 6-volt

accumulator is used to supply current to a valve requiring only four volts (as is often the case) there must be a voltage drop of two volts across the used portion of the rheostat when this is properly adjusted.

### For Grid Bias

These two volts can often be utilised to supply grid bias to amplifying valves and thus save the necessity of a special battery for the purpose. It should then be connected in the negative lead to the valve filament and the return grid lead of this valve taken direct to L.T. negative.

It happens, however, that the grid bias will then be altered whenever the filament voltage is readjusted so that it is really better not to use this method when a grid-bias battery is employed (as when a considerable

G.B. voltage is necessary), in which case the rheostat can be put on the positive side of the valve filament.

L.M.T.

A LECTURE on the use of water was given from a German station the other day. Probably part of an educational course for milkmen's apprentices.

UNNECESSARY items.—The recent talk from Aberdeen (of all places) on collecting old silver.

THE B.B.C. says that 62 per cent. of its programmes consist of musical items. We must listen out for some of them.

WIRELESS has brought London within hearing distance of New York, says an American. It seems pretty hard luck on the Londoners, but I suppose they will get over it.



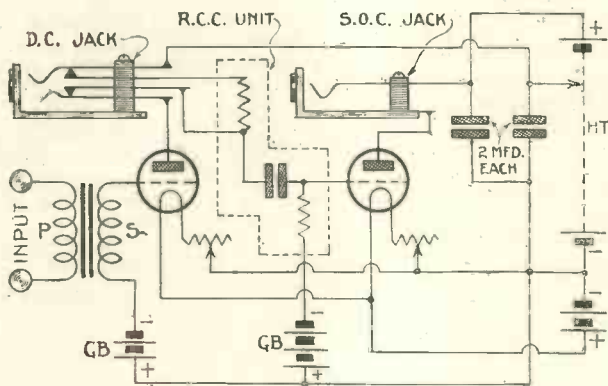
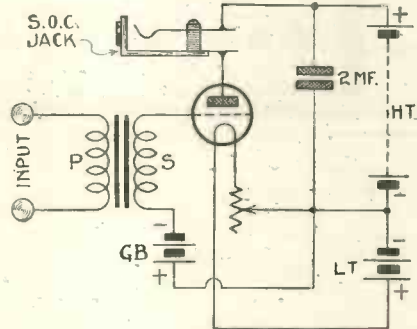
# IMPROVE YOUR RECEPTION!

## One-, Two-, and Three-valve Amplifier Circuits

Where transformers are shown a suitable ratio is 4:1, while any available make of resistance-capacity-coupling (R.C.C.) unit can be used. Two types of jack are shown—the double-contact jack (D.C.) and the single open-circuit jack (S.O.C.). Valves used after the resistance-coupling units should be of the special type made for the purpose.

An amplifier made on the lines of the circuit shown here is especially suitable for improving the results obtained from a crystal or one- or two-valve receiver. It is simple and inexpensive to build up.

The inclusion of the grid-biasing battery is optional, but will be found useful if the amplifier is employed for loud-speaker work.

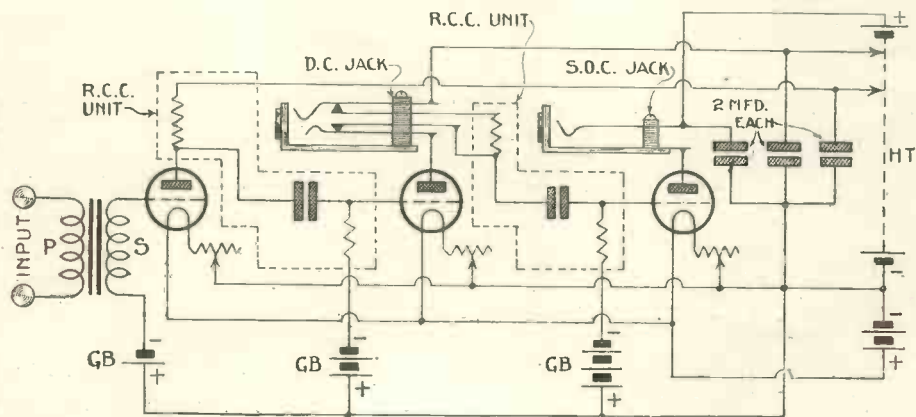


If you prefer a little more volume than is obtainable from a one-valve amplifier, at the same time keeping signals as distortionless as possible, a two-valve amplifier wired up as shown will be found very suitable for coupling to your existing head-phone set.

Jacks are arranged so that either one or two valves can be used at will—depending on the volume required—but when only the first valve is employed the rheostat of the second valve should be turned to the off position or the filament of that valve will be burning unnecessarily.

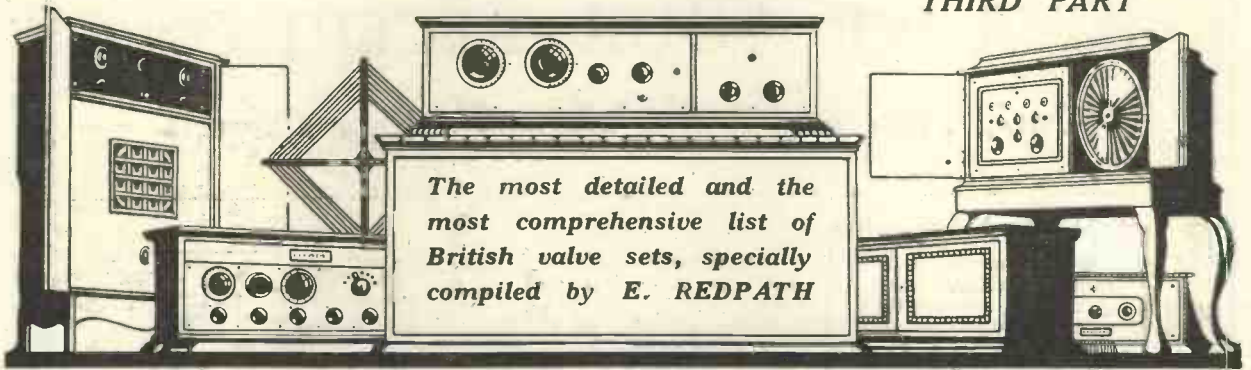
The circuit shown here is very suitable for use in an amplifier to be coupled to an existing H.F. and detector or one-valve detector set and will give really good volume without distortion, providing signals are already at fair head phone strength.

Jacks are provided so that either two or three valves may be utilised at will, enabling the volume to be adjusted to suit the loud-speaker in use.



# Guide to the Best Valve Sets

## THIRD PART



The most detailed and the most comprehensive list of British valve sets, specially compiled by E. REDPATH

IN order to make this guide as helpful as possible to each prospective owner of a set, a few preliminary remarks regarding the general characteristics and capabilities of the different types of set are given at the beginning of each section.

### Conservative Estimates

Readers will appreciate that as reception conditions will vary considerably, a conservative estimate of performance is given, based upon average conditions—both atmospheric and geographical—and the use of an aerial-earth arrangement of average height and efficiency. Under favourable conditions the performances indicated will be improved upon quite readily.

To save space and needless repetition, a simple code will be employed to describe the different valve combinations; that is, HF—D—2LF represents a four-valve set having one high-frequency amplifying valve followed by a valve detector and two low-frequency amplifying valves. Similarly, C—LF represents a crystal detector plus one low-frequency amplifying valve. An asterisk (\*) against or above one of the figures means that the valve so marked is "reflexed," and therefore functions in a dual capacity.

### Prices

With a few exceptions, prices throughout are given in two forms. First, the price of the set alone (including Marconi royalty of 12s. 6d. per valve holder), as this will interest readers who already have phones or loud-speakers, batteries, valves, etc., and, secondly, an "all-in" price for the set (including royalties) and accessories, which will be specified as follows:—

A—Accumulator or suitable dry-cell battery.

B—High-tension dry-cell battery.

V—Valve or valves, as required.

E—Aerial equipment (included in some cases).

T—Telephones—one pair as a rule.

S—Loud-speaker.

Thus "Price £10" is the price of the particular set plus Marconi royalties.

### SAVE YOURSELF TIME AND TROUBLE

by writing to US for further particulars of any sets in which you are particularly interested:

At the end of the description of each set you will see a reference number. If you are interested in several three-valvers, say, send us a postcard bearing your name and address and the numbers of the sets of which you require more details—we will see that the manufacturers do the rest.

"Price (ABVS) £18" is the "all-in" price of set, royalties, L.T. battery, H.T. battery, valves, and loud-speaker.

### Liable to Alteration

Although the greatest care has been taken in ascertaining the prices and in quoting them in a uniform manner in order to facilitate ready reference and comparison, the prices shown are not to be regarded as an offer or quotation by the manufacturers.

## ONE-VALVE SETS

THIS type of set may profitably be installed in place of a crystal set where increased volume from the local transmitting station or the use of additional pairs of telephones is desired.

It will also enable satisfactory results to be obtained over much greater distances, say up to 50 miles from a main station and 100 miles from 5XX (Daventry).

Not recommended for use with a loud-speaker, but at distances not exceeding 4 or 5 miles a modest volume for a quiet room may be obtained from a small loud-speaker without undue use of the reaction or volume control provided.

The initial cost of a set of this type is low; it is simple to operate and

economical in upkeep. If a low-consumption valve is fitted, the filament may be heated by means of a suitable dry-cell battery or quite a small accumulator, which will not require recharging very frequently.

The high-tension battery need not, as a rule, exceed 45 to 60 volts, and should give satisfactory service for several months.

**G.A.C. UNI-VALVE. C.A.C. Valve Distributing Co., Ltd., 10, Rangoon Street, Crutched Friars, E.C.3.**

A simple and easily operated single-valve set in flat case (polished oak or mahogany) with interchangeable coils carried in a two-coil holder mounted upon the side of the case. Operation in this case involves merely the adjustment of one dial and the relative positions of the two coils, controlled by means of the extension handle. Coils for the normal broadcast wavelengths are supplied with the set. The valve, also all terminals and controls (except two-coil holder), are carried upon the ebonite top panel. Quite satisfactory reception over the usual ranges is readily obtained.

Price £3-5-0.

All-in price (ABVET) £6-10-6.  
Ref. W.M.105

**FELLOPHONE SUPER-ONE. Fellows Magneto Co., Ltd., Cumberland Avenue, Park Royal, N.W.10.**

Contained in an open-fronted black leatherette cabinet, the Super-One set is both neat in appearance and efficient in performance. Designed to enable good phone reception to be obtained from stations at considerable distances, the controls are nevertheless simple, and comprise a main tuning knob with pointer, a reaction knob, and filament rheostat knob. For simplicity all terminals and controls are mounted upon the vertical front panel, whilst the valve and coils are enclosed, and accordingly protected. A Fellows coil is supplied with each set to enable the normal broadcast wavelength range to be covered. Additional coils, for which provision is made, enable Daventry or other long-wave stations to be received.



Price £2-10-0.  
All-in price (ABVET) £4-17-6.  
Ref. W.M.108

**CARPAX CABINET. Carpax Co. Ltd., 312, Deansgate, Manchester.**

This set embodies the same circuit arrangements as the F11 type described



**Carpax One-valve Set.**

below, but the cabinet design gives the obvious advantage of an enclosed valve and coil. The standard set, as illustrated, is in black "pebble-grained" cabinet, and the whole presents a very neat appearance. If desired, it may also be obtained in a mahogany cabinet.

Price £3-6-0.  
All-in price (ABVT) £6-10-6.  
Ref. W.M.107

**CARPAX F11. Carpax Co., Ltd., 312, Deansgate, Manchester.**

An extremely simple and economical single-valve set of the box type with horizontal panel carrying the valve, coil, terminals and necessary controls, which, in this case, comprise a condenser dial and filament-rheostat knob. Coil for the normal broadcast wavelengths (250-500 metres) is supplied with the set, and the use of additional coils enables the wavelength range to be extended. The



**Carpax Box-type Set.**

Accessories are specified as follows:—  
A—Accumulator or suitable dry-cell battery.  
B—High-tension dry-cell battery.  
V—Valve or valves, as required.  
E—Aerial equipment.  
T—Telephones.  
S—Loud-speaker.

makers claim that, under reasonably good conditions, satisfactory telephone reception from distant stations may be obtained.

Price £2-8-0.  
All-in price (ABVT) £5-7-6.  
Ref. W.M.106

**TWO-VALVE SETS**

THERE are two familiar arrangements of this type of receiving set. The first comprises a high-frequency amplifying and a detector valve (HF—D) intended for long-distance telephone reception (say 150 miles from a main station).

The second, and much more popular arrangement, comprises a detector valve (provided with reaction or volume control), followed by a low-frequency amplifying valve (D—LF), and is capable of giving satisfactory loud-speaker results at distances up to 15-20 miles from a main station or 50-60 miles from 5XX.

**B.S.A. B.S.A. Radio, Ltd., Small Heath, Birmingham.**

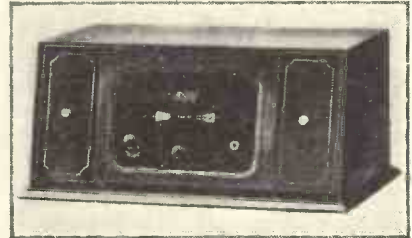


**B.S.A. Two-valver.**

D—LF. Extreme simplicity and neat appearance, together with a good loud-speaker performance from nearby broadcasting stations, have been the principal objects of the designers of this set. Embodying a patented B.S.A. tuning unit, the controls are very simple, as may be gathered from the illustration, and the overall neatness is maintained by the provision of a multiple battery cord, permanently attached to the set, with all battery connections clearly labelled. A new B.S.A. power valve is used in the amplifying stage, and an arrangement for

giving correct adjustment of grid potential ensures good tonal quality. The complete set is enclosed in a mahogany cabinet with front panel of oxydised metal instead of ebonite. A small master switch, shown on the panel, simultaneously disconnects both batteries.

Price £8-0-0.  
All-in price (ABV) £11-17-0.  
Wooden plinth for battery box, extra £0-18-0.  
Ref. W.M.234



**A.J.S. Symphony II.**

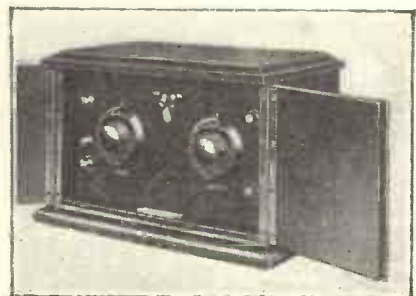
**SYMPHONY II. A. J. Stevens & Co. (1914), Ltd., 122/124, Charing Cross Road, W.C.2.**

D—LF. A handsome, all-enclosed two-valve set of particularly neat and artistic appearance. The cabinet is well made of mahogany and provided with battery compartments at each end, the batteries themselves being readily accessible when necessary. The controls are two in number, one for tuning purposes and one for volume control. Plug-in coils of the well-known A.J.S. type are provided for the normal and long-wave stations, whilst additional coils may be obtained to cover the complete wavelength range of from 80 to 4,500-metres. In lieu of the usual dials on the front panel it will be noticed that the adjustment of the controls is indicated by moving scales, which are visible through apertures in the panel. Each selector has two scales, one numbered and one left blank to have the name or call-sign of any particular station marked to facilitate subsequent adjustment.

All-in price (ABVS) £17-10-0.  
Ref. W.M.227

**EDISON BELL ERA. Edison Bell, Ltd., Glengall Road, S.E.15.**

D—LF. A particularly neat and compact set fitted in polished cabinet with folding doors and measuring overall 12in. by 9in. by 8in. A vertical panel, immediately be-



**Edison Bell Two-valve Set.**

*If you want further particulars of any of these sets send a postcard to US and save yourself trouble*

## Guide to the Best Valve Sets (Continued)

hind the doors, carries the simple operating controls, comprising two main dials (tuning and reaction adjustments), aerial, earth and telephone terminals, and an on-and-off switch. All battery terminals are at the rear of the cabinet, provision being made for the application of different voltages to detector and low-frequency amplifying valve, the correct grid bias for the latter being obtained by a special arrangement instead of the usual additional battery. The set as supplied will tune from 280 to 500 metres and from 900 to 1,600 metres, thus enabling both normal and long-wave broadcasting to be received.

Price £5-15-0.

Ref. W.M.235

**COMPACTUM.** *Edison Swan Electric Co., Ltd., 123/5, Queen Victoria Street, E.C.4.*

D-LF. This set, of rather unusual appearance, has all external parts made



Compactum Two-valver.

of moulded insulating material, with the object of enabling a compact and efficient receiver to be produced at a low price. Excellent loud-speaker reproduction is obtained at distances up to 25 miles from a main station, whilst with telephones greatly increased distance may be covered. The two valves are mounted on top of the central column, which forms a casing for the low-frequency transformer and its connections. The circular base on the set contains the variable condenser operated by a radial lever, as also are the other controls, namely, the reaction adjustment and the filament rheostat. Plug-in coils are employed, so that, by the provision of appropriate coils, the complete range of wavelengths may be tuned-in.

Price £4-0-0.

All-in price (ABVES) £11-8-1½.

Ref. W.M.233

**FELLOPHONE.** *Fellows Magneto Co., Ltd., Cumberland Avenue, Park Royal, N.W.10.*

HF-D. Intended for satisfactory phone reception from near or distant stations, this set comprises a sloping ebonite panel, carrying all controls, terminals and valves, fitted to a well-finished mahogany cabinet. There are two tuning dials, one adjusting the aerial circuit and the other

Accessories are specified as follows:—  
 A—Accumulator or suitable dry-cell battery.  
 B—High-tension dry-cell battery.  
 V—Valve or valves, as required.  
 E—Aerial equipment  
 T—Telephones.  
 S—Loud-speaker.

the output circuit of the high-frequency amplifying valve. A reaction control is also provided, and a single rheostat knob which controls the filament current of both valves. Special sockets are fitted to take additional coils when it is desired to extend the wavelength range. These sockets are normally short-circuited by means of plugs supplied. The set is guaranteed to receive any B.B.C. station and, with the addition of suitable coils, several Continental stations.

Price £5-15-0.

All-in price (ABVET) £7-17-6.

Ref. W.M.224

**FELLOPHONE LITTLE-GIANT.** *Fellows Magneto Co., Ltd., Cumberland Avenue, Park Royal, N.W.10.*

D-LF. Contained in a neat leatherette-covered case with horizontal top panel carrying all terminals, controls and valves, this is a low-priced but eminently serviceable set capable of giving good loud-speaker volume over the usual distances. The operation is simple, the adjustments comprising one main tuning knob, with pointer moving over scale marked upon the panel; reaction or volume-control knob, also with pointer and scale, and a single filament rheostat which controls both valves. As supplied, the set tunes over the normal broadcast wavelengths, but additional coils may be plugged into a socket provided to enable other wavelengths to be received. Such detail as provision of terminals for grid battery has not been overlooked.

Price £3-15-0.

All-in price (ABVES) £6-75-0.

Ref. W.M.225

**B.R.C. British Radio Corporation, Ltd., Weybridge, Surrey.**

D-LF. A well-made and very serviceable set which, by means of a patented device, enables a wide range of wavelengths (that is, 200 to 2,000 metres) to be covered without additional coils. The tuning adjustments comprise a main tuning dial which is to be operated in conjunction with the wavelength-range switch. Reaction or volume control is provided, and a separate filament resistance controls each valve. All terminals for battery and aerial-earth connections are at the back of the cabinet. To ensure satisfactory loud-speaker volume, power amplification is employed and a suitable power valve is included in the equipment supplied. A twelve months' guarantee accompanies each instrument.

Price £7-15-0.

All-in price (ABVS) £12-12-0.

Ref. W.M.223



B.R.C. Two-valve Set.

### TWO-VALVE AND CRYSTAL SETS

UNDER this heading, several different arrangements are possible, but experience has indicated that two only are really satisfactory and therefore popular.

The first of these, comprising a crystal detector followed by two low-frequency amplifying valves, is suitable for use within crystal range of a broadcasting station, but has the advantage of enabling full loud-speaker volume to be obtained. At the same time the arrangement is as simple to operate as an ordinary crystal receiving set, the only additional adjustment or control being the movement of a switch or knob to turn the filament current of the valves on and off.



Brownie Two-valve and Crystal Set.

**BROWNIE.** *Brownie Wireless Co. of Gt. Britain, Ltd., Nelson Wks., Arlington Road, N.W.1.*

C-2LF. This combination receiver comprises the popular Brownie No. 2 crystal receiver and a specially designed two-valve low-frequency amplifier, and is intended to enable good loud-speaker reception to be obtained from broadcasting stations within crystal range. The crystal set is of novel design, and is made of one solid moulding, neat in appearance, strong, and well finished. It has a normal wavelength range of from



about 300 to 600 metres, according to the aerial with which it is used, and by means of an additional coil, which fits into the coil socket provided, reception from 5XX is obtainable. The amplifier unit, which has been specially designed to enable the crystal set to be fitted and connected easily, is also in a moulded casing to match, the two valves being housed in the moulding by means of anti-microphonic sockets. Battery connections are at the back of the amplifier, and both valves are controlled by a single rheostat. The amplifier may be obtained as a separate unit and used with any crystal or single-valve set, the actual connecting up being extremely simple. In the complete set the adjustments comprise merely the setting of the crystal detector, turning on or off the valves, and the adjustment of one tuning control.

Price (crystal set complete and amplifier) £3-13-6. Ref. W.M.216

### THREE-VALVE SETS

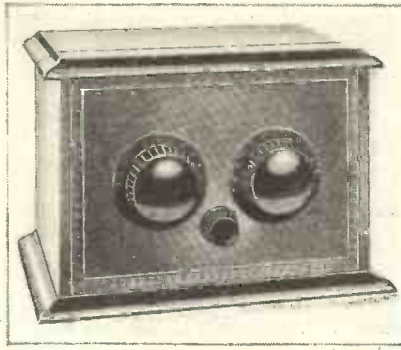
OF three-valve receiving sets there are three serviceable types available. First, the arrangement consisting of two high-frequency and a detector valve (HF-D), which is particularly suitable for selective long-distance reception on telephones, but not really suitable for loud-speaker operation. Performance of this kind is not in any great demand, and accordingly not many sets are manufactured with this circuit arrangement.

Secondly, there is the combination of detector valve (with reaction), followed by two low-frequency amplifying valves (D-2LF), which gives powerful loud-speaker results from a main station within 50 or 60 miles and, with careful adjustment, reasonable loud-speaker volume over much greater distances. Satisfactory reception from Daventry is obtainable up to 200 miles, whilst the operation of this type of set is quite as simple a matter as in the case of a single-valve-with-reaction receiver.

The third arrangement, which may be considered the average of the first and second above mentioned, comprises one H.F. valve, detector valve and L.F. valve (HF-D-LF). The high-frequency valve ensures satisfactory range and increased selectivity, and the low-frequency valve following the detector ensures a strength adequate in most cases for good loud-speaker volumes at distances up to 100/120 miles from a main broadcasting station and 200/250 miles from 5XX.

It is to be noted that this type of set will permit a selection of programmes to be received provided that (a) the receiver is situated at least a few miles from the local broadcasting station, and (b) that the difference in wavelength between the local and the desired station is sufficiently great for the degree of selectivity provided in the set.

**SUCCESS SUPER-THREE.** *Beard & Fitch, Ltd., 34/36, Aylesbury Street, E.C.1.*



Success Super-three.

D-2LF. A neat, compact, and very efficient set designed to give loud-speaker reception over considerable distances and, at the same time, to be as simple as possible in operation. A special method of obtaining reaction is incorporated, ensuring smooth control with consequent benefit either in the way of distant reception or of maximum volume without distortion. By means of interchangeable inductances, a wavelength range of 40 2,500 metres may be covered, so that, under favourable conditions, the short-wave American transmissions can be received. The set is assembled in a well-finished, open-front walnut cabinet, and the controls (tuning and reaction dials, filament rheostat and loud-speaker jack only) are conveniently arranged upon the vertical front panel. Access to valves and interchangeable coils, which are completely enclosed within the cabinet, is by means of the hinged lid.

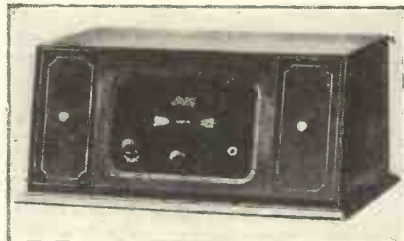
All-in price (ABVS) £17-10-0.

Ref. W.M.325

A COMPLETE INDEX  
TO THIS GUIDE TO  
THE BEST VALVE SETS  
APPEARS ON PAGE 355

**SYMPHONY III.** *A. J. Stevens & Co. (1914), Ltd., 122/124, Charing Cross Road, W.C.2.*

D-2LF. Of similar external appearance to the two-valve receiver already referred to, this set comprises an additional low-frequency amplifying valve, thereby ensuring full loud-speaker volume from a limited number of main stations,



A.J.S. Symphony III.

and, by changing the plug-in coil for a larger one provided, from the high-power station 5XX. In both this and the former receiver a special tuning arrangement is incorporated, together with condenser reaction, the whole proving very effective, whilst the reaction or volume control, in particular, is smooth and certain. A good degree of selectivity is also obtainable, and the makers claim that, used in conjunction with a standard roof. aerial, in the Midlands good loud-speaker reception was obtained from the high-power station and from London, Birmingham, Bournemouth, Manchester, Stoke, Nottingham, and Paris. The set should appeal particularly to those desirous of having an efficient and artistic home-entertainment set which is easy to operate and economic to maintain.

All-in price (ABVS) £25-0-0.

Ref. W.M.330

**FELLOPHONE GRAND.** *Fellows Magneto Co., Ltd., Cumberland Avenue, Park Royal, N.W.10.*

HF\*-D-LF. A handsome cabinet set incorporating a three-valve reflex circuit by means of which the results obtained



Fellophone Grand.

are comparable to an ordinary four-valve set. The cabinet itself may be obtained in Jacobean or Sheraton style. The double doors provide complete protection to valves and control panel, whilst, in the base, ample space is available for stowage of batteries. The standard set can be tuned to receive from all stations on the normal wavelength band, whilst additional loading coils may be plugged-in when reception from 5XX is desired. The tuning operations involved are fairly simple, the actual controls being practically identical with those of the Fellophone Super-Three described on the next page.

Price £12-15-0.

All-in price (ABVET) £15-10-0.

Ref. W.M.328

**B.R.C. British Radio Corporation, Ltd., Weybridge, Surrey.**

D-2LF. This extremely serviceable set incorporates a special patented control by means of which all wavelengths between 200 and 2,000 metres may be covered with-

If you want further particulars of any of these sets send a postcard to US and save yourself trouble

## Guide to the Best Valve Sets (Continued)



B.R.C. Three-valve Set.

out the necessity for coil changing. Of neat and symmetrical appearance, the complete assembly is contained in a well-made walnut cabinet with all controls, comprising the main tuning dial, wavelength range switch, reaction or volume control, and filament rheostat knobs, mounted upon the vertical front. The installation and operation of this set are simple and straightforward, whilst the results obtainable show it to be efficient and capable of giving very satisfactory loud-speaker reception over the usual distances, whilst, with a little careful manipulation, reception from stations at considerable distances may be obtained at moderate loud-speaker strength or, of course, at adequate strength in telephones.

Price £11-17-6.

All-in price (ABVES) £17-17-0.

The same receiver can also be supplied in totally-enclosed walnut cabinet with space for batteries, etc.—price £25-10-0.

Ref. W.M.319

### DUODYNE III. Peter Curtis, Ltd., 11, Red Lion Square, W.C.1.

2HF—D. Specially designed for long-distance reception on telephones, this three-valve set comprises two high-frequency amplifying stages (one tuned), followed by a detector valve with provision for reaction to the anode circuit of the preceding valve. Although this may appear a little complicated, the actual operation is simple. There are



Duodyne III.

Accessories are specified as follows:—  
 A—Accumulator or suitable dry-cell battery.  
 B—High-tension dry-cell battery.  
 V—Valve or valves, as required  
 E—Aerial equipment.  
 T—Telephones.  
 S—Loud-speaker.

two main tuning dials to be adjusted and a reaction or volume-control knob, apart from the two filament rheostat knobs. The standard set is contained in an open-fronted cabinet, but an enclosed cabinet, with folding doors, can be supplied if desired. Any standard plug-in coils may be used with the set, and coils to cover the 250-500-metre wavelengths are supplied as part of the standard equipment.

Price £11-17-6.

Ref. W.M.322

### COSMOS. Metro-Vick Supplies, Ltd., 155, Charing Cross Road, W.C.2.

D—2LF. This very serviceable set, arranged in decidedly novel form, incor-



Cosmos Three-valver.

porates an efficient straightforward circuit, capable of giving satisfactory reception at distances up to 30-35 miles from a main station and 100-150 miles from 5XX. Special steps have been taken to ensure purity of reproduction rather than mere volume, whilst the questions of artistic appearance and general economy in operation have also received attention. There are in all four controls, but two only of these are adjusted in normal operation, apart from the vernier adjustment provided in connection with the main tuning dial. Interchangeable coil units are available and the unit for the normal broadcast wavelengths may readily be replaced by one for the 1,300-3,000 metre range. The complete set may be enclosed beneath a domed cover, which, having a flat top, forms a suitable stand for the loud-speaker.

Price £8-5-0.

All-in price (ABVES) £14-14-0.

Ref. W.M.326

### FELLOPHONE SUPER - THREE Fellows Magneto Co., Ltd., Cumberland Avenue, Park Royal, N.W.10.

HF—D—LF. A straightforward three-valve set mounted in well-finished sloping mahogany cabinet with ebonite front panel carrying all controls, terminals and valves. Separate filament rheostat knobs are provided for each valve, the remaining controls comprising two tuning dials (for the aerial and high-frequency circuits respectively) and reaction-control knob. The complete arrangement forms a fairly sensitive and selective receiver, claimed to give satisfactory loud-speaker reception at 30 to 40 miles from a main station and correspondingly greater distance from Daventry. As supplied, the set can be tuned to all normal broadcast wavelengths, the long-wave stations (Daventry, Radiola) being brought in by the addition of suitable Fellows loading coils.

Price £7-12-0.

All-in price (ABVET) £10-5-0.

Ref. W.M.327

### B.S.A. B.S.A. Radio, Ltd., Small Heath, Birmingham.

D—2LF. In general appearance somewhat resembling the two-valve set already described and illustrated, this receiver includes an additional stage of low-frequency amplification, and is recommended for use at distances up to 50 miles from a main broadcasting station. Under these conditions, and with a standard 100ft. aerial, satisfactory loud-speaker volume and good reproduction will be obtained. The tuning arrangement is similar to that used in the two-valve set, but an improved volume control is provided. All battery leads are combined in one multiple cable, which is attached to the set, the free ends being clearly labelled for connection to batteries. Once the tuning is set a master switch controls the operation of the set.

Price £15-7-6.

All-in price (ABV) £21-17-6.

Ref. W.M.329

### CARPAX FAMILY. Carpax Co., Ltd., 312, Deansgate, Manchester.

D—2LF. This three-valve family cabinet set is specially designed for clear loud-speaker reception from the nearest broadcasting station with the utmost simplicity in operation. Apart from the three filament rheostats, the controls comprise one main tuning dial and a reaction dial. The standard set is enclosed in a black, pebble-



Carpax Family Three-valver.



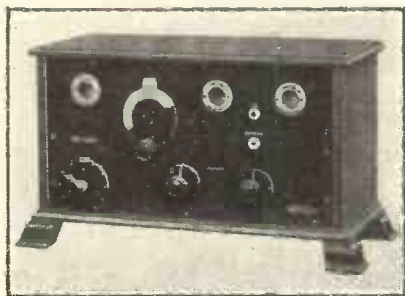
grained cabinet, but it can also be obtained in a mahogany cabinet of similar shape or in a totally-enclosed mahogany cabinet with folding doors in front and battery compartment below. All valves, coils, etc., are enclosed but accessible through the hinged lid. Coils for the 250-500 metre wavelengths are supplied with the set.

Price £9-10-0.

All-in price (ABVT) £15-5-0.

Prices for special cabinet work are obtainable on application to the makers.

Ref. W.M.320



Simplon Autodyne III.

**SIMPLON AUTODYNE III.** *Dargue Bros., Ltd., Simplon Works, South Street, Halifax.*

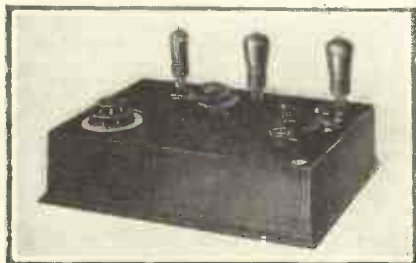
D-2LF. Intended as a family three-valve set for clear loud-speaker reception of broadcast programmes, this set combines handsome external appearance with excellence of design and ease of operation. By means of a device termed an "automatic reaction governor" (the dial and pointer of which will be seen in the lower left-hand of the accompanying illustration), manipulation of the vernier knob beneath the main tuning dial simultaneously varies the reaction effect and maintains same at the best value whatever the wavelength to which the set is tuned. The utility of this device is twofold. It reduces the tuning to one-dial operation and, whilst maintaining adequate sensitivity; it prevents accidental self-oscillation. Jacks are provided for the insertion of loud-speaker or telephone plugs, and the filament current to the valves is controlled by means of two rheostats, the knobs of which are also clearly shown in the illustration.

Price £12-15-0.

All-in price (ABVET and S) £22-5-6.

Ref. W.M.323

**MELLOWTONE.** *Midland Radio-telephone Manuf'rs., Ltd., Brettell Lane Works, Stourbridge.*



Mellowtone Three-valver.

D-2LF. The illustration represents this set in box form, but, if desired, it may also be obtained in de-luxe cabinet. Simplicity and neatness of appearance, ease of operation and good quality reproduction have been the main points in view in the design of this receiver. Tuning is effected by means of one dial only, with vernier knob (above the main dial) for final adjustment. Additional controls are provided for reaction or volume and for switching off the last valve when satisfactory volume is obtained without it, whilst a special feature is the provision of a patented tone-control, by means of which the most pleasing effects can be obtained from different kinds of performance, that is, soprano song, piano solo, military band. The loud-speaker range under normal conditions is claimed to be 50-80 miles from a main station and up to 200 miles from 5XX.

Price £16-17-6.

All-in price (ABVS) £28-17-6.

Ref. W.M.312

**SIMPLON CABINET AUTODYNE III.** *Dargue Bros., Ltd., Simplon Works, South Street, Halifax.*

D-2LF. This set comprises the panel, components and circuit arrangement of



Simplon Cabinet Autodyne III.

the table model, mounted complete in a handsome floor cabinet of best mahogany, substantially made and provided with lifting top and folding doors. Below the receiving set ample space is available for the stowage of batteries and other accessories. The whole forms quite a neat piece of furniture, the only external wires necessary being the aerial and earth leads and, when in actual use, the loud-speaker connection from the jack on the panel to the loud-speaker itself, which may conveniently stand on top of the cabinet.

Price £18-13-6.

All-in price (ABVET and S) £28-4-0.

Ref. W.M.324

## FOUR-VALVE SETS

ALTHOUGH several combinations of valves are possible in a four-valve set, experience and popular demand have resulted in one particular type being made almost exclusively.

This is a set comprising one high-frequency amplifying valve, detector valve and two low-frequency amplifying valves, and usually provided with some form of switching arrangement so that the last valve may be cut out of circuit when adequate volume is obtainable upon three valves.

For the user who desires a selection of programmes from British and Continental stations at good loud-speaker strength, with occasional full-strength dance or outdoor music from the local station or Daventry, this type of four-valve set is thoroughly recommended. Its operation does not call for any special skill as the controls usually do not exceed two dials (for tuning purposes) and some form of volume adjustment.

If used in conjunction with a reasonably good aerial-earth system, good loud-speaker volume may readily be obtained at distances up to 100-150 miles from a main station and about 300 miles from Daventry.

**R.I. Radio Instruments, Ltd., 12, Hyde Street, New Oxford Street, W.C.1.**

HF-D-2LF. A particularly neat and efficient cabinet receiver designed to cover the complete range of broadcast wavelengths (actually covering 300-4,000 metres) without the use of any interchangeable coils, and to afford good quality loud-speaker reception from both local and distant stations. All controls are carried upon a vertical panel, and comprise two main tuning dials, wavelength-range selector, reaction or volume control, and two filament control knobs. The double doors of the cabinet afford access to the controls and adequate protection when closed. The base of the cabinet provides accommodation for batteries. All terminals are at the back, and valves, etc., are accessible through a hinged door, also in the back of cabinet. Within a few miles of a main station satisfactory results may be obtained upon a small indoor or frame aerial.



R.I. Four-valve Set.

*If you want further particulars of any of these sets send a postcard to US and save yourself trouble*

## Guide to the Best Valve Sets (Continued)

Price £24-0-0.  
All-in price (ABVET) £30-10-3.  
Ref. W.M.407



Fellophone Four-valve Cabinet Set.

**FELLOPHONE CABINET.** *Fellows Magneto Co., Ltd., Cumberland Avenue, Park Royal, N.W.10.*

HF—D—2LF. This set comprises two well-finished cabinets, each with folding doors, the upper one containing a complete receiving set with high-frequency and detector valves, and the lower one, a two-valve resistance-coupled amplifier, the whole forming a compact and all-enclosed four-valve receiver. The arrangement is selective, easy to operate, and enables good quality loud-speaker reproduction to be obtained from most British and several Continental broadcasting stations. As supplied, the set covers the normal broadcast wavelengths but, by the use of additional Fellows plug-in coils, the stations using long waves can be tuned-in. Apart from the filament rheostats of the amplifier and a switch to cut out the last valve when not required, the controls are identical with those of the Fellophone two-valve cabinet set, namely, aerial tuning, H.F. tuning and reaction adjustment.

Price £14-10-0.  
All-in price (ABVT) £17-10-0.  
Ref. W.M.425.

**EDISWAN LONG-RANGE.** *Edison Swan Electric Co., Ltd., 123/5, Queen Victoria Street, E.C.4.*



Ediswan Long-range Four-valver.

Accessories are specified as follows:—  
A—Accumulator or suitable dry-cell battery.  
B—High-tension dry-cell battery.  
V—Valve or valves, as required.  
E—Aerial equipment.  
T—Telephones.  
S—Loud-speaker.

HF\*—D—2LF. This receiver is contained in a well-finished cabinet provided with double doors so that, when not in use, the control panel may be completely protected. The circuit employed is of the dual or reflex type, the first valve functioning as both H.F. and L.F. amplifier, so that, with the economy of four valves, results obtained are comparable with those of a five-valve set. The set is designed to operate a loud-speaker on distant stations and enables most British and many Continental stations to be received at satisfactory strength. Operation is a comparatively simple matter, the normal adjustments comprising two main tuning dials (aerial and high-frequency respectively) and a reaction-condenser dial. A separate filament rheostat is provided for each valve, also on-off and change-over switches. The tuning inductances are in the form of range-blocks, the standard blocks (supplied with each set) covering 300-500 metres. Additional range-blocks are obtainable which enable a total wavelength range of 190-4,000 metres to be covered.

Price £29-0-0.  
All-in price (ABVET) £37-1-1½.  
Ref. W.M.423

**B.R.C. British Radio Corporation, Ltd., Weybridge, Surrey.**

HF—D—2LF. A substantially-built and well-finished four-valve set, all enclosed in walnut cabinet with provision for stowage of high-tension batteries in the base. The vertical ebonite panel carries all controls and terminals for loud-speaker or telephone leads. Other terminals (for L.T. battery, aerial and earth) are out of sight at back of cabinet. Operation of the set is extremely simple, tuning being effected by means of the two main dials in conjunction with a special wavelength-range selector switch, whilst a further knob controls the reaction effect. A wavelength range of 200 to 2,000 metres is obtainable without the use of any additional coils, etc. Used with a reasonably efficient aerial-earth system, satisfactory loud-speaker volume and good quality reproduction are obtainable from most British and several Continental broadcasting stations.

Price £21-15-0.  
All-in price (ABVES) £30-0-0.  
Ref. W.M.420

**EDISWAN JACOBAN RADIO-PHONE.** *Edison Swan Electric Co., Ltd., 123/5, Queen Victoria Street, E.C.4.*

HF\*—D—2LF. A magnificent cabinet set in Jacobean oak, complete with loud-speaker (normally concealed behind the louvres of the removable front panel) and

providing ample storage for all batteries, and sundries. The upper part of the cabinet contains the receiving set, which incorporates the four-valve five-stage circuit of the standard long-range cabinet set. Immediately beneath the set is an accessory drawer containing telephones for tuning purposes, a switch on the set effecting the change-over to loud-speaker when tuning is completed. The loud-speaker is a Televox model (listed at £5-5-0).

All-in price (ABVET and S) £63-3-0.  
The upper part of the cabinet, including the receiving set, is also obtainable separately, if desired. Price £36-4-4½.  
Ref. W.M.424



Ediswan Jacobean Four-valver.

**GECOPHONE CABINET DE-LUXE.** *General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.*

HF—D—2LF. This further model, which incorporates the general circuit arrangements of the previously described four-valve sets, is intended to provide satisfactory loud-speaker reception at distances up to 10 miles from a broadcasting station, employing only a frame aerial. With the orthodox outdoor aerial, of average efficiency, the loud-speaker range is 150-250 miles. The cabinet work is of highly finished mahogany with fretted front to the loud-speaker compartment. The receiving set itself is fitted in the upper portion of the cabinet and enclosed by a hinged cover, whilst in the lower part space is provided for stowage of all batteries and the four pairs of telephones included with the equipment. A Gecophone loud-speaker is also supplied, and ensures adequate volume together with good quality reproduction. Power amplification is provided for in the two low-frequency stages, and one or both of the power valves can be cut out of circuit by means of a rotary switch. Overall



dimensions: height 4 ft., width 30 in., depth 21 in.

All-in price (ABVS and 4 phones) £85-0-0. Ref. W.M.418

**CARPAX.** *Carpax Co., Ltd., 312, Deansgate, Manchester.*

**HF—D—2LF.** A well-arranged set in completely enclosed cabinet, which may be had in black pebble-grain finish or in polished mahogany. All batteries may be stowed in the base of the cabinet, where they are easily accessible from the front. Additional selectivity is gained by the use of a separate and loosely-coupled aerial circuit and it is claimed that the sensitivity and amplification obtainable enable practically every B.B.C. station and many Continental stations to be received, even when the local station is not at any great distance. The receiver assembly is contained in the upper portion of the cabinet, behind a vertical ebonite panel carrying the controls, which comprise two main tuning dials and filament rheostats.

Price £11-10-0.

All-in price (ABVT) £18-0-0.

Ref. W.M.421



**Simplon Four-valve Set.**

All-in price (ABVET and S) £34-7-6.  
Ref. W.M.422

### FIVE-VALVE SETS

**THIS** type of receiving set almost invariably consists of two high-frequency amplifying valves (ensuring adequate range and selectivity), a detector valve and two low-frequency amplifying valves (ensuring satisfactory loud-speaker volume even when receiving from distant stations).

The modern tendency is towards simplification in control without undue sacrifice of efficiency and, although some five-valve sets require a little care and skill in tuning, many are operated quite as simply as a three-valve set.

The advantage over a four-valve receiver is that the additional H.F. valve enables long-range reception to be obtained without excessively critical adjustment of the controls, whilst the extra selectivity which it automatically introduces minimises interference from undesired stations.

Given favourable atmospheric and

### A COMPLETE INDEX APPEARS ON PAGE 355.

geographical conditions, together with an efficient aerial-earth system, a well-designed and carefully operated five-valve set will bring in, at reasonably good loud-speaker strength, transmissions of stations at great distances.

Even with a moderate aerial there should be no difficulty in receiving all British and many Continental stations at good loud-speaker volume.

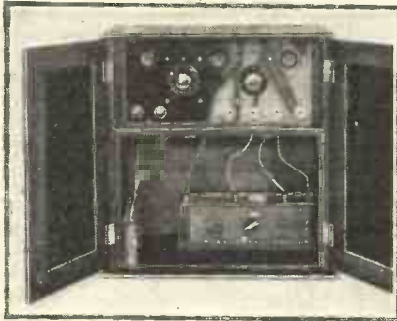
**COSMOS.** *Metro-Vick Supplies, Ltd., 145, Charing Cross Road, S.W.1.*

**HF\*—D—3LF.** Designed to give the best possible reproduction of broadcast speech and music, together with a satisfactory distance range and selectivity, this receiver incorporates a special circuit arrangement which, in practice, proves very effective. The first valve acts in a dual capacity as high- and low-frequency amplifier, the three L.F. valves following the detector being operated on the resistance-capacity method, well known to give great freedom from distortion. The standard table set is contained in a well-finished hardwood case with hinged box-type lid. A polished panel carries all controls, terminals and switches, the five valves being sunk into sockets in the panel. The controls comprise two tuning adjustments, reaction control, filament rheostats and on-off switch. By means of easily interchanged coil-boxes a total wavelength range of 180 to 3,000 metres can be covered.

Price £22-5-0.

All-in price (ABVET) £30-10-0.

Ref. W.M.501

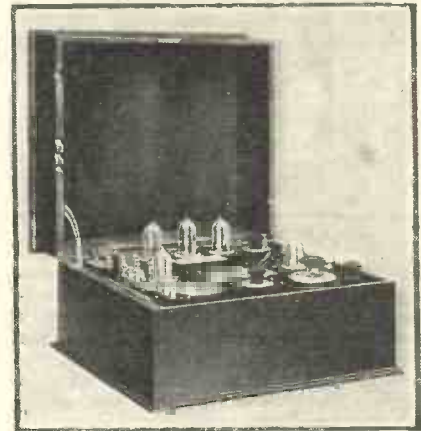


**Carpax Four-valver.**

**SIMPLON.** *Dargue Brothers, Ltd., Simplon Works, Halifax.*

**HF—D—2LF.** This four-valve set incorporates a straightforward circuit arrangement, with plug-in coils (aerial, high-frequency and reaction), the complete assembly being fitted into a particularly handsome floor-type cabinet of selected mahogany. The receiver panel of polished ebonite is set at a slight slope to facilitate manipulation of controls, and carries all valves, coils, tuning dials (two in number) and terminals. Other essential components are mounted beneath the panel. In the lower part of the cabinet and enclosed by the double doors, space is provided for stowage of all batteries and sundries, whilst, when not in use, the panel, valves, etc., are completely protected by the hinged box-lid. The set is designed to give good quality loud-speaker reception of most British and several Continental stations on the normal broadcast wavelengths. Reception from the long-wave stations can be obtained by substituting additional plug-in coils.

Price £25-0-0.



**Cosmos Five-valver.**

**ETHOPHONE GRAND.** *Burndepth Wireless, Ltd., Aldine House, Bedford Street, W.C.2.*

**2HF—D—2LF.** This is a five-valve universal receiving set provided with convenient and efficient switching arrangements, so that any desired combination of valves may be used, whilst the actual operation of the set may be made quite simple, or can offer every possible adjustment required by a keen experimenter. With the first two valves in use, great amplification is obtained on wavelengths from 100 to 5,000 metres. By omitting these two valves and changing the plug-in coils the wavelengths

*If you want further particulars of any of these sets send a postcard to US and save yourself trouble*

## Guide to the Best Valve Sets (Continued)

range can be extended to 25,000 metres, if desired. The cabinet is of solid mahogany, inlaid, and measures 35 in. long by 16 in. by 15 in. Full instructions for operation are given in a booklet supplied with the set.

Price (including valves) £78-2-6.  
All-in price (ABVET and S) £92-2-0.  
Ref. W.M.501

### COSMOS LOUD-SPEAKER SET. Metro-Vick Supplies, Ltd., 155, Charing Cross Road, S.W.1.

HF\*-D-3LF. This represents a further development in which the standard panel



Cosmos Five-valve Set.

and assembly are fitted into a seat floor-cabinet, together with self-contained loud-speaker. Various types of cabinet work are obtainable varying from a plain, but good-looking, mahogany cabinet to highly ornate models in Jacobean and Georgian style. The accompanying illustration shows the simple mahogany cabinet.

Price £46-0-0.  
All-in price (ABVT and built-in loud-speaker) £54-14-6.

Ref. W.M.503

### FELLOPHONE SUPER - FIVE. Fellows Magneto Co., Ltd., Cumber- land Avenue, Park Royal, N.W.10.

HF-D-3LF. A straightforward and easily operated five-valve set mounted in a well-finished cabinet provided with glass-panel double doors which afford protection to the main panel, controls, etc., when the set is not actually in use. The degree of sensitivity, together with the ample power provided by the three low-frequency valves, should enable excellent loud-speaker reception of all British and many Continental stations to be obtained without difficulty or especial skill in making the necessary adjustments. A reaction control is fitted, which improves both sensitivity and selectivity. The number of valves actually in use may be varied by means of plugs and jacks. Additional coils for reception from 5XX

Accessories are specified as follows:—  
A—Accumulator or suitable dry-cell battery.  
B—High-tension dry-cell battery.  
V—Valve or valves, as required.  
E—Aerial equipment.  
T—Telephones.  
S—Loud-speaker.

or other long-wave stations are supplied with the set.

Price £21-0-0.  
All-in price £24-0-0.

Ref. W.M.504

### FELLOPHONE CABINET - FIVE. Fellows Magneto Co., Ltd., Cumber- land Avenue, Park Royal, N.W.10.

HF-D-3LF. This set is fitted into a fine Jacobean oak cabinet or bureau, with loud-speaker incorporated and operating through a circular aperture at the top of the cabinet. The control panel is conveniently situated and is protected by a glazed door, whilst, in the lower part of the cabinet, space is available for stowage of all batteries and sundry accessories.

All-in price (ABVET and built-in loud-speaker) £50-0-0.

Ref. W.M.505



Fellophone Cabinet Five-valver.

### COSMOS UNIVERSAL. Metro-Vick Supplies, Ltd., 145, Charing Cross Road, S.W.1.

HF\*-D-3LF. A handsome cabinet-receiver, completely self-contained except for aerial-earth connections and loud-speaker. The panel and circuit arrangements are identical with the standard table model and are fitted to a substantially built and well-finished floor cabinet, having ample space available for stowage of all batteries, and obtainable in either mahogany or Jacobean oak, as desired.

Price (oak) £28-10-0.  
All-in price (ABVET) (oak) £37-12-6.  
With mahogany cabinet these prices are increased by £2-0-0.

Ref. W.M.502



Cosmos Universal Five-valver.

### PORTABLE RECEIVING SETS

IN this section have been included all types of sets with real claims to portability, whether completely self-contained (that is, with batteries, frame-aerial and loud-speaker all fitted into one case), or intended for use with a small, temporary outdoor aerial and/or separate and external loud-speaker.

The degree of portability desired by users or prospective users, the circumstances in which sets are to be used, and the class of results desired, vary over wide limits, but, for the purpose of this guide, only sets which may be carried complete, including all valves and batteries—even though not actually assembled as one unit—properly protected and provided with convenient means for carrying, are considered as portable sets.

The range extends from one-, two-, and three-valve sets to eight-valve super-het sets, so that no general indications of range, etc., can be given in this preliminary note.

To facilitate reference, however, the following simple classification has been adopted, and the class letter will be found after the title of each receiving set.

Sets entirely self-contained,  
with valves, batteries, frame  
aerial and loud-speaker ... CLASS A.  
Sets complete with valves,  
batteries and frame aerial  
but for use with external  
loud-speaker ... CLASS B.  
Sets complete with valves and  
batteries, but for use with  
temporary outdoor aerial  
and external loud-speaker ... CLASS C.  
Sets complete with valves and  
batteries, but for use with  
temporary outdoor aerial  
and phones only ... CLASS D.



**UBIQUE IV. Gilfillan Bros., Ltd., 63, High Holborn, W.C.2.**

HF—D—2LF (Class A). This set, complete as indicated by Class A, is contained in a substantial hide case, with carrying handle, and weighs 21 lb. Provision is made for the use of an external aerial, also an external loud-speaker or telephones, if desired. Special features are the simple switching arrangements which enable the change-over from the normal to long-wave broadcasting, and the on-off switch which controls the complete set and which is automatically moved to the off position when the case is closed. At about 20 miles from London very satisfactory loud-

speaker results were obtained, the music being clearly audible all over the house. Daventry, some 90 odd miles distant, was not quite as loud, but gave satisfactory room volume. Altogether an excellent and compact set.

All-in price £25-0-0.

Ref. W.M.602

**C.A.C. PORTABLE. C.A.C. Valve Distributing Co., Ltd., 10, Rangoon Street, Crutched Friars, E.C.3.**

HF—D—2LF (Class B). A very compact set, measuring overall 14 in. by 12 in. by 8 in., and weighing only 16 lb. It is sensitive, having a normal receiving

range of about 25 miles when used in conjunction with the frame aerial which is concealed in the hinged front of the case. Clear reception over much greater distances can readily be obtained upon telephones, or upon a loud-speaker if an outdoor aerial is used. Provision is made for connecting the latter, if desired. Valves and batteries, although completely protected, are easily accessible.

Valve filaments are heated by means of an unspillable accumulator. In operation the set is very stable and, once adjusted, can be put into or out of action by the movement of a master switch.

Price (AB only) £22-10-0.

Ref. W.M.603

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*If you want further particulars of any of these sets send a postcard to US and save yourself trouble*



*By An Australian Listener*

**I**F—or when—you listen to Rugby (GBR) pounding out its three daily news bulletins, does it ever cross your mind that those same signals are simultaneously poking their way into the Empire's most distant corners? Do you realise, when you put the phones on the table and let them bark at you, that the same morse is coming out—faint but clear—in Melbourne, Australia, or in Wellington, New Zealand?

Can you visualise the romance of this invisible link that unites the expatriated Britisher with London—and all that that name conveys? Even though the broadcast matter is not always of enthralling interest, its mere reception acts, for the moment, like a magic carpet that eliminates space.

Ten thousand miles—when spoken quickly—may not sound a very long distance, but it is one over which we do not all journey. In the confines of your tight little island a couple of hundred miles is something more than a week-end jaunt to most.

*Great Spans*

You are, unfortunately, apt to measure the area of a colony by a similar scale, and to forget that the mileage between our Perth and Sydney is about the same as that between Liverpool and New York. True, radio has consumed distance and bridged oceans, but, in order to appreciate its performance, we must not forget the length of its spans.

However, ten thousand miles is the length of the span between my home and Rugby, and some notes on its reception here may be of interest to you.

Two factors that have to be taken into consideration are the difference between local time and G.M.T. (we

are ten hours ahead of London), and the fact that static is worse in these latitudes than in yours. For these combined reasons GBR's 8 p.m. transmission (6 a.m. local time) comes through the best even in our summer—which, of course, is your winter.

At that time it is broad daylight and there is a minimum of static,

*YOU HAVE SOME PEOPLE  
IN THE COLONIES ?*

*Yes ? Then why not send them  
a gift of wireless apparatus for  
Christmas now ?*

although it seems anomalous to take down details of a severe snowstorm and, at the same time, to be perspiring in pyjamas! Probably, in the English summer, the midnight period will be the best.

There is plenty of kick at this end. At first, with an aerial having an overall length of only 65ft., and a mean height of 30ft., three dull-emitter valves were employed. The receiver took the form of a stage of high-frequency amplification coupled to a detector by means of a tuned-anode circuit and ending with one stage of note magnification. Reaction was employed between the detector's plate and the H.F. grid circuit.

This arrangement gave excellent signals when honeycomb coils of 1,500 turns each were placed in the reaction and anode circuits, while another of 1,250 was in the aerial circuit. Variable condensers of .001 microfarad capacity were used

However, there were two sources of interference: it was difficult to tune-out Lyons (LY) and Saigon (HZA). In addition, a harmonic from Braybrook (3LO), which puts out 5,000 watts on a wavelength of 371 metres, and is less than a mile distant, created an absolute blot when in operation.

However, GBR's signals being so good, it was decided to abolish the tuned-anode and substitute a straight detector followed by a stage of L.F. In this instance the time-honoured three-circuit tuner was employed with the 1,500-turn coils in primary and secondary, and that of 1,250 in the reaction.

The two-valver gives practically the same volume as that wherein three valves were required, and, what is much more important, there is not the slightest interference from anywhere. Certainly there is a minor undercurrent of LY, but nothing that need worry the poorest operator.

We do not know just how much power Rugby is employing, but, when properly tuned, Lyons' signals are quite twice the strength of GBR, and, at their 8 p.m. (G.M.T.) time signals, the Frenchman simply romps in.

*Reciprocation ?*

I have mentioned Braybrook (3LO) as a fairly powerful broadcasting station which is situated in the suburbs of Melbourne. In view of the fact that we occasionally hear your 2LO on four- and five-valve sets there seems no reason why you should not be able to reciprocate.

Two other Australian stations utilise the same power, Sydney (2FC) and Perth (6WF), and work on wavelengths of 1,100 and 1,250 metres respectively.

J. L. B.



# BROADCAST MUSIC *of the* MONTH: *By* Studios



Miss Winifred Fisher

ALTHOUGH the season for which we were promised lighter musical fare has passed, I am glad to note that we are still hearing many of the light orchestras from the various hotels and cinemas. These, in fact, are in many cases the only oases in the dreary wastes of interminable folk-songs of Elizabethan times or the syncopated brutalities of sound termed "jazz."

Arthur Salisbury, De Groot, and Frank Westfield have all made the musical accompaniment of a meal or a cinema film so important that without it neither would be complete.

Mr. Frank Westfield has perhaps the largest orchestra in any picture house in London, and the Prince of Wales, Lewisham, has justly become a musical centre of South London; the weekly broadcasts are more appreciated than many of the wearisome studio concerts. Mr. Westfield claims to have had hundreds of letters of appreciation of his work.

Besides the other bands of the month may be mentioned the Kettner Five and the Romaine Four from the Savoy Hotel, this combination taking the place of the earlier quartet known as the Selma Four.

One of the best of the new restaurant bands is that from the Café Verrey, where Mr. Arthur Salisbury leads. Mr. Salisbury already has a big reputation behind him; a pupil of Gomez and Melzak, he was just making public progress when the war interrupted his career.

### *His Successes*

After three years, on his discharge from the Army, he became leader of De Groot's orchestra at the Piccadilly; later he left De Groot to take

charge of Verrey's. He has recently been heard at the Holborn Empire with his colleagues, L. Racklin ('cello) and A. Ferraris (piano).

Apart from the military bands of the famous regiments, such as the String Band of the Royal Artillery, the Grenadiers, and the Air Force Bands, many of provincial fame have been heard, such as the St. Hilda's Colliery Band, Callender's Band, and others. The first band is attached to the famous Callender's Cable Works and is directed by Mr. Tom Morgan, who, being one of the best-known cornettists in the country, has played with the Coldstream Guards for six years and taken part in engagements under Edward German, Sir Edward Elgar, Sir Landon Ronald, as well as with the Savoy and Carl Rosa Opera Companies.

### *With Callender's Band*

Since 1913 Mr. Morgan has been director of Callender's Band, which has broadcast so frequently of late. As an adjudicator, also, Mr. Morgan has won fame throughout this country, Australia, and New Zealand.

Almost all of the provincial stations have been made conspicuous by the work of respective artists. At



Miss Lilia Mackinnon.

When we get opportunities for hearing the best and most melodious of works from the highly-trained musicians who make up these outside orchestras, we appreciate it.

Such artists as Emilio Colombo, Camille Couturier,

Miss Linda Seymour.



Miss Marguerite Bamberg.



Mr. Arthur Salisbury.

Birmingham, the 5IT Orchestra has been led and often conducted by Mr. Frank Cantell since 1924. He was, and is still, leader of the popular station quintet and has made their work an outstanding item in the daily programmes.

Mr. Cantell is a student of the Birmingham and Midland Institute and began a professional career at the age of eleven. In addition to his prowess as violinist, he was principal viola for two seasons for the Birmingham City Orchestra.

Mr. Frederick J. Thurston is another of the earliest broadcasters, at Marconi House in 1922. As a clarinettist, he has played with most of the big chamber-music combinations and also the Royal Opera, Covent Garden. His broadcasting work is connected mainly with chamber music, and he has been heard frequently this month.

### Pianoforte Recitals

The series of short pianoforte recitals has again been the means of introducing some famous artists to the widest possible public. Mention may be made of Miss Lilius Mackinnon, who, apart from her own wide concert-hall experience, has added technical training to her art and devised a memorising method which has met with the approval of the greatest pianists in the world, including Myra Hess, Irene Scharrer, Serge Kousevisky and many others. Miss Mackinnon's playing is always conspicuous for its clarity and power.

Besides other pianists may be mentioned Miss Edith Barnett, who made the composer Weber her especial rædium, and Mr. Rae Robertson, with his fortnight devoted to the Elizabethan music

in the FitzWilliam Virginal Books. Mr. Robertson is an exponent of the famous Tobias Matthay system of playing, which is essentially suitable to the Virginal music.

### Miss Doris Worsley

Miss Doris Worsley is another artist who has made pianoforte playing her art since the age of six. An open competition gave her a year at the University of Wales, and she won later the Caradoc Scholarship. Taking up concert work, Miss Worsley has given several recitals and is widely known not only for her instrumental work, but for her clever character studies and child impersonations.

We have had opportunities this month of hearing many artists of the younger school, amongst them Miss Joan Elwes, whose singing of Bach arias has placed her amongst the first rank of classical concert singers.

Miss Lillian Cooper is a clever young soprano, a pupil of Esta D'Argo, and winner last year of the Soprano and Rose Bowl Competitions at Blackpool. She has broadcast on many occasions, notably in a recital of Grieg Songs.

Miss Winifred Fisher needs little introduction to listeners, for I think she was one of the earliest artists to broadcast. From the very outset she has made a point of singing suitable songs with a clarity and beauty of diction that has made her one of the favourite artists in every request programme.

### Mr. Stanley Riley

On the masculine side we have had Mr. Stanley Riley who, apart from his fine work over the ether, will probably be remembered to listeners for the romance of his engagement and marriage last year to Miss Joan Strong, of the Wireless Chorus.

Mr. Riley has a great career before him; already at 25 he is the youngest Assistant Vicar Choral at

Miss Edith Barnett.



Mr. Rex Burchell.



Miss Winifred Fairlie.





Mr. Frank Cantell.



Sir Martin Harvey.

St. Paul's Cathedral, as well as bass soloist and leader of the Wireless Orchestra at 2LO. He has had varied experience as concert singer and also of stage work under Dion Titheradge at His Majesty's Theatre. His work over the ether is outstanding.

Mr. Gilbert Bailey is another well-known singer who has been heard again recently: He has been heard from many stations, but his recitals at 2LO and Daventry added considerable distinction to the programmes by reason of his choice of song.

#### For Lighter Fare

For lighter fare we have depended mainly on concert parties, cabaret shows, and a surplus of syncopated music. Amongst those who are always welcome may be mentioned Miss Winifred Fairlie and Mr. Charles Harris, who, if our memory does not fail us, was first heard over the ether last year with his own concert party, The Londoners.

Helena Millais, John Henry, Vivian Foster, and Willie Rouse have also given us of their best.

The talkers predominate in many instances, but there are a few whose work is of sufficient interest to be eagerly welcomed—those of Sir William Bragg, Mr. Allen Walker, and Desmond MacCarthy, besides a host of others.

Up in the North the work of Augustus Beddie is always welcomed, and his recitals both over the ether and at various halls are always well received. Probably he is one of the few talkers whose work has been recorded for home music and entertainment. This autumn he has given some "Portraits of History" and poetical extracts.

#### Herbs and Herb Gardens

Probably few people realised the fascination of herbs and a herb garden till they heard the lectures of Eleanour Sinclair Rohde, the authoress of many charming books on this subject.

Mr. Moses Baritz is probably the most famous talker of the B.B.C., as from the very beginning at the Man-

chester Station he started his lectures on operatic music and utilised the great gramophone records to illustrate his points. He has broadcast in this way from many other stations, and is one of the greatest authorities on operatic music and the making of operas that we have in this country.

Taking a broad outlook of the month's music and programmes, there is an obvious effort to provide contrast, the result often failing through the lack of utilising music more suited for the masses than the few who can better afford to indulge their classical tastes at the standard concert halls.

#### The Larger Public

That there is an audience for this type of work we do not doubt, but the larger public is that scattered throughout the country, and it is more than doubtful if a Greek play of Euripides or a constant flow of Elizabethan folk song and the classical works of Bach, Brahms, and Beethoven are of overwhelming interest.

Given alternative programmes of classical and popular music, all might yet be well, but at present the many are still being forced to enjoy items specially to the taste of the chosen few.



Miss Doris Worsley.



Mr. Stanley Riley.



Mr. Moses Baritz



Mr. Gilbert Bailey.



Lino Cut by William Kermode.

THE maids had gone to the cinema, so I opened the door myself. Twenty years ago such an object as I now beheld would either have been immersed in the quad fountain or deprived of his trousers; his hair was greased and parted down the middle, while he wore horn goggles and trousers capacious enough to accommodate an entire boat's crew of A.B.s.

By this time Julie, my younger daughter, was mysteriously at my elbow. "This is Bill, dad!" she explained. I had never heard of Bill; were they secretly married, or had they met for the first time last night? With the modern daughter one never knows.

"How d'ye do, Bill?" I temporised. He wrung my hand effusively: evidently they weren't married yet. "Have you got the doings, Bill?" continued Julie, "bring 'em right in."

The modern parent being a nonentity in his own house, I meekly assisted Bill to retrieve from his car a large blue leatherette suitcase, and a small mahogany object which I mistook for a tea caddy. Abetted by Julie, he took the "doings" into the drawing-room. Roulette crossed my mind; also thoughts of a protest. Bill received rapturous greetings from the assembly, none of whom knew him, though all were expecting him.

Handling the suitcase delicately, he removed its lid, which he stuck on a small pivot; peeping over younger shoulders, I discovered eight valves on a shelf inside it. Bill next laid on the table a periodical previously unknown to me. The young folk informed me pityingly that it contained the programmes, call signs, and wavelengths of all the Continental broadcasting stations.

We now settled down to modern

scientific gambling. Each person in turn selected a station from the list in the paper. Julie then juggled with the mahogany tea caddy. It made no immediate protest, but I was given to understand that it emanated waves identical with those of the specified station. Bill then made magic passes over the blue leatherette suitcase, from the bowels of which a small horn projected. When the suitcase and tea caddy were adjusted to perfect sympathy, the horn emitted a loud booming noise, reminiscent of a ship's siren in a fog.

When Bill was satisfied, he nodded to Julie—speech was inaudible against the siren. Julie then switched off the tea caddy, and the Ruritanian station should be audible on the loud-speaker. If it was, Bill got a shilling from the person who had named Ruritania. If it wasn't, Bill paid a shilling.

I listened in considerable mystification. The odds seemed to be heavily in favour of the bank, and Bill collected a number of shillings by successively tuning-in Rome, Madrid, Munster, Toulouse, Brussels, and several weird places which I vow were never on the map in my school-days, including Ryvang and Oslo.

If the item being transmitted chanced to be jazz, gambling was suspended, and the company—always excluding the elderly master of the house—curvetted gaily till the station faded or the tune ceased.

Presently a slight fracas arose. Young Harcourt's turn came, and he demanded some outlandish place called Hilversum. Julie set the tea caddy, Bill tuned-in the foghorn effect, Julie switched off the wave-meter, and a deathly silence ensued. It lasted a minute or two and Harcourt held out his hand for a shilling.

Bill did not pay up, which I

thought ungracious, as his pocket was bulging by this time. He tickled another knob, and the suitcase gave an impression of a somewhat anæmic pig being slaughtered at a great distance. This, he alleged, was Hilversum's "carrier wave"—whatever a carrier wave may be. Hilversum, it was claimed, was enjoying an interval: if we waited a few moments, the night would be filled with Dutch music. We waited. It wasn't.

The company appointed me a sort of amateur Tattersall. I realised by this time that Bill's reluctance to pay up was not avarice, but a technical conscience. He could not bear the blue suitcase to be defeated. I honoured his motives. "That unmelodious noise," I decided firmly, "is Hilversum's carrier wave." Harcourt paid.

After a few more tangos, fox-trots, and guttural unintelligibilities, the damsel on my right chose Zurich to carry her shilling, and handed me the periodical. I pored over it, realising my gross ignorance of modern geography. But near the right-hand bottom corner of the list I identified a certain winner. The male voice quartette from Zurich concluded their tremolos, and Bill gazed at me expectantly.

"Jönköping on 265 metres!" I demanded in accents which tried not to be too triumphant. There was a deathly silence. Even Bill seemed daunted. I saw at once that in my senile ignorance I had broken some unwritten law of the game. I felt as if I had shot a fox, or was wearing a made-up tie.

Murmurs of protest arose faintly from the assembly. "There isn't such a station!" and so on. Bill stretched out a doubtful hand for the paper. "It's a relay!" he murmured in a tone of deep disgust.



## PROSPECTING BY WIRELESS

Evidently there is something indecent about relays; meditating flight, I wondered what frightful *faux pas* I had committed.

"Where?" enquired Joan. "Sweden," explained Harcourt, who was sharing the paper with Bill, "and only half a kilowatt!"

I wished the floor would open under me. "Never mind," I intervened hastily, "I'm not really interested in Jönköping, I only thought it had rather an intriguing sort of name, and I've never heard Swedish spoken. I don't mind at all, honestly I don't. I'll pick another." I snatched the periodical from the lads, and fumbled, "Give me Bournemouth!"

Howls of execration arose from the multitude. Bill, it appeared, was the super wireless product of a scientific century. Bournemouth was a station which any schoolboy could pick up on a crystal. It was as if I had asked Fender whether he knew how to bowl a yorker. Muttering something about seeing whether there were any more syphons in the pantry, I fled from the room.

G. W.

## TOO MUCH WIRELESS?

SOME people are never tired of complaining about radio; but I think the most original growl comes from a gentleman who has heroically decided not to touch the earphones on certain nights because the ubiquity of wireless tempts him away from other recreations.

One can't help feeling, "Well, why not, if he enjoys listening-in so much better than his other recreations? It's not work that's suffering."

Still, I think this must be a rare grouse. For one thing, it implies so much more leisure for listening-in than most of us get. It also implies that the gentleman never stirs from home day in, day out, since he mentions tea- and dinner-time transmissions.

Most of us—at any rate, us women—by the time we are through with our work and have allowed for the afternoons and evenings we spend out and entertaining friends, don't find we suffer from an overdose of broadcasting.

A. M. M.

It is well known that the presence of conducting bodies obstructs the passage of ether waves. The use of a screening or reflecting network of wire, placed behind the radiating system of a directional beam transmitter, is one illustration of this action.

### Twisted Wave-fronts

When an ordinary direction-finding set is used on board ship or in an aeroplane, it is found that the direction of the incoming wave-front is disturbed or twisted out of the true by the action of any adjacent metal funnels, hatch coverings, stay wires and the like, and it is necessary to calibrate and allow for this quadrantal error, as it is called.

The angle of twist is calculated by a method similar to that employed when heeling a ship for magnetic deviation, due to the presence of iron, upon a ship's compass.

In the course of some recent experiments in direction-finding on land, carried out by the Air Ministry, a mysterious but constant error was found to occur in the calculated bearings of certain stations. Various suggestions were put forward in explanation, but no satisfactory solution was found until one ingenious investigator thought of examining the ground in the vicinity of the wireless hut.

The clue to the puzzle was then discovered in the shape of a segment of metal pipe-line, which had been lying buried some feet under the soil for many years. Its existence had been totally forgotten until it succeeded in making its presence felt through the medium of wireless.

The same basic idea underlies a new method for locating metal ores which has recently been invented in Australia and tried out on a large scale in New South Wales. The tests were made on the side of a mountain suspected to contain rich deposits of ore in the neighbourhood of the town of Hillgrove.

The prospecting apparatus consists of a low-power transmitter and receiver combination, which are placed in position about 100 yards apart. The transmitting and receiving aerials are in the form of small frames or helices.

After first getting into touch, with both aerials upright and facing each other, the frames are gradually depressed towards the horizontal position so that a concentrated beam of radiation is directed through the part of the mountain-side under investigation.

If no sound is heard, it is evidence that there is no metallic or conducting mass buried in the soil between the transmitter and receiver, but if signals are obtained then one has been located. By noting the angle at which the frame aerials give maximum signal strength, the depth of the reflecting mass of metal can be calculated, the length of the base-line between the two instruments being known.

A somewhat similar idea has been utilised by a French inventor, M. Langevin, for indicating the depth of water under a ship. Here, however, ultra-acoustic sound vibrations are directed towards and reflected back from the sea bottom, the time interval between the moment when the sound vibrations are emitted and the moment when the reflected echo returns being registered by means of a thermionic valve.

The valve is initially paralysed by means of a high negative charge on the grid. The depression of a key used to operate the sound-producer short-circuits a blocking condenser in the grid circuit of the valve, and so removes the bias, whereupon a current immediately flows through an integrating recorder in the plate circuit.

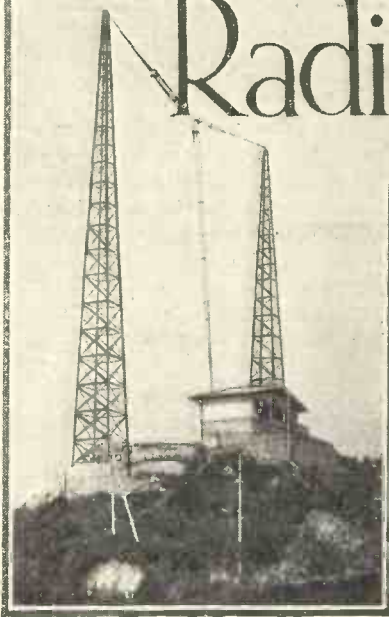
### Restoring Original Bias

This current continues to flow until the reflected echo is received upon the grid of a second valve. The corresponding change of plate current in the second valve is arranged to restore the original grid bias on the first valve, the plate current of which accordingly stops.

The reading of the integrating instrument then gives a record of the interval that has elapsed between the original outgoing sound and the impact of the echo, and the velocity with which a sound wave travels through the water being known, the depth of sea at any given point can readily be determined.

B. A. R.

# Radio San Sebastian



We assure Dr. Rodrigues that we are glad to have the opportunity of publishing these special photographs of his station.

The San Sebastian transmitter is situated outside the town on a mountain called Monte Igueldo, as can be seen from the leading photograph. The transmitting gear is installed in the building directly underneath the aerial. The studio itself is in the town of San Sebastian.

the spur of the moment. Thought and research in quotation books would surely discover others, equally or more appropriate.

Like softest music to attending ears.—*Shakespeare.*

Give us grace to listen well.—*Keble.*

They hear a voice in every wind.—*Gray.*

Sounds overflow the listener's brain. So sweet, that joy is almost pain.—*Shelley.*

Or, perhaps best of all, Longfellow's:—

And the night shall be filled with music,

And the cares that infest the day, Shall fold their tents like the Arabs, And as silently steal away.

So much for the wireless set.

And for speakers before the microphone, with the B.B.C. bogey of censorship always dangled before them, who can better this dictum of Bacon's that, "Discretion of speech is more than eloquence"? M.

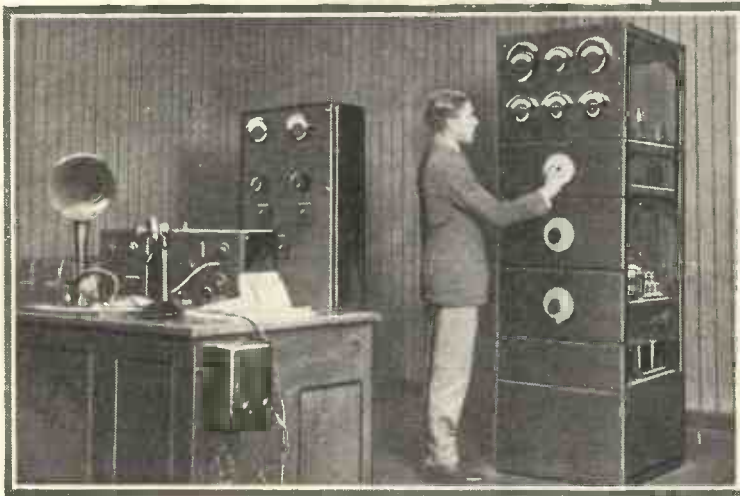
## A Motto for Your Set?

**M**OST of the Spanish broadcasting stations are very well received even by English listeners who use only the simplest of one-valve sets, and the transmissions of San Sebastian (its call sign is EAJ8) come in with particularly good volume. For this reason additional interest is added to the photographs that appear on this page.

These photographs have been sent to us specially by the engineer of the San Sebastian station, Dr. Fermin Rodrigues. In his letter Dr. Rodrigues says: "Please be kind enough to excuse the liberty I take in writing you, and pray forgive me if I spoil your language, of which, I am sorry no to have a proper knowledge."

**A**N apt quotation is always a joy—hence the prevailing habit of having one beautifully lettered, framed and hung over the hearth or on the walls as a motto. Why not, then, a motto for the wireless set? It would have to be found from among the classic authors who never heard of radio and the ingenuity required to discover something appropriate would make an amusing little family or party competition.

Here are my own entries for the contest, made on



Many English listeners are familiar with San Sebastian, EAJ8. These photographs show the engineer attending to the transmitting gear; on the left he is adjusting the aerial tuning and above he is measuring the wavelength before starting to transmit a programme.



# SOLDERING

## *Without Groans!*

*An Article That Will Save  
The Home Constructor Pain*



"OH, I can't be bothered to solder the connections! I know it's supposed to be more effective, but it's such a messy business!"

But really soldering and unsoldering are no more tedious than twisting and untwisting wires, and need in no circumstances be described as "messy."

### *Main Points*

The main points to remember are these:

#### ALWAYS—

- Observe strict mechanical cleanliness.
- Maintain a proper temperature of the bit.
- Keep the bit in a properly tinned condition.

#### NEVER—

- Allow solder or work to oxidise.
- Be too lavish with flux.
- Handle the surfaces to be soldered once they have been prepared for the operation of soldering.

Most of the foregoing points may usefully be elaborated a little, while one at least needs to receive attention in detail.

By mechanical cleanliness is meant absence of all matter or conditions inimical to the success of the operation of soldering, for example, tarnish or oxidation, grease, sooty deposits, etc. The presence of such matter in even minute quantities is sufficient to cause partial or complete failure in soldering, so that every surface to be worked should first of all be cleaned either with emery cloth or a smooth file.

It is unwise to assume that already tinned surfaces, such as those of tinned wire, tags, etc., do not require any cleaning. The cleaning in these cases may, however, be

confined to rubbing with a cotton rag on which a little flux has been smeared, though if they are badly tarnished the emery cloth should be brought into use.

Certain means sometimes used for heating the bit are totally unsuitable for the purpose. A coal fire is one. Gas is not good, not only because it contains too many sooty impurities and oxidising agents, but also because its heating qualities are too great to be readily regulated for the purpose in hand.

The most suitable and convenient agent to use is undoubtedly a methylated-spirit flame, in which the bit can usually be left for quite a considerable period without raising its temperature sufficiently to cause oxidation of the tinned surface. Small spirit lamps, especially designed for soldering work, may be purchased at small cost. It is advisable to choose a make which includes a hinged support for the bit.

The point relative to keeping the bit in a properly tinned condition is of such importance that the process of tinning will be briefly described and hints added as to the proper maintenance of that condition.

### *"Tinning" the Bit*

Tinning is the process by which any surface (not only that of the bit) is covered with a coating of bright solder. To do this with a new bit, it or rather the copper portion (the bolt), should be cleaned with emery cloth and the bit brought to the proper temperature in the spirit flame. This is the case when the flame becomes tinged with a green colour.

Here a word of warning. Never allow the tinned portion of the bit or that portion about to be tinned

to come into direct contact with the heating flame, which should only be allowed to play upon that part of the bit where the bolt is rivetted to the shank. Remove the bit from the flame; dip the end of the stick of solder into flux, and with it lightly touch each of the bevelled surfaces.

The solder will probably not run evenly, but will collect in "blobs," so in order to spread it satisfactorily over the entire surface the bit should be wiped while still hot on a cotton rag on which a small quantity of flux has been smeared. The operation is then finished, and it will be seen that the business portion of the bit is completely covered with a bright coating of "tin."

### *Keeping the Bit "Tinned"*

This is the condition of the bit which it is necessary to maintain if quick, clean, and firm joints are to be effected. Should by any chance the tinned surface become dull (that is oxidised), or otherwise mechanically dirty, the bit should be heated and wiped thoroughly on the cotton rag already referred to.

In some cases where the bit has got into a particularly bad condition, it may be necessary to have recourse to a file to remove the entire existing surface. The bit must then be retinned in the manner described.

The rag already twice mentioned requires a short note to emphasise the necessity of its consisting of vegetable fibre, such as cotton, and not of animal fibre, such as wool, which, owing to the quantity of grease and other carbon it contains, soon ruins the surface of the bit for soldering purposes.

The remaining points can be dealt with in a few words. Oxidisation, as can readily be inferred from what has already been written, is the main

## Soldering Without Groans! (Continued)

enemy of successful soldering. This undesirable condition is usually the result of overheating, although it also follows from exposure to the atmosphere for any length of time and it is mainly to counter its effects that flux is used.

That is no excuse, however, for an improper use of this invaluable material. It should be remembered as an axiom that the slightest touch of flux properly applied in the right place is of far more value than wholesale and indiscriminate smears.

*'Ware Burns!*

The main reason for not handling surfaces to be soldered has already been intimated, namely, because the minute quantity of grease so deposited is sufficient to prevent a successful joint. Apart from that reason, however, it is wise to handle

material to be worked only with a pair of pliers, because the heat from the bit travels much more rapidly and much further than one might imagine, and one is apt to receive a nasty burn if care is not taken in this respect.

A few general hints in conclusion: Always have tools and materials ready to hand. Much valuable time is lost otherwise, not to speak of the vexation caused by having to reheat a cooled bit at a critical moment just because it has been necessary to spend a few moments looking for some gadget or other.

It is a good plan to coil the stick of solder so that it may lie conveniently on the bench or table in such a position that in order to replenish the supply of molten solder on the tip of the bit, all that is necessary is to touch it lightly with the latter implement.

Square-tinned wire has many advantages over the round variety as far as ease of soldering is concerned. It is important to remember, however, that in order to effect really sound joints at least three adjacent surfaces of square wire should be cleaned preparatory to applying the solder so that the latter may flow readily all round the actual surface to be joined.

*Unsoldering*

Lastly, to unsolder, all that is required to separate the joints is a hot bit and a pair of pliers. The writer guarantees that with a little practice a dozen soldered joints may be unstuck in as many seconds. Compare this rapidity of work with the tedium of unscrewing nuts and untwisting wires!

E. L. M.

## "SSSH!" Adventures at a Listening-in Party

"CAN you come on Thursday evening to listen-in? Mary has just got her wireless up, and she knows how very musical you are, and that you have never listened-in yet."

"So many thanks!" you say; and you hurry off on Thursday evening, thinking: "Never mind the weather: there's beautiful music when I get there."

And so there was! Mary sat on one side of the fire, and her father on the other, and I was given a place in the middle. The only three phones were produced, and we fixed them on our three happy heads. Mother got out some sewing. Hilda sat and read a book.

In the middle of a lovely song, mother tip-toed to the back of my head and whispered: "Are your phones on quite right?" I said: "Oh quite, tha—" "Sssh!" she breathed, giving my phones a jerk, and I missed that climax in the song!

During the next lovely item, my left eye saw mother waving violently to Hilda. The girl looked up from her book at last and said: "What, Mummy?" "Sssh!"

Then much pointing to the fire and coal scuttle. Hilda gets up and picks up the tongs. ("Sssh!") She throws a lump of coal on. ("Sssh!") She goes back to her book, and unfortunately drops it. ("Sssh!")

We are getting on nicely now, when mother extends her hand towards the young reader and waves it up and

mother tip-toes, with much silent jerking of the body, to Mary, and whispers. Mary says: "Oh, Mother!" "Sssh-ssh-ssh!"

Mary moves to another seat, accompanied by many "Sssh's!" and mother brings in the kettle and puts it on the fire for making hot drink. Dad says: "What, already?" "Sssh-sssh-sssh-sssh-sssh-sssh!" Another item spoilt!

Never mind! Now there's a lovely baritone song, and you've forgotten all the antics witnessed before.

What a fine voice you are thinking; and his compass is really most—"Do you prefer cocoa or coffee?" is whispered into your ear. You almost jump, for you had not seen or felt mother coming this time.

You'd like to answer that you'd prefer music, but politeness has to be considered; so you lose the point in the song, and say: "Oh! cocoa, thank—" ("Sssh!")

At the end of the evening mother says: "Come again next Thursday, won't you?" You are driven reluctantly to say: "I'm so sorry, but I am full up that evening." ("Sssh!")

A. M. C.

UP AGAINST A  
KNOTTY PROBLEM?

Let us help you. Send your questions (together with the coupon on cover iii and a stamped addressed envelope) to The Editor, WIRELESS MAGAZINE, La Belle Sauvage, E.C.A., and we will let you have a reply in a few posts.

down, then waggles two fingers together in the manner of cutting with scissors and points towards upstairs. Hilda says: "Do you want your scissors, Mummy?" ("Sssh!") Hilda opens the door ("Sssh!") and finally gets the scissors. Returning, she closes the door again ("Sssh!")

Later, during an interesting item,



# DECORATING YOUR WIRELESS CABINETS

By  
S.N. Sedgwick.

Designs by  
Molly Dowler



NOBODY can say that wireless cabinets are particularly artistic or beautiful. Generally speaking, they may be described as plain and useful, but certainly not ornamental. Every reader is familiar with the usual shapes and designs to be found in every wireless shop—plain rectangular boxes or desk-shaped cases of oak or mahogany (chiefly imitation) devoid, as a rule, of any sort of carving or decoration.

No doubt, at this stage of wireless history, this is all that we can expect; but the time is coming when we may fairly look for something rather more decorative and beautiful in outward appearance.

It is a commonplace to say that every person who gets bitten by the new delights of listening-in looks upon wireless as the most wonderful invention of the century.

"Little short of a miracle." is a frequent description of it and no one will deny that there is something akin to the marvellous in the picture of, shall we say, a working man in a small cottage in an out-of-the-way village, sitting down in the evening to manipulate a power which brings him into touch with all the world.

Just because that is so, it may well follow that when the artist and the craftsman apply their faculties to the decoration and adornment of wireless cabinets they will want to let their imaginations play, and to make their carvings or paintings enshrine this thought.

One might almost say that wireless is too fine and magical a thing to be expressed outwardly in plain wood boxes and ugly sloping cubes. The jars and other receptacles in which the wizards of the Arabian Nights kept their magic charms were made to match.

Our fathers took care that the same

and the designer in the wireless world of to-day.

Here are two designs which have been used in the making of some simple wireless cabinets, and also the photograph of a crystal set completed for a lady's drawing-room.

In them the artist has introduced that touch of fantasy which is referred to above, and each design contains some wireless "allegory," not without a hint of humour.

In Fig. 1, the main thought is "waves," of course—"the swelling of the voiceful sea." The two lower panels form the doors and, when open, the back of the right-hand door bears a carved inscription:—

Certain stars shoot madly  
from their spheres  
To hear the sea-maid's music.

The other door carries Chaucer's words, which illustrate the bottom design:—

Oh, it was wonder like to  
bee  
Song of mermaidens of the  
see  
That for hir singen is so  
clere.

For Fig. 2, the main idea is "Ariel"—a whimsical pun, not without poetry in it, as we think of Prospero's fairy servant who "drinks the air and returns, Or e'er your pulse twice beat." But this is Ariel set free to listen to the horns of elf-land. In this cabinet the ebonite panel is behind the folding doors.

The heading photograph illustrates a neatly designed crystal-set. In this set nothing is visible except four terminals, which are at the back of the cabinet. The design,



Fig. 1.—A "Waves" Cabinet Decoration.

principle was applied to the instruments with which they viewed the stars; and even in prosaic matters, such as printing, their old presses stood on fine iron dragons, or leviathans that were more or less emblematical.

There is room, then, for the artist

## Decorating Your Wireless Cabinets (Continued)

in this case, explains itself; the quotation:

Music on the spirit lies  
Like tired lids on tired eyes.

reminds us of those fall asleep with earphones on, though the artist has drawn a "loud-speaker," through which the distant Pierrot's voice has lulled the listener to slumber.

### Direct Carving

There are several ways by which these or other designs can be produced. Direct carving on the wood suits the second design particularly well, but those who can use a fret-saw, can produce the design by fretwork overlays, using xylonite, ivorine or other material.

Others may like to try their hand at inlay work, using different

coloured woods—padouk, whitewood, silverwood, chestnut, which can be

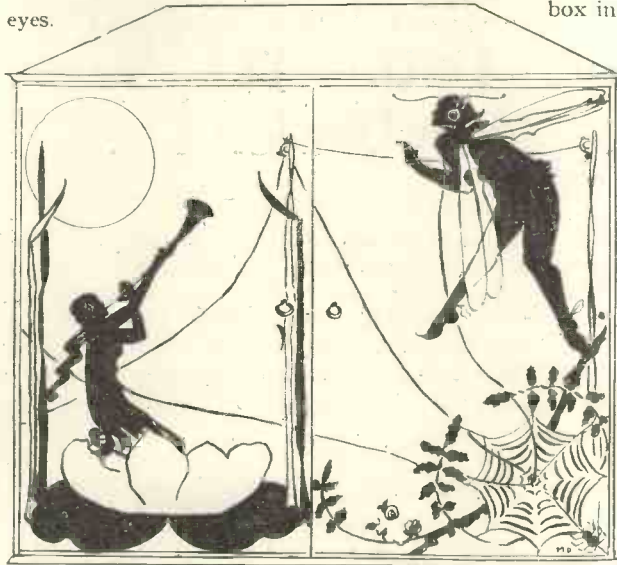


Fig. 2.—"Ariel" Cabinet Design.

bought for this purpose from any handicraft shop.

There are also marquetry inlay transfers which can be used in artistic hands to transform a plain box into a handsome cabinet, whilst "poker-work" suggests itself, also, as a possible method of decorating cases.

### Other Methods

The design in the photograph is painted direct on to the case, and covered with a clear hard varnish; but this article is intended to be suggestive, and readers may have methods of their own, by which they can produce cabinet or case worthy of the instrument which affords them so much pleasure, and puts such enchantments within their reach.

Remember that it is the design and not the medium that matters!

## ON UNKNOWN WAVELENGTHS!

SEVERAL women recently broadcast a debate on Sunlight. Needless to say, they didn't soft-soap one another.

2 L O's new studio clock has not any tick. We can sympathise with it. Our tailor gets like that sometimes.

A COMPETITOR in a wireless club raffle recently won a pair of German headphones. That should teach him to leave gambling severely alone in the future.

AN item in a recent Austrian programme, "Ten Girls and One Man," is described as a comic opera. It sounds more like the curtain raiser to a tragedy.

ONE of the American stations has given a talk on "How to Live Long." This is the sort of thing that will bring wireless into disrepute—especially amongst undertakers.

COMMANDER KENWORTHY has heard his own voice on the wireless. What a pity all our M.P.s can't be put through this procedure.

"WHAT Men Will Do for Gold" was broadcast from a Californian station a few weeks ago. The answer, of course, is "other men."

WE should like to correct the impression of the correspondent who thinks that gang-control originated at Dartmoor.

A B.B.C. correspondent has suggested that all lectures shall be given in Esperanto. Evidently a Yorkshireman who does not understand ordinary English.

FROM a daily paper: "Wireless concerts were given during the recent hop-picking season in the Kent hop-fields." (N.B.—Some of our older readers may remember that hops, in pre-war days, were used as an ingredient in the brewing of beer).

"THRIFT" formed the subject of a talk from Glasgow recently. We suggest that "Coal" might similarly be given from Newcastle.

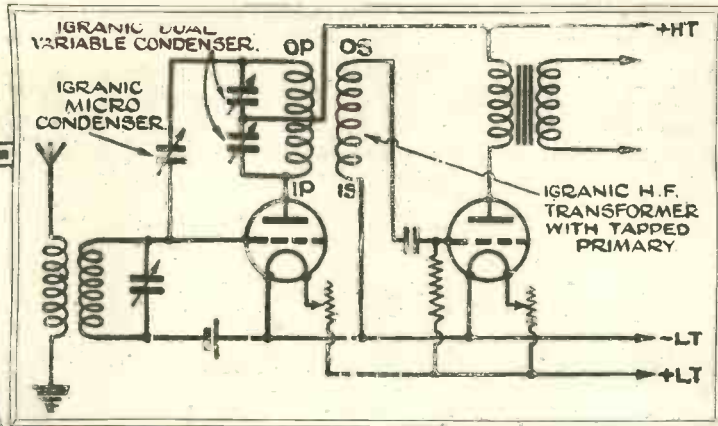
COMING wireless lectures on "speed" are announced. The Bricklayers' Union are considering whether they shall strike as a protest.

OF the 26 broadcasting stations in Spain, only 11 are at work. No wonder that somebody said the other day that wireless was "nearly human."

A PUBLICAN says that there has been less drinking in his bar since he installed the wireless. Then the programmes can't be so dry as some people would have us believe.

SEVERAL listeners have been complaining that too many of the programmes are designed for loud-speaker work. Such as a 5 P Y talk on Cheshire Cheese, for example.

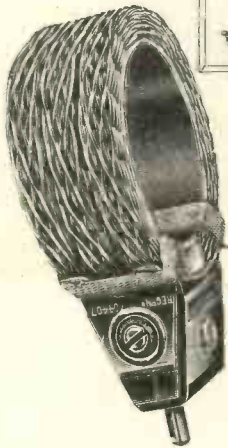




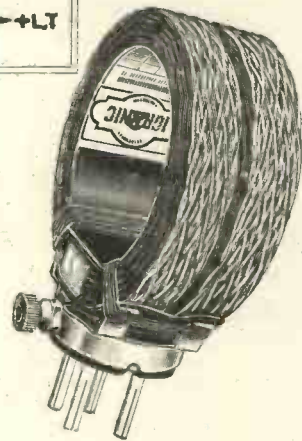
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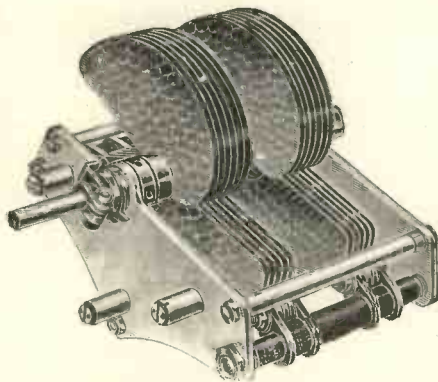
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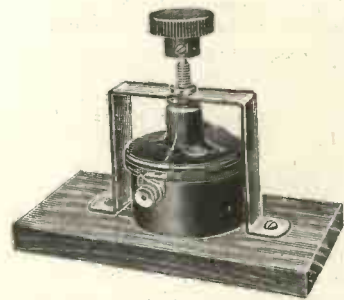
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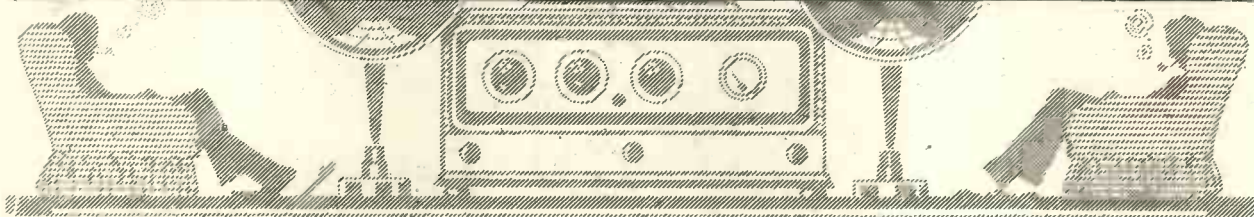
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# What Readers Think of Our Sets



## AS GOOD A SET AS MONEY CAN BUY.

February, 1925, p. 20 (No. 1).  
September, 1925, p. 135 (No. 8).  
March, 1926, p. 121 (No. 14).

### In West Australia

To the Editor, "Wireless Magazine."

SIR.—Perhaps the following information may be useful by way of comparison as to what your set, described under the heading of "As Good A Set As Money Can Buy," is capable of in other countries. Using this set I have received the following stations regularly:

Station	Call Sign.	Distance in Miles.
Brisbane	4QG	2,300
Sydney	2FC	2,100
Sydney	2BL	2,100
Melbourne	3LO	1,700
Melbourne	3AR	1,700
Adelaide	5CL	1,200
Adelaide	5DN	1,200
Durban (S. Africa)	—	5,300
Sydney	2KY	2,100

All stations except the last one can be heard at reasonable strength on a Baby Brown loud-speaker. For the local station, 6WF (1,200 metres, with a power of 5 kilowatts) only three valves can be used as four make too much sound.

It is interesting to note that the station 4QG, Brisbane, is 2,300 miles away over land all the way. For Durban, of course, it is practically water all the way.—L. SEWELL (Perth).

### "Purity and Power"

SIR.—Please allow me a few lines of praise for your "As Good As Money Can Buy" Four-valver (first circuit). My set has been in constant use for twelve months, and I have refrained from altering the circuit except to use a Bretwood variable grid leak, which I find gives the set the finest control over oscillation.

My aerial is an indoor one, 14 feet long with four strands and two spreaders 4 ft. 3 in. wide. With this poor aerial I work 2LO, 5XX, 2ZY, 6LV, 2BE, Madrid, Munster, Frankfurt, Oslo, and a great many other stations on my loud-speaker. Dublin on three valves is far too powerful.

As the power station is not all that could be desired, and the house is fitted

with electric light, I sometimes have a great deal of interference with the dynamos working, but by disconnecting the earth from the set and slightly altering the tuning I can still work Dublin without loss of power, and cut out nearly all interference.

Purity and power are the keynotes of this set, and when I have been having a few friends or, worse still, wireless fans, to come and hear the set working, it has only once let me down.

I shall not regret the day I started wireless and your excellent magazine.—H. HAYES (Holyhead).

### "Selective and Sensitive"

SIR.—I feel that I must let you know of my success with another of your sets. I constructed your four-valver, "As Good A Set as Money Can Buy," and have found it a topper. I have kept to your circuit, but have altered the layout.

All the coils are totally enclosed within the cabinet, and here I have introduced a novelty. The anode coil is entirely wrapped up in tinfoil, which is connected to earth. This makes a very efficient screen and prevents interaction between the coils. It also cuts out a lot of interference.

The set is very selective, sensitive and loud. I receive the local station at 25 miles, and Daventry at about 180 miles at full loud-speaker strength on three valves; also about ten other stations (B.B.C. and foreign). With all four valves in use I can almost have any programme I choose.

I may say that I have substituted plugs and jacks in place of terminals so that I can use two, three or four valves at will.

The panel is made of three-ply wood, stained walnut and french polished. I found this a great saving and at no sacrifice of efficiency, for all components on the panel are at earth potential. The whole is enclosed in a cabinet fitted with doors, and altogether it is a real de luxe set.

I thank you for this, one more of your many successful sets.—A. E. RUTTER (Wingate, Co. Durham).

### "Delighted With It"

SIR.—I have made the four-valve set named "As Good A Set As Money Can Buy," designed by your staff, which you recommended as being the most suitable set for my requirements, and thought you

would be interested to know I am delighted with it.

When working in conjunction with an Amplion Radiolux loud-speaker it gives most remarkable results. From Cardiff, Daventry and Bournemouth reception is beautifully clear and very natural. Radio-Paris comes in very well on three valves, but a wavetrap is necessary to separate it from Daventry when the latter is broadcasting.

I have heard most of the demonstration sets of all makes up to £50 or more in the Bristol shops, but speaking absolutely without exaggeration none of them are so natural or so clear, although some may be louder.

The Amplion Radiolux gives perfect reception but will not take the four valves on 5XX or 5WA, so I invariably use three valves.

The set is perfect on three valves, but when four valves are switched on a certain amount of crackle\* comes in which rather spoils the reception (but even then is quite as good as most sets).

My many wireless expert friends all are very surprised with the results I get and say it is quite as good a set as they have ever heard, and it evidently is "as good a set as money can buy."

I thank you very much.—A. J. BROWNSTON (Bristol).

\* We suggest that these cracklings are due to atmospherics or some other form of interference external to the set.—ED.]

## A NOVEL QUICK-ASSEMBLY CRYSTAL SET.

September, 1926, p. 156 (No. 20).

### "Most Wonderful Set"

SIR.—I have just completed the crystal set described in this month's magazine, and I think it is the most wonderful crystal set I have ever made.

I have a bought set and I have made many, and I can say that none has been able to compare with the Quick-assembly Set.

Thirty miles off Newcastle is quite strong, Daventry fairly good. With my neighbour working a four-valve set next door I was able to receive Dublin. I feel that I must sincerely thank the designers for furnishing us with details of such a perfect little model.—G. WALKER (Eastgate, Co. Durham).



**S.P. 18  
RED SPOT**

A real two-volt power valve. Designed specially for low frequency amplification. Should always be used in last stage for operating loud speaker. It is also suitable as a detector.

Fil. Volts: 1'6.  
Amps.: '3.

PRICE 14/-

**S.P. 16  
GREEN SPOT.**

A high amplification valve having a moderate impedance. Designed as a high frequency amplifier and as a detector. Also suitable for resistance, choke and transformer coupling (except last stage, where an S.P. 18 Red should always be used).

Fil. Volts: 1'6.  
Amps.: '3.

PRICE 14/-

**S.P. 18  
BLUE SPOT.**

Extra high amplification valve. Designed for resistance capacity, choke and early stages of transformer coupling. Excellent as a detector or tuned anode H.F. amplifier.

Fil. Volts: 1'6.  
Amps.: '09.

PRICE 14/-



# Team work

**T**TEAM WORK counts in Radio too. Unless valves work together harmoniously reception will never be at its best. That is why BENJAMIN Valves should be used in every stage. They have been designed as a team which, working together, will give results far surpassing those that can be obtained with any other valves, in any other way.

Anode and filament are very close together, and therefore the electrons traverse a very *short path*. This increases amplification. A specially designed filament consumes less current. Tone is improved. Ask your dealer or write for descriptive leaflet giving curves.

## BENJAMIN SHORTPATH RADIO VALVES

THE BENJAMIN ELECTRIC LTD.,  
Brantwood Works, Tottenham, N. 17.

**D.E. 55.**

A very economical general purpose valve. For high frequency, detector and low frequency (except last stage, when the S.P. 55 Red should always be used).

Fil. Volts: 5'5.  
Amps.: '09.

PRICE 18/6

**S.P. 55  
BLUE SPOT.**

Extra high amplification valve. Designed for resistance capacity, choke and early stage transformer coupling. Also excellent as a rectifier or high frequency amplifier.

Fil. Volts: 5'5.  
Amps.: '09.

PRICE 18/6

**S.P. 55  
RED SPOT.**

Super power valve specially designed as a last stage power amplifier. Will give great power without distortion. Also suitable for detector or H.F. amplifier.

Fil. Volts: 5'5.  
Amps.: '25.

PRICE 22/6



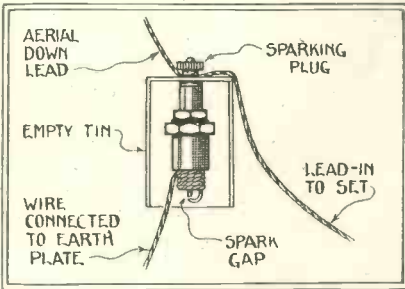
RV3

In writing to advertisers, please say you saw the advertisement in the WIRELESS MAGAZINE.

# GADGETS, HINTS & TIPS

## Improvised Spark Gap

HOW a sparking plug from a car can be used to serve as a safety spark gap is shown by the diagram.



### Details of Improvised Spark Gap.

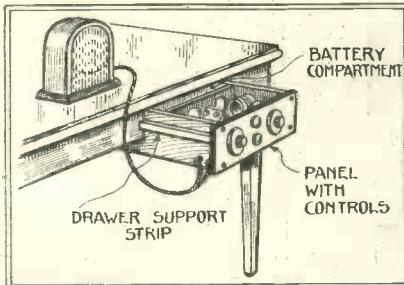
An earth lead is connected to the lower end of the plug, while screwed under the nut at the top of the plug is the aerial lead and an old tin. The tin protects the spark gap from rain.

Care should be taken to clean the sparking plug before use, otherwise the efficiency of the aerial system will be lowered owing to leakage. J. B.

## Unobtrusive Receiving Set

THOSE who have not much space to spare or who object to the presence of a large receiving set can overcome the trouble by utilising a table drawer as a cabinet.

The sketch shows how to do this,



### Receiver Accommodated in Drawer.

the panel with the controls mounted on it taking the place of the drawer front.

Coils and components are mounted inside the drawer and a compartment left for batteries. All that need show

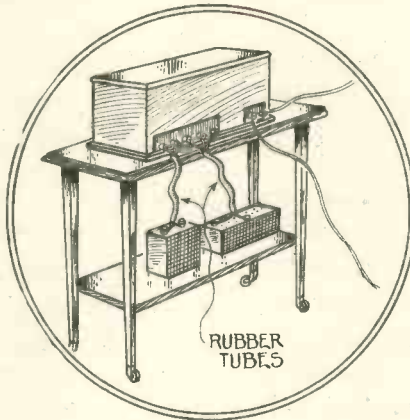
when the set is in operation is the loud-speaker connection. B. E.

## Neat Battery Leads

HOWEVER handsome may be the cabinet of a receiver, the effect is

RENEW YOUR H.T. BATTERY FOR NATIONAL WIRELESS WEEK!

always spoilt by long straggling battery leads; shown in the sketch is



### Neat Arrangement of Battery Leads.

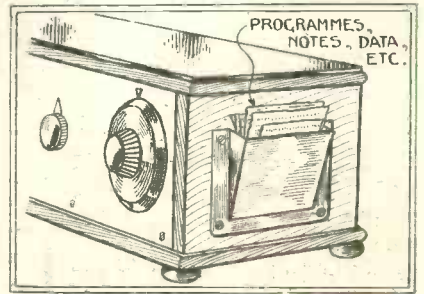
a hint which in practice obviates all untidiness.

Rubber tubing is used, one piece for the L.T. leads and another for the multiplicity of H.T. leads. As these wires are bunched together care should be taken that they are well insulated from one another. R. S.

## Broadcasting Programmes

DETAILS of the broadcast programmes, notes and log-books and kindred odds and ends which are required when listening-in can be conveniently stored by means of a bracket fixed on the side of the receiving set itself.

The sketch shows one method of doing this, in which an oxidised metal sheet is shaped as shown. An alternative method would be to use



### Receptacle for Programmes.

thin wood, the same as is used for the cabinet, finished to match it.

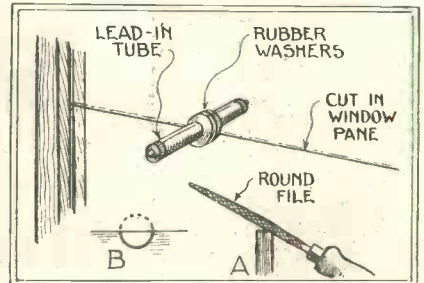
R. U. T.

## Efficient Lead-in

WHEN inconvenient or inefficient to bring the lead-in tube through the window frame, it can be taken through the window pane.

The only difficulty is in drilling the hole in the glass. The best plan is to take out the pane of glass and cut it in half. Then with a medium round file cut a groove in the manner shown at A and so produce a semi-circular cut as shown at B.

A corresponding cut is made in the other half of the pane, so that when



### Details of Efficient Lead-in.

the two panes are reassembled, as in the illustration, a hole is formed to accommodate the lead-in tube.

Two rubber washers, one each side of the glass, hold the tube in position. I. C. W.





Type "O." The unit alone.  
Price **8/6**



Type "V." A similar unit incorporating the "Cosmos" Spring Valve Holder.  
Price **10/6**



Illustration shows a Type "V" Unit with a Valve inserted.

Suitable Valves are—  
for 2-volt "Cosmos" S.P.18/B at **14/-**  
for 5-volt "Cosmos" S.P.55/B at **18/6**

# The Cosmos Resistance Coupling Unit

## Real purity of reproduction

Even the advertisements of the best Transformers plead guilty to imperfect amplification over the whole musical range. Real purity of reproduction can only be obtained with resistance capacity coupling. The "Cosmos" coupling unit with a suitable valve can be as effective as a transformer-coupled stage. Avoids all distortion and effects considerable economies in first and operating cost.

Designed primarily for use with the "Cosmos" S.P. Blue Spot Valves, it can be used successfully with any valve having an amplification factor of 30 or more.

### Additional advantages:—

- 1 Maximum possible amplification per stage.
- 2 Economy in filament consumption "Cosmos" S.P. Blue Spot Valves consume 0.09 amp.
- 3 Economy in H.T. battery consumption Less than 1/20th of normal.
- 4 Immunity from breakdown caused by complete or partial failure of the windings of transformers or chokes.
- 5 Small space and light weight

A high-tension battery of 120 volts is adequate with this unit and "Cosmos" Shortpath Blue Spot Valves.

**METRO - VICK  
SUPPLIES LTD.**

Metro-Vick House,  
155, Charing Cross Road,  
LONDON, W.C.2.



Ask your dealer for copy of folder 4117/7, fully describing this coupling unit and its advantages.

R  
P51

# Wireless Femininities

Broadcasting from  
the Melbourne  
studio.

IT is excellent news that the B.B.C., in conjunction with the Royal Academy of Dramatic Art, will begin this autumn to train suitable dramatic students especially for broadcasting. The system which assumes that because you can write a bright lecturette, or because your name is well known, you must have a voice and manner suitable for transmission by microphone has been one of the banes of wireless up to now.

I have often been a listener and lost half of each sentence because the nervous broadcaster at the other end dropped his or her voice—a perfectly natural habit which it happens the microphone won't tolerate.

I have often, on the other hand, been a contributor to the programme, and have found it a nerve-racking task to keep my voice to the right pitch and speed, avoid rustling paper as the sheets are turned over, and at the same time infuse snap and personality into my remarks.

## Trying Things

Two things about broadcasting, to the person who has had no training in microphone delivery, are particularly trying—the timing and the as-you-go-along criticisms of the announcer. One eye must be always on the clock to see that neither a minute less nor a minute more than the allotted span is occupied; and the announcer, no doubt necessarily, but very disconcertingly, may glide up at any moment and interject instructions in a stage whisper.

"Will you go more slowly, please." "Do you mind speaking a little louder." When you're already highly nervous, such remarks do put you off. But the trained broadcast artist of the future will know better than to make these little mistakes and listening-in will gain thereby.

If we accept as accurate a recent definition of jazz as the slang of music (and it seems a good description), this appears to throw a fresh light on the many discussions of to-day concerning the lastingness or otherwise of light syncopated melodies. People of classic tastes always insist that jazz is ephemeral and that listeners quickly tire of it, while jazz

enthusiasts declare that the best of their favourites will live.

Is slang handed down to posterity or does it die in its own generation?

To this one can only give both answers, "Yes" and "No." Many slang words and phrases utterly disappear in a few years as if they had never been. On the other hand, literary English is constantly being enriched by rogue words which from being sniffed at by the learned, find a place eventually in the most respectable of dictionaries. For instance, within the memory of living people "pluck" was considered an absolutely slang word.

On this analogy there seems some hope for the permanence of a certain amount of jazz music.

\* \* \* \* \*

A friend who read my note last month mentioning weaving at a table loom being an ideal manual occupation to accompany listening-in writes to me enthusiastically about this handicraft as a hobby for wireless "fans."

"I shall be starting the making of Christmas presents before long," is one of her remarks, "and I intend to get them done on my little loom during the time devoted each day to the loud speaker."

Most women like to make many of their Christmas gifts, if they can only find the time, and this suggests a way of doing so without sacrificing work or any other recreation. Few of us weave, perhaps, but the cult of the needle has been enormously revived in the last two or three years, and sewing turns out many a charming gift, without boredom, if indulged in during listening-in hours.

\* \* \* \* \*

Women who are choosing a wireless set without the expert help of a male relative are up against one difficulty which doesn't seem to have



occurred to radio manufacturers—that with their technical ignorance the imposing names which are given to sets are unintelligible to them.

It's time a woman told those business firms that a title like "crystal set with air-spaced coils" or "reflex set with valve detector" stirs no chords at all in the feminine breast.

And what woman ever yearned to possess a set which its makers have cryptically labelled "The ABC (or XYZ) Crystal Set"?

## Making Equipment Interesting

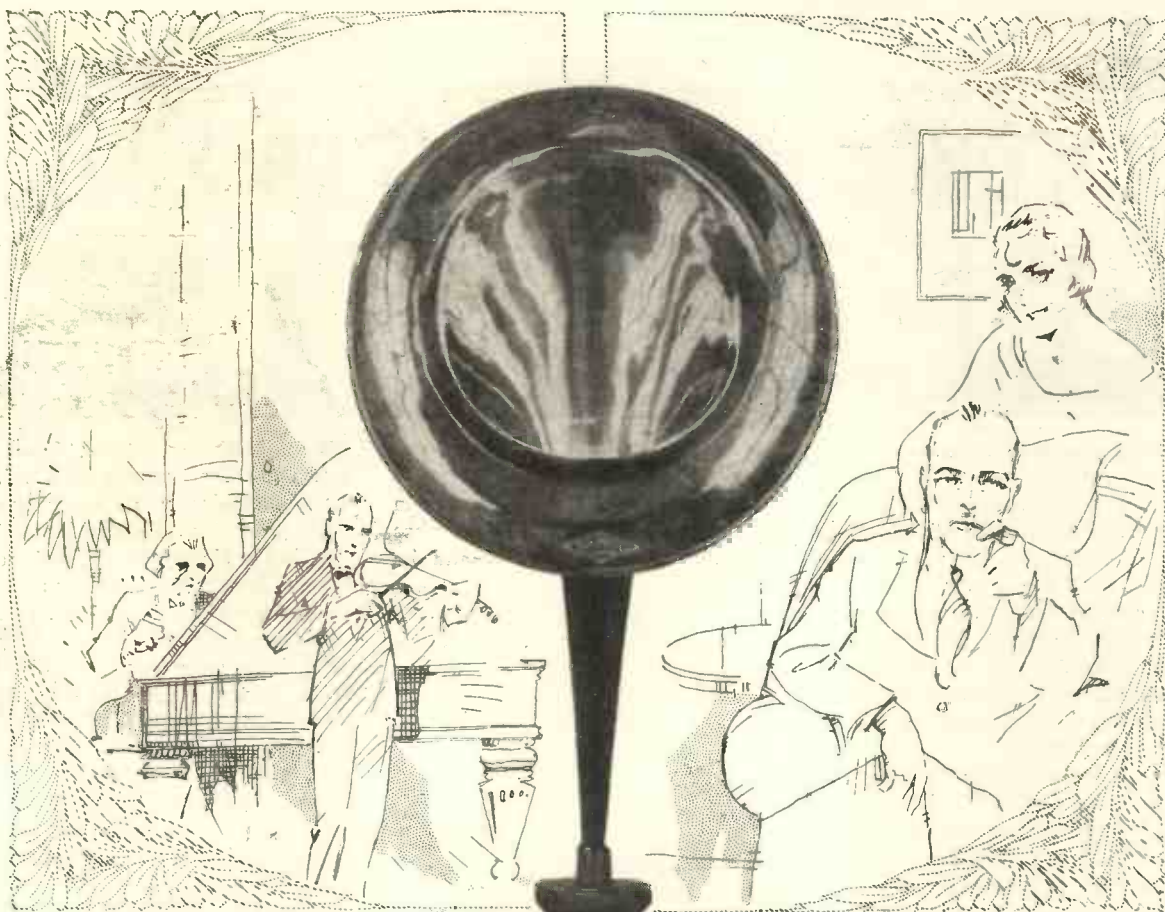
To make wireless equipment interesting to women, it should be named on non-technical and much more homely lines. "One-valve-amplifier" is a phrase which leaves us cold; but "The Louder-tone One-valve Set" sounds interesting and carries its claims to superiority in its title.

And we should rush for the comfort of "Neyerache" headphones and the cosy fireside intimacy of a "Teatime" loud-speaker.

It seems to me that it might be worth the while of big wireless firms to pay a retaining fee to an intelligent woman who understands the psychology of her sex. Her job would simply be, when new models of wireless apparatus are launched, to give them titles and descriptions that would allure women buyers as well as men.

A. M. M.

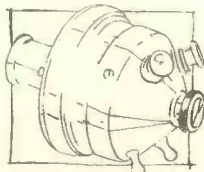




# GOLDEN HARMONY

**C**LEAR at a whisper—clear at the heavy volume of a brass band....the T.M.C. "Concert Grand" brings a wealth of mellowness, and faithfully reproduces the sounds originated in the Broadcasting studio. The instrument is unequalled for its freedom from "throaty" noises, because the copper used in the construction of the horn is in a natural, unstressed

state and its frequency of vibration is out of range of that of any note which the loud speaker may be called upon to reproduce. It gives that full richness which only copper can give.



The magnetic system—a vitally important part of every loud speaker—is the result of much study, and experimental work. Price **£5 . 10 . 0**.

**OTHER T.M.C. RADIO SPECIALITIES.**  
**LOUD SPEAKERS.**  
 "Standard" £4. 5. 0  
 "Junior" .. £1. 17. 6  
 "Minor" .. 17. 6  
**CRYSTAL SETS.**  
 From 12s. 6d. to £2. 7. 6.

THE "GRAMO-SPEAKER" is a little brother to the "Concert Grand." In a moment it will turn your Gramophone into a splendid loud speaker or it can be fitted to home-made or purchased horns of ordinary design. It makes a most useful extra loud speaker at a nominal price for your nursery or for entertaining your domestic staff. It is not an adapted "Earpiece" with the diaphragm held in place by a screw-on cap, ready to loosen through its own vibration. It is a real Loud Speaker Unit with an adjustable magnetic system (Loud Speaker size) fitted with permanent magnets of cobalt steel and a diaphragm firmly clamped between ground metal surfaces. For performance, finish and price, it is the best of its kind.

Ask your dealer to show it to you. Its price is only **13/6**

**OTHER T.M.C. RADIO SPECIALITIES.**  
**HEADPHONES.**  
 No. 3. (Lightweight) s. d. in cardboard box .. 17 6  
 No. 2s. Heavier Model 15 0  
 Push-lined cases 2/6 extra.  
**LOW CAPACITY KEYS.**  
 No. 1. 12 point, 3 s. d. position..... 7 0  
 No. 2. 6 point, 2 position..... 6 0  
 No. 3. 24 point, 3 position..... 15 6

Prices do not apply to the Irish Free State.

# T M C

Ask for the new T.M.C. Catalogue.

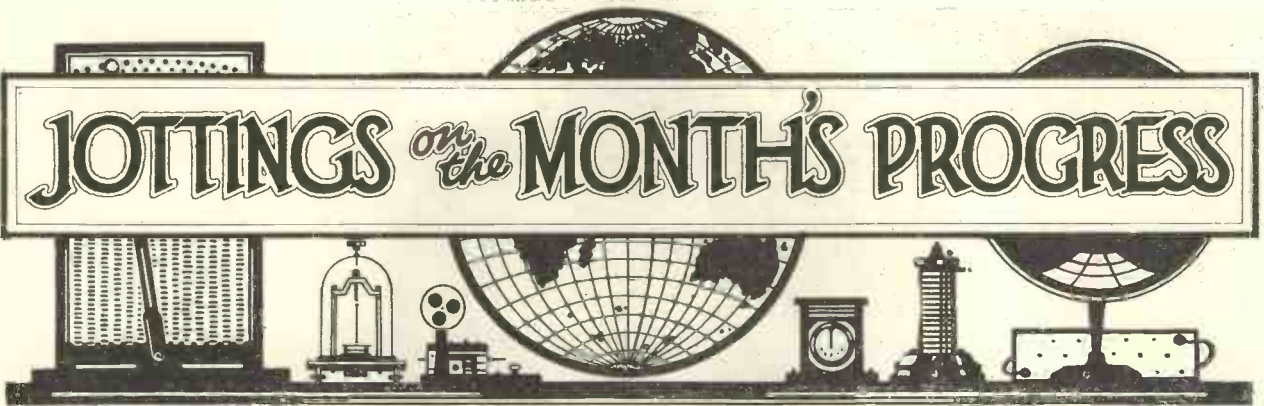
**Telephone Manufacturing Co. Ltd.**  
**HOLLINGSWORTH WORKS, WEST DULWICH, S.E. 21.**

Phones: By Jenham 2190/1.

Telegrams: "Bubastis, Dulcros, London."

In writing to advertisers, please say you saw the advertisement in the WIRELESS MAGAZINE.

# JOTTINGS *on the* MONTH'S PROGRESS



**T**HE new Indian Broadcasting Company is apparently to enjoy far more favourable terms than those accorded to the B.B.C. The licence fee is to be fixed at 10 Rs. or 15s., of which 80 per cent., or 12s., goes to the company. In addition they will receive 10 per cent. of the value of all imported wireless receiving sets and accessories, and are to be free from any Government limitation of profits during the first five years.

Two stations are at present in course of erection, one in Bengal and the other in Bombay. If these prove successful it is intended to establish other centres so as to give an adequate crystal-set service over the greater part of British India.

\* \* \* \* \*

## *A Luminous Resonator*

W. G. Cady has discovered that if a small quartz rod is enclosed in an evacuated glass bulb and subjected to an oscillating electromotive force, a uniform glow appears around the crystal when it is oscillating at its natural frequency. Partial resonance, when energised by higher harmonic oscillations, results in a partial illumination of the rod.

The explanation of this extraordinary phenomenon is so far a matter of conjecture, but it has already been applied in practice to the determination, at night, of the electrical characteristics of an oscillating circuit by direct observation of the luminous appearance of the crystal in the dark.

\* \* \* \* \*

It can hardly be said that any very outstanding note of novelty was struck by the exhibits at Olympia last month. A decided improvement was, however, to be observed in the design of component parts in general, more particularly in vari-

able condensers, inductance coils, and transformers.

The standard of British practice in this respect is noticeably in advance of last year, and there should be little cause to fear foreign competition in this connection either from America or elsewhere.

\* \* \* \* \*

## *Lower Prices*

The price of multi-valve sets, such as the supersonic receiver and various types of neutralised circuits, is slowly coming within the reach of the man of moderate means. The non-technical wireless enthusiast must also be encouraged by the simplification that has been effected in the control and operation of such sets.

A certain advance is to be recorded in the general standard of selectivity. We seem to be getting somewhat nearer the standard of the ideal receiver capable of selecting practically any programme at will, even under the shadow of the local transmitting station.

Quite an interesting exhibit in this connection was the Retrosonic receiver, for which some really remarkable claims are made. This set is of the straight variety, in that it does not utilise either the supersonic or neutrodyne principle, nor even a succession of high-frequency stages.

It depends for its selectivity upon a special type of absorber or trap circuit, the precise details of which have not yet been published. If the logging chart exhibited on the stand is a true record of its normal performance, the set is one of which more will be heard in the near future.

\* \* \* \* \*

Dr. Dobson, in the published version of his Halley lecture, makes some important contributions to our knowledge of conditions in the

higher atmosphere. Apart from its effect upon the passage of wireless waves, the ionised upper strata, sometimes referred to as the Heaviside layer, is the birthplace of the Aurora Borealis, besides being largely responsible for the diurnal variation of the earth's magnetic field.

The Aurora appears to be directly due to electric discharges caused by charged particles projected across space from the sun and trapped in the outer confines of our atmosphere. The actual ionisation of the Heaviside layer is the result of the direct action of ultra-violet light in bombarding the individual air molecules and thus releasing some of the normally-bound electrons.

Electric currents are in turn set up in these ionised areas by tidal movements in the atmosphere similar to those occurring in the sea, and the consequence of these periodic currents is to be observed in the well-known daily fluctuation in the value of the earth's magnetic field.

\* \* \* \* \*

## *Piezo Vibrations*

A searching investigation has been made at the National Physical Laboratory into the nature of the oscillations produced by a quartz resonator, of the type now being used for stabilising the wavelength of broadcast transmitting stations.

As a result it has been calculated that a piezo-electric crystal, when in operation, can be regarded as the equivalent of an electric "loop" circuit, one arm of which comprises inductance, resistance, and a condenser in series, the other arm of the "loop" consisting of a shunt capacity. In addition, an external series condenser must be allowed for to cover the capacity effect of the air-gap in the crystal mounting.

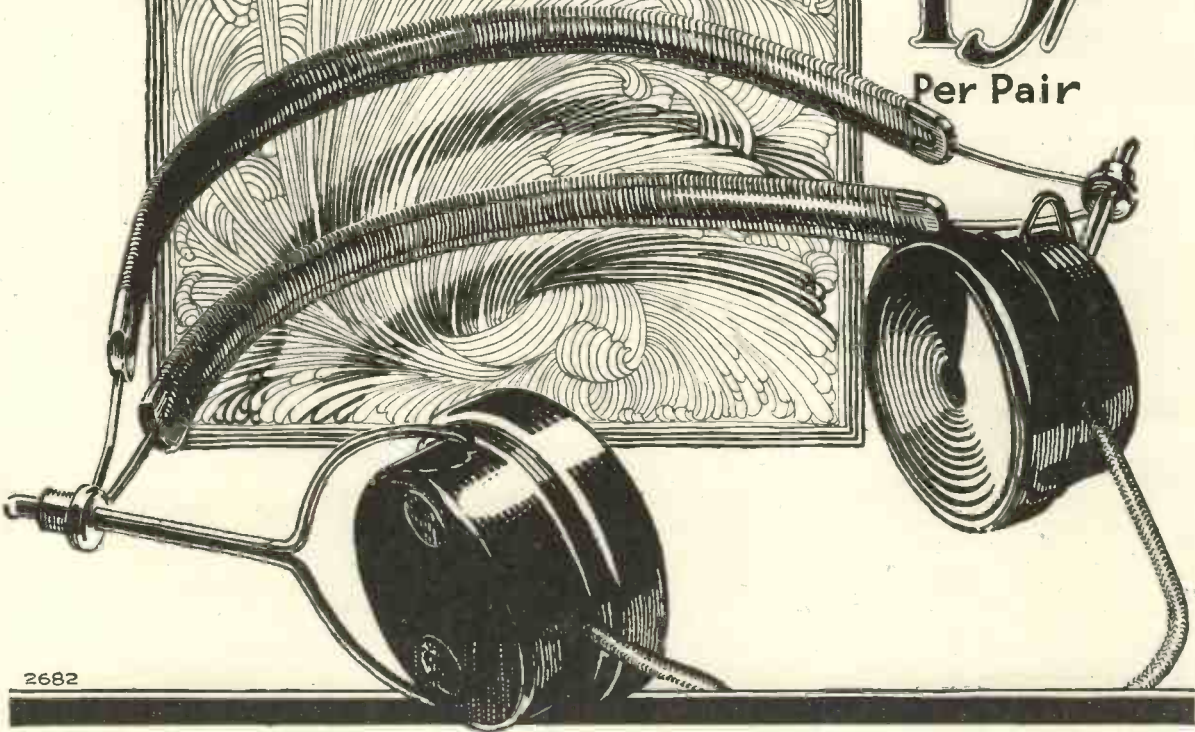
B. A. R.



**B  
T-H**  
**HEADPHONES**

**FOR NATURAL TONE  
& PERFECT COMFORT**

Price  
**15/-**  
Per Pair



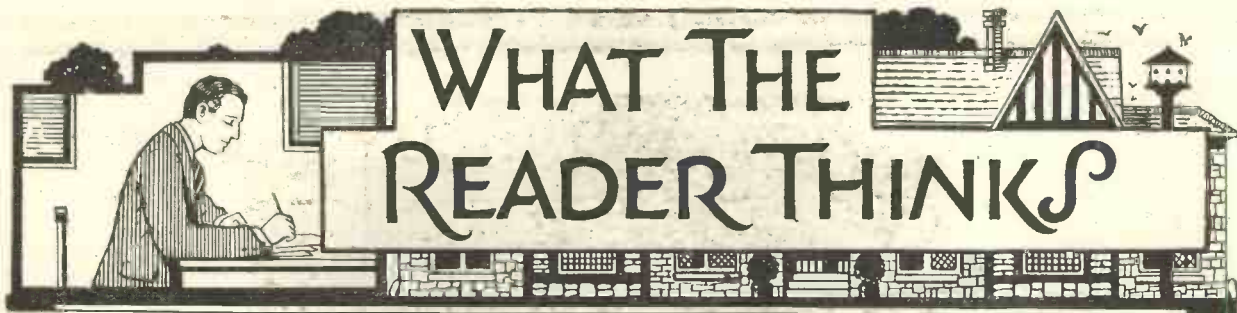
2682

*Sold by all good Radio Dealers*

**BUY BRITISH HEADPHONES**

*The British Thomson-Houston Co., Ltd.*

*In writing to advertisers, please say you saw the advertisement in the WIRELESS MAGAZINE.*



### Long-distance Crystal Reception To the Editor, "Wireless Magazine."

SIR,—Mr. Ramon reports long-distance crystal reception in the October WIRELESS MAGAZINE.

He may be interested to know I have often heard the following foreign stations on a simple crystal set:—

- Brussels.
- L'Ecole Superieure.
- Le Petit Parisien.
- Prague (only heard once, when testing to America).
- Madrid (Union Radio Iberica).
- Königswusterhausen.

Frankfort and Hamburg come in practically at the same strength as 2LO.—B. DUNN (Stock).

### Announcing the Station!

SIR,—I believe a better method of announcing radio stations would be something similar to that adopted by the Dublin Radio Station, "2RN. Station calling—Dublin."

This method of calling gives the listener in two chances of obtaining the name of the station received, should reception be rather weak or interrupted by atmospherics, etc.—W. HYNOR.

### Short-wave Coils

SIR,—When building the "Round-the-World Short-wave Three-valver," described in the WIRELESS MAGAZINE, February, 1926, I thought of the difficulty some constructors must have when winding the coil on the low-loss former with the stout No. 16 gauge wire.

I think I hit on a very simple plan which might be useful to others. Instead of winding round and round the former from the reel, very often an exasperating job, take the "doings" into the garden.

Very often there is a staple or other convenient fastening in the wall of the house and on to this, about 4 ft. above the ground, fasten the free end of wire on reel, then walk backwards, and, keeping the wire taut, unroll sufficient to wind the whole of the two coils—32 turns, 33 ft. approximately, with a bit over.

The wire will be straight, perfectly "quiet," and free from twists or kinks. Next fasten the free end through the hole in former, and taking each end of former in the fingers turn the former slowly and walk towards the fixed end.

When 7 turns have been completed hold the wire with left thumb and taking pliers from pocket cut as directed; fasten end through former.

# WHAT THE READER THINKS

Now reverse the coil former, pick up free end of wire and start winding as before, this time making 25 turns. Cut wire now nearly used up and fasten as before. Every turn in place, no movement of wire, and easily and quickly done, and something to please the eye.

To the writers of letters published each month we award valves. This month's letter-writers will each receive an Edison R bright-emitter valve; next month's writers will be sent a B.T.H. R valve each.

I might add I tried the above set out last night and got KDKA first time.—R. SAAVYER (Edmonton).

### That Mad Feeling!

SIR,—What a mad feeling it gives one to burn out one's valves! I have done it twice, burning out seven valves, and I dare say other amateurs have done the same thing. What one feels like saying under such circumstances is, of course, unprintable!

Had it not been for this little gadget which I am about to mention I should have burnt out no less than fifteen valves!

All that has to be done is to insert a torch bulb—not over 3.5 volts for ordinary use, but where lower voltages than 100 volts are used for H.T. a 2.5-volt bulb would be better—in the negative lead of the H.T. supply.

Should the valve be carelessly inserted, resulting in a "short," or an unprotected wire coming into contact with another, the torch bulb will immediately blow out and save all the valves.

Hoping to benefit others.—H. HAWKES (Durban).

### Separate High-tension

SIR,—I have a three-valve set (H.F., detector and L.F.), and my H.T. is composed of two 36-volt batteries in series; all valves receive the same H.T. voltage.

I generally hear four different stations nightly.

One evening I found an H.T. battery to be faulty, so I put it aside and carried on with the other. To my amazement I could tune in clearly 12 different stations. The H.F. and detector valves were having too much H.T. previously.

I bought a new 36-volt H.T. battery and put it in series with the positive phone terminal, giving the L.F. valve extra voltage. The result was great.

Needless to say, I am now going to give each valve separate H.T. voltage; it pays to do so.—L. E. EDWARDS (Machynlleth).

### Railway Interference

SIR,—My aerial is about 70 yd. from the railway station and a big iron railway bridge adjoining it that crosses the River Ouse. The trains cause me a good deal of mysterious interference, in the form of very loud "knocks" in the loud-speaker or phones.

This is very difficult for me to account for as passenger trains (often electrically lit) do not cause so much interference as slowly-moving goods trains. Trains standing in the station are sometimes guilty, too. The knocks are as loud as anyone rapping on the room door and obliterate the words of any speech being received.

Fast passenger trains cause fairly regular knocks, similar to a series of morse dots. Slowly-moving goods trains make knocks in groups of three or four, a pause of a second or so, then more knocks. This process goes on until the offending train is past.

Have any other readers of "our" magazine experienced it, and, if so, can they put forward any "pet theory" as to the cause?—E. PIERCY (Selby).

### More Interference

SIR,—Readers may be interested in some experiences and experiments I carried out last May. I heard whilst listening-in a peculiar buzzing sound, and when I turned out my valves it continued for perhaps twenty minutes though slightly diminished; also at intervals I heard slighter buzzing sounds.

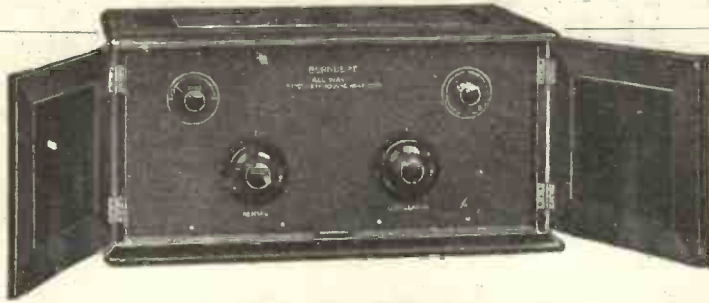
I connected up a crystal set and still the buzzes continued, so I put a pair of phones in circuit between two earths separated about six feet apart, and still heard them.

After this I set out to look around outside the house for perhaps a radius of a hundred yards or so, and on investigating the various shops I found two bacon-cutting machines at a grocer's, a large portable hair-drier at a ladies' hair-dressers, and a high-frequency spark coil at another, and a motor generator set at the cinema.

When any of these instruments or machines were working I heard the sounds. I came to the conclusion these currents or waves I was picking up were not high-frequency impulses, but either inductive effects from the rapid making or breaking of a highly inductive circuit, armature, or trembler coil, or direct magnetic effects from the same source.

Can any reader give a better explanation of the above? If so, I should be grateful.—E. I. R. BELLAS (Wallasey).





# BURNDEPT

## ALL-WAVE SUPER-HETERODYNE

### *A Home Constructional Receiver*

Specially designed by us for those who desire the pleasure of constructing for themselves a perfect Broadcast Receiver of extreme selectivity and enormous range, coupled with ABSOLUTELY FAITHFUL REPRODUCTION of music and speech. The design of the instrument is such that it will receive on all waves from 50 to 3,000 metres, and can be used either with a frame aerial or with an ordinary aerial; the aerial need not be a large one, in fact twenty or thirty feet of wire ten or twelve feet high **WILL BRING IN STATIONS FROM ALL OVER EUROPE**, while a short length of wire across a room, or tucked around the picture rail, will enable one to receive many broadcast stations. Within ten miles or so of a broadcast station there is no need for any type of aerial whatsoever.

We supply the Burndept Transformers singly and also in Kits of three and four perfectly matched, comprising respectively two and three intermediate frequency amplifier valves. With each Kit we supply a detailed constructional diagram panel layout, list of parts and full instructions. Also suitable Cabinets and ready drilled and engraved Front Panels and terminal strips.

We do not sell a complete list of components ready for assembling as we desire our customers to have free choice. Instead, we endeavour to assist the purchaser to construct an instrument that will really work by providing diagrams and a careful layout of a Receiver that has been made and tested in our Research Department, and by supplying a detailed list of all the components required for that layout.

No. 913. Kit of three matched SUPER-HETERODYNE TRANSFORMERS, with Envelope No. 916 .. .. .	£3 15 0	No. 914. Kit of four matched SUPER-HETERODYNE TRANSFORMERS, with Envelope No. 916 .. .. .	£5 0 0
No. 916. Envelope containing Drawings, Diagrams, etc., of BURNDEPT ALL-WAVE SUPER-HETERODYNE, with full instructions (W.P-106) for building .. .. .			2/6

# BURNDEPT

WIRELESS LIMITED

The Burndept range includes everything for efficient radio reception. Guaranteed Super Valves, components, Loud Speakers and complete installations.

Head Office & Factory: BLACKHEATH, LONDON, S.E.3  
 'Phone:—Lee Green 2100      Telegrams:—Burnacoil, Phone, London

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 EVERYWHERE

In writing to advertisers, please say you saw the advertisement in the WIRELESS MAGAZINE.

*Specially Written by the Officials at Savoy Hill*

# WHAT THE B.B.C. IS DOING



THE Council of the Wireless Retailers' Association touched on a very important matter when they passed a resolution expressing the opinion that licence fees should not be subject to any deduction other than the actual cost of collection, and that the amounts already collected by the Post Office in excess of such cost should be paid to us.

## *Eve of the Change-over.*

Now that we are on the eve of the change-over to Corporation control, it may not be amiss to review the financial situation and to call attention to the tendency which is becoming apparent in some quarters to assess the future financial requirements of the service on the basis of past accounts.

The presumption is that programmes can be stabilised at their present standard, and that too much life and spontaneity are opposed to the interests of listeners. That is quite definitely a view that listeners themselves do not share, and we have always maintained that it is a wrong view.

Although we shall soon be relieved of our responsibility, it is due to listeners to recall some of the chief points in connection with the financial position. Under the Supplementary Agreement of October 1st, 1923, it was provided that the amount of licence collections to be handed over should be "in such proportion as the Postmaster-General, in consultation with the Company, should consider reasonably adequate to enable the Company to provide a broadcasting service to his reasonable satisfaction."

This clause was interpreted by the Post Office as meaning that large amounts could be withheld from us;

and while in 1924-1925 our proportion of the licence fees amounted to £489,000, the amount retained by the Post Office being £115,000, we received only £500,000 in 1925-1926 and the Post Office retained £284,000.

It might logically be supposed that if the Post Office share was more than doubled in the period mentioned our revenue should have shown a good deal more expansion than a mere £11,000.

The estimated total number of licences in force at the end of the year will be 2,100,000, and the amount of revenue due to broadcasting should be in the neighbourhood of £785,000. If, however, the bare cost to the Post office of issuing a licence and of all incidental administrative work were confined to a shilling, a reform which would not involve the Post Office in any loss, the broadcasting service would receive about £900,000. Then present standards could be improved and present activities extended.

## *Feeling the Pinch*

On the programme side we have been feeling the pinch caused by restricted revenue; many additional thousands of pounds could very well be expended on improvements in the programmes; further, the officials are unquenchably enthusiastic as concerns the big technical developments

which have been talked about from time to time.

The country wants a new system of distribution to enable nearly every listener in Great Britain and Northern Ireland to have the choice of at least two programmes, available simultaneously, on the cheapest and simplest apparatus. New regional high-power transmitters are urgently required, and their cost may be in the neighbourhood of £200,000. We have only touched the fringe of research work during the past four years. There is practically no limit to the amount of money that could usefully be spent on this branch of broadcasting activity.

## *Progress—or Decline*

A point which we have frequently emphasised is that the service cannot stand still. If it does not go forward, it must decline. The Corporation, having at its command a highly efficient service with considerable capital assets and revenue-earning capacity, will, it is hoped, accomplish that progressive work from which we, through restricted income, were debarred.

\* \* \* \*

In view of the fact that we are excluded from taking sides, or of indulging in controversy, it is doubtless *ultra vires* even to venture the inoffensive observation that the recent strictures of a modernist poet respecting stage artists were unfortunate.

The circumstances are as follows: Mr. Osbert Sitwell, in the course of a Press interview, made the following remark: "Actors and actresses are so busy trying to be ladies and gentlemen and golfers that they have no time left to pay attention to their jobs."

MORE ABOUT THE  
1927 FIVE

on page 294



The reason why this remark was unfortunate, from our point of view, was that it was launched on the eve of a broadcast in which the Sitwells and Mr. and Miss Wilson Barrett, grandchildren of the great actor of *The Sign of the Cross* fame, were booked to take part.

#### Permission Withdrawn

Mr. Archibald de Bear, the well-known producer, at once withdrew the permission which he had given for the Wilson Barretts, who were members of his revue company, to appear in the studio with the Sitwells, and we were compelled at the last moment to obtain substitutes.

It appears, however, that this was not what we were expected to do. The Company, we learn, should have cancelled the broadcast entirely, seeing that it was minus the services of the Wilson Barretts; and should, moreover, have apologised to the stage in general on behalf of Mr. Sitwell.

Obviously, we should have been participating in controversy if we had taken sides; hence our silence when invited to express an opinion for publication; but we must take a firm stand on the question of any individual's right to dictate what shall or shall not be broadcast.

For a long time prior to the ratification of the theatrical agreement we made every effort, and even went out of our way, to cultivate friendly relations with members of the theatrical profession; and those relations have continued to improve. We have also striven to maintain the best relations with artists who have no connection with the stage, with professors and politicians, with the Press and the Church, and, indeed, with everyone who has been at any time associated with broadcasting work.

#### Not Party to Dispute

We have not been party to any acrimonious dispute between one sphere of public activity and another, but have carried on the service in the interests of the listening public alone. That task is quite big enough to occupy all our attention and to tax our ingenuity to the utmost. It is certain that all the eminent members of the stage profession who take part in broadcasting are sufficiently broad-minded to agree that there is nothing in the controversy between the stage and the Sitwells with which we can be reproached; to hold any other view is merely silly.

Patent Nos. 238003.



223625 and pending.

## IMPORTANT NOTICE



Photo of Sir Oliver Lodge  
by LAFAYETTE.

Having acquired the World Rights for Sir Oliver Lodge's famous "N" Circuit we desire to state that we assume all responsibility under the CLEARTRON Ironclad Guarantee for the performance of all sets made by us or in accordance with the diagrams furnished with CLEARTRON-Lodge "N" Constructor Kits containing the components selected and approved by the inventors — and royalty paid. Any sets made up otherwise than in accordance with the foregoing carry no guarantee, and no authorisation of Sir Oliver Lodge. Unless the "Lodge" Royalty is paid the manufacture of these Circuits constitutes an infringement of the Lodge Patents owned by "CLEARTRON."

## LODGE 'N' CIRCUIT

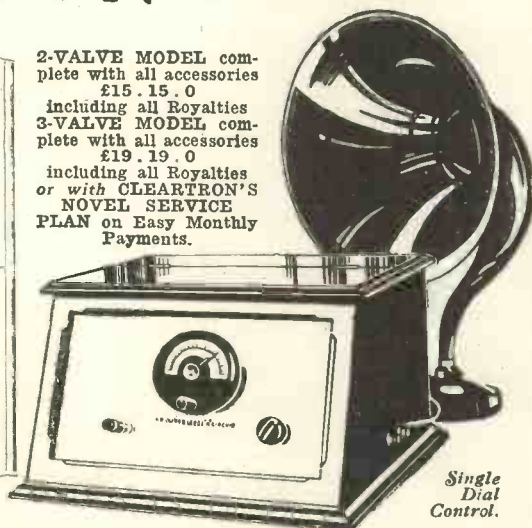
#### CHIEF FEATURES:

*Non-radiating,  
Non-interfering.  
Great volume,  
Extreme purity,  
Keenly selective,  
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Also  
Home  
Constructor Kits  
complete

2-Valve - £6.6.0  
3-Valve - £8.8.0  
plus Royalties and  
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2-VALVE MODEL complete with all accessories £15.15.0  
including all Royalties  
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or with CLEARTRON'S  
NOVEL SERVICE  
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Send for Lodge "N" Booklet post free.

All LODGE "N" CIRCUITS are fitted with

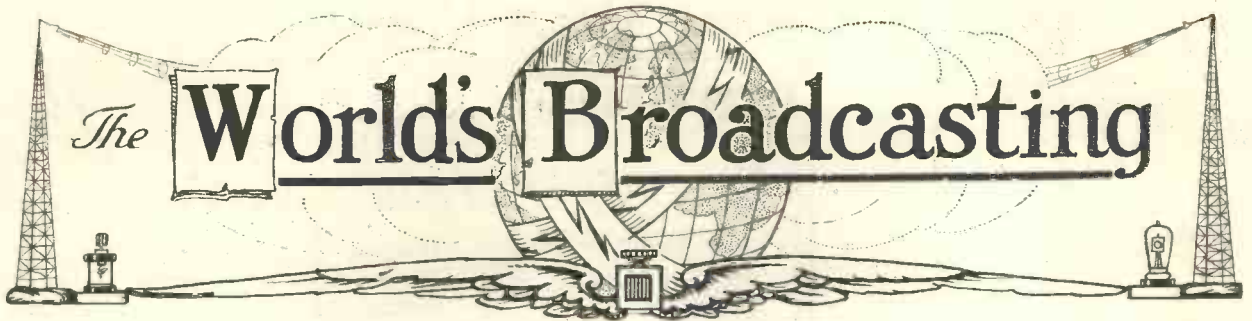
**CLEARTRON** 1926/27 **NEW MODEL VALVES**

and backed by Cleartron's Ironclad Guarantee.

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Telephone: Regent 2231/2.

Works: Birmingham  
Telegrams: "Cleartron, Westrand, London."



A Guide to the Principal European and American Stations.

The New Wavelengths.

New Wave-length in Metres.	Station.	Call Sign.	Old Wave-length in Metres.	New Wave-length in Metres.	* Station.	Call Sign.	Old Wave-length in Metres.	New Wave-length in Metres.	Station.	Call Sign.	Old Wave-length in Metres.
201.3	Karlsrona	SMSM	196		Carthagena	—	330	416.7	Stockholm	SASA	428
204.1	Gefle	—	208		Jyvaskyla	—	301.5	422.6	Rome	IRO	425
211.9	Kiev	—	281.9		Leeds	2LS	321.5	428.6	Hamburg	—	392.5
217.4	Luxemburg	LOAA	1,200	303	Münster	—	410	434.8	Bilbao	EAJ9	415
219	Kovno	—	—	306.1	Bournemouth	6BM	386	441.2	Brunn	OKB	521
222.2	Strasbourg	—	205	309.3	Marseilles	PTT	351	417.8	Paris	FPTT	458
223.9	Leningrad	—	940	312.5	Newcastle-on-Tyne	5NO	404	454.3	New York	WJZ	—
225.6	Belgrade	HFF	1,650					454.5	Boden	SASE	1,200
229	Malmö	SASC	270	315.8	Milan	—	320	461.5	Bergen	—	357
238.1	Bordeaux	PTT	411	319.1	Dublin	2RN	397	468.8	Elberfeld	—	259
240	Helsingfors	—	318	322.4	Mount Prospect	WJAZ	—	476.2	Lyonis	PTT	480
241.9	Königsberg	—	462	322.6	Leipzig	—	452	483.9	Berlin	—	504
245.9	Toulouse	PTT	280	326.1	Belfast	2BE	440	491.5	New York	WEAF	—
250	Gleiwitz	—	251	329.7	Nuremberg	—	340	491.8	Aberdeen	2BD	495
252.1	Stettin	—	241	331.3	Springfield	WBZ	—	—	Birmingham	5IT	479
	Montpellier	—	220	333.3	Reykjavik	—	327	500	Zurich	—	513
254.2	Kiel	—	234.5	337	Copenhagen	—	347.5	—	Helsingfors	—	522
260.9	Gothenburg	SASB	290	340.9	Paris	Petit Parisien	333	508.5	Antwerp	—	265
265.5	Brussels	—	486		Seville	EAJ5	357	517.2	Vienna	—	582.5
272.7	Norrköping	SMVV	260	344.8	Prague	—	368	526.3	Riga	—	480
	San Sebastian	EAJ8	343	348.9	Cardiff	5WA	353	535.7	Munich	—	485
	Cassel	—	273	353	Breslau	—	418	545.6	Sundsvall	SASD	545
275.2	Zagreb	—	350	357.1	Oakland	KGO	—	555.6	Buda Pesth	—	560
	Madrid (F)	EAJ4	340	361.2	London	2LO	365	566	Orebro	—	237
	Angers	—	275	361.4	Graz	—	402	577	Berlin	—	571
277.8	Seville	EAJ17	300	365.8	Oslo	—	382	588.2	Madrid	EAJ6	392
	Barcelona	EAJ13	462	370.4	Madrid	EAJ7	373	—	Linköping	—	467
	Caen	—	332	375	Schenectady	WGJ	—	720	Vienna	—	531
280.4	Barcelona	EAJ1	324	379.5	Troy	WHAZ	—	760	Ostersund	—	720
283	Dortmund	—	283		Stuttgart	—	446	810	Geneva	HB1	760
285.7	Reval	—	350	379.7	Manchester	2ZY	378	850	Odense	—	810
288.5	Edinburgh	2EH	328	384.6	Radio Toulouse	—	430	940	Lausanne	HB2	850
	Hull	6KH	335.5	389.6	Frankfort-on-Main	—	470	1,000	Leningrad	—	—
	Plymouth	5PY	338	394.7	Bremen	—	279	1,010	Basle	—	1,000
	Nottingham	5NG	326	400	Aalesund	—	—	1,060	Moscow	Popoff	1,010
	Sheffield	6FL	306		Koszice	—	2,020	1,150	Hilversum	HDO	1,050
	Stoke-on-Trent	6ST	301		Warsaw	—	480	1,150	Ryvang	—	1,150
	Liverpool	6LV	331		Falun	SMZK	370	1,300	Sorö	—	1,150
	Swansea	5SX	482		Cadiz	EAJ3	355	1,350	Berlin	LP	1,300
	Dundee	2DE	315		Mont de Marsan	—	390	1,450	Karlsborg	SAJ	1,350
291.3	Lyons	Radio	280		Newark	WOR	—	1,500	Moscow	RDW	1,450
294.1	Liege	—	280		New York	WJY	—	1,600	Daventry	5XX	1,600
	Bilbao	EAJ11	418		Glasgow	5SC	422	1,750	Paris	SFR	1,750
	Trollaattan	SMXQ	345	405.2	Berne	—	435	1,800	Norddeich	KAV	1,800
	Bradford	2LS	310		Minneapolis	WCCO	417	2,125	Amsterdam	PCFF	2,125
	Dresden	—	294	405.4				2,650	Paris	FL	2,650
297	Agen	—	318	411							
	Hanover	—	297	416.4							

Kovno (given as 219 metres) may work on 344.8 metres; Leningrad (given as 223.9 and 940 metres) may work only on 434.8 metres; and Helsingfors (given as 240 metres) may work on 375 metres.



For:—  
ONE-CELL ACCUMULATORS

# Choose your Valves carefully —

For:—  
THREE-CELL ACCUMULATORS

## "COSMOS" DE.11

The 1-1-Volt Valve that works well off a dry battery.

Filament Current 0.25 Amp. Amplification Factor 6.5.



14/-

## "COSMOS" SP.18/R SHORTPATH RED SPOT

The real 2-Volt Power Valve.

Filament Current 0.3 Amp. Amplification Factor 7.



## "COSMOS" SP.18/G SHORTPATH GREEN SPOT

A 2-Volt High Amplification Valve.

Filament Current 0.3 Amp. Amplification Factor 15.



14/-

## "COSMOS" SP.18/B SHORTPATH BLUE SPOT

The 2-Volt Resistance Capacity Valve.

Filament Current 0.09 Amp. Amplification Factor 35.



14/-

A CAREFUL choice of the valves for use in the various positions of a receiving set will often make a wonderful improvement, and the time spent in making the choice is well worth while. The comprehensive range of "Cosmos" Valves shown on this page is shown for convenience under the general heading of the L.T. Supply—2-Volt and 6-Volt respectively—and some brief particulars are given to indicate their chief characteristics.

Particular attention is drawn to the S.P. 18/B and the S.P. 55/B (Blue Spot) Valves, which are specially effective when used with the modern method of Resistance Capacity coupling, equaling the amplification obtained with L.F. Transformers and general purpose valves, with all the recognised advantages of resistance coupling.

Complete details of every valve cannot be given in the space at our disposal, so, in order to assist you in making a careful and satisfactory choice of a valve for each position in your set, the booklet illustrated below has been produced. It gives all the characteristics and features of the entire range of "Cosmos" Valves, and includes an easily understood table showing the best types of valves for use in the different positions or stages in various kinds of circuit.

Your dealer has a supply of these booklets, "The Soul of Music," and would be very pleased to give you a copy.

If by any chance you should have any difficulty in obtaining it write to:—

### METRO-VICK SUPPLIES LIMITED

Metro-Vick House,

155, Charing Cross Rd., London, W.C.2

## A.45 "COSMOS"

A bright Filament Valve for general purposes for 4-5 Volts.

Filament Current 0.65 Amp. Amplification Factor 9.



8/-

## DE.55 "COSMOS"

A 6-Volt Dull Emitter General Purposes Valve.

Filament Current 0.09 Amp. Amplification Factor 9.



18/6

## SP.55/R "COSMOS" SHORTPATH RED SPOT

The Loud Speaker Valve supreme for 6 Volts.

Filament Current 0.25 Amp. Amplification Factor 6.



22/6

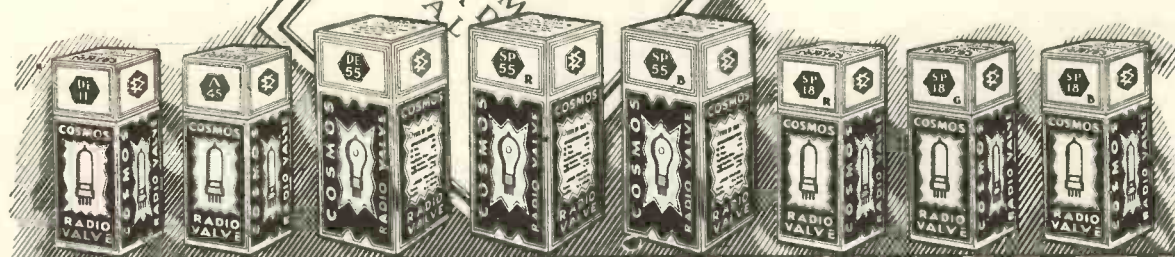
## SP.55/B "COSMOS" SHORTPATH BLUE SPOT

The 6-Volt Resistance Capacity Valve.

Filament Current 0.09 Amp. Amplification Factor 35.



18/6



A COSMOS VALVE FOR EVERY POSITION

In writing to advertisers, please say you saw the advertisement in the WIRELESS MAGAZINE.



5YM writes on Interesting Matters—



AS many of my readers know, I live in a small village on the borders of Hampshire and Surrey. Though the village is small there are a great number of receiving sets in the neighbourhood, though it is not so very long ago that there was only one aerial for miles around. About a year ago my licence was altered so that I could work on 44-46 metres and 23 metres at any time of the day or night, irrespective of broadcasting.

Of course, this presupposed two things—one was that the neighbouring broadcast receivers would be reasonably efficient, and the second was that I should so conduct my station as to make it possible for an efficient receiver a short distance away to cut me clean out. All that was necessary on my part was a clean emission from my aerial and a clear and sparkless generation of power.

With the co-operation of friendly folk in various positions, I got my transmission reasonably right; but there was some interference with the less selective sets. I continued to investigate all sources of interference from my end, not working during broadcast hours, until I have got things so that the only set interfered with is that of my immediate neighbour, whose aerial is fifty yards from mine.

### "Shock Excitation"

What he gets is that which is known as "shock excitation." Whenever my aerial charges up a current is induced in his aerial, and he hears it as a click in his loud-speaker. Fortunately, however, he is a reasonable man; also he dines from eight o'clock until eight-forty-five.

I have thus three-quarters of an hour in the middle of the evening when I can work without disturbing him, and, also, if I want to do any special experiment at any other time

he is always willing to shut off for half an hour, provided there is not some specially interesting programme.

Thus everything is now all right; but at first, when it was known that I was investigating, every squeak, howl, or static was put down to me and duly reported to me as interference caused by my transmitter. On several occasions my neighbour came in to tell me that interference was very bad, when I had not been transmitting for hours. On one of these occasions there was a bad thunderstorm about thirty miles away, and it was really impossible to hear anything decently on the broadcast band!

\* \* \* \* \*

### Set for All Wavelengths

The building of a set for all wavelengths presents many interesting problems. The tuning condenser for work on 45 metres should not be bigger than .0003 microfarad when "all in." A small condenser of considerably less maximum value is better still. Usually it is the best policy to choose the smallest possible condenser that will tune from 30 to 60 metres with a given inductance, one inductance thus covering the wavelength range on which most work is now done. But a very small variable condenser greatly restricts the tuning range of any given coil on the higher wavelengths. A compromise between the conventional .0005 microfarad condenser usually fitted to broadcast receivers for aerial tuning, and the very small variable condenser which gives the very best results on short waves must be found. This will be found to be in the neighbourhood of .0003 microfarad, at which value a reasonable range will be given to an inductance for broadcast reception, whilst the difference between minimum and

maximum is not so great as to make the separation of stations too difficult on the closely-packed amateur wavebands. A square-law, or, better still, a straight-line-frequency condenser, is imperative. For short-wave working the inductance should be so chosen that the required wavelength range is given on the lower part of the condenser scale. Naturally, since the set is required for short-wave work as well as medium and long-wave work, one of the many systems of reaction control which do away with the use of a movable reaction coil will be used. This will greatly facilitate the reception of long-range broadcast stations as well as improving the stability of the instrument for ordinary working.

At my own station I have developed my receiving plant in the opposite direction. I am using a variometer-tuned receiver with a range of from 30 to 50 metres, with a fixed-reaction coil and parallel-reaction tuning condenser. A slow-motion dial is fitted to the variometer, which is built with bare, spaced wire, and the whole instrument is most delightful to handle.

\* \* \* \* \*

### Crystal Control

Very little progress has as yet been made in this country with crystal-controlled transmitters. One of the difficulties is the supply of quartz plates with strong oscillating characteristics. The other is the fact that at least two, and probably three, valves have been necessary to work on 45 metres. Recent developments point to the probability that it will be possible to work crystal control on low power with one or two valves. Work is being done along these lines at my own station, but so far success seems to be rather elusive. But it will be done properly by someone before long.

5YM.



# FREE

## Season Tickets For The Zoo

For Members of the

# DAILY GRAPHIC

Children's Birthday Club



Photo by Aitken, Ltd.

By special arrangement with the Council and Secretary of the Zoological Society, Members of the Birthday Club are admitted absolutely free to London's Zoo.

A little book containing 20 free admission tickets is presented (whenever written application is made for them), together with an official Badge of Membership to each new young reader of the "Daily Graphic" on becoming a Member of the Children's Birthday Club. These tickets can be used any day of the week except Sundays and Mondays right up to the end of the year.

A member has to give up one ticket each time they visit the Zoo, and must wear the Membership Badge.

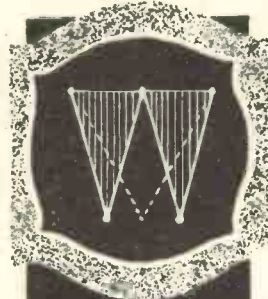
### HOW TO BECOME A MEMBER

Start collecting now 50 membership coupons, one of which appears every other day in the "Daily Graphic," or, if you do not wish to wait so long before you can become a member, send a postal Order for 6/6 to the "Daily Graphic," Tallis House, Tallis Street, E.C.4—this being 13 weeks' subscription—together with one Birthday Coupon (cut from the "Daily Graphic"), filled in and the name and address of your nearest newsagent. You will then be registered as a member and be entitled to this free privilege. In addition to this free treat you will receive on your birthday, whenever it may fall, a wonderful present—but this will be sent only if you join before October 31st.

See the full particulars in the  
**DAILY GRAPHIC**

# Increased Electronic emission.

*length of filament  
about twice that  
in the usual type.*



**Duo-  
triangular  
filament ~  
suspension**



Comparative Diagram

SIX-SIXTY

ORDINARY

SEEING is believing. It is obvious from the construction of the Six-Sixty Duo-Triangular system of Suspension that the length of filament employed is almost twice that in the usual type of design, represented by broken lines. Now this increased length of filament must result in a corresponding increase in electronic emission, and if in turn all this valuable electron stream is utilised, then greater efficiency must ensue.

In the early days of the radio valve, the length of filament in the old type of cylindrical construction may have been relatively great, but a very large proportion of the electron stream was lost. The design of the new Six-Sixty Point One Valves is such that the entire filament—supported at each corner of both triangles—is wholly enclosed within the grid and anode, and therefore all the electron stream is utilised.

Then too, the stability and perfect alignment resulting from the additional supports render it unnecessary to assemble the filament in tension, and ensure a constancy of perfect reception.

And remember, the special Six-Sixty filament itself is wonderfully economical. Its current consumption is barely 1 amp., and when operating at the rated voltage there is absolutely no sign of "glow."

The new Six-Sixty Point One Valves—embodying all the advantages of Duo-Triangular Filament Suspension—are suitable for operation in all stages of a receiver, whether the L.T. supply be 2, 4, or 6 volts.

After exacting and exhaustive tests, Messrs. A. J. Stevens (1914) Ltd. have decided to standardise SIX-SIXTY valves in their famous "Symphony" Range of Receivers.

Descriptive leaflet S.S.9-26, with particulars of complete range, free on application.

S.S.2A., H.F. and L.F. D.E., 1'8 volts, 1 amp., H.F., L.F., and Detector . . . . .	14/-
S.S.10. D.E., 2 volts, 1'5 amp., Power Ampli- fier . . . . .	18/6
S.S.7. D.E., 3'7 volts, 1 amp., Power Ampli- fier . . . . .	18/6
S.S.8. D.E., 3-4 volts, 1 amp., General Pur- pose . . . . .	14/-

*These Prices do not apply  
in the Irish Free State.*

**SIX-SIXTY VALVES**  
*Better by Six Times Sixty*

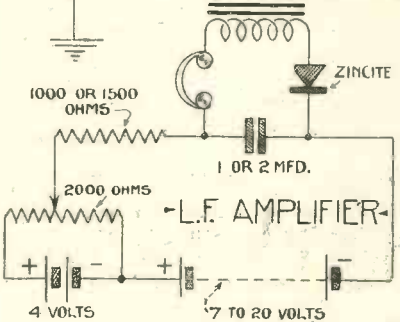
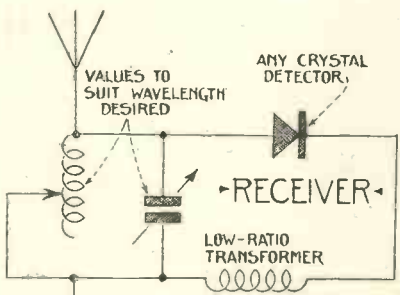
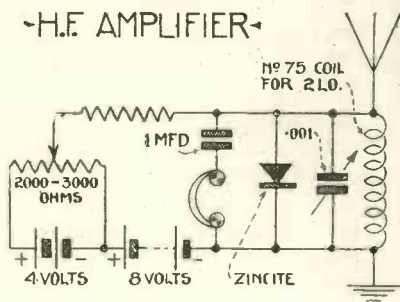
The Electron Co., Ltd., Triumph House, 189, Regent St., LONDON, W.1. 2A.

# QUESTIONS SIMPLY ANSWERED

## Oscillating-crystal Circuits

**Q.**—Can you give me circuits making use of an oscillating crystal as an H.F. amplifier and as an L.F. amplifier?—H. W. H. (Keyworth).

### H.F. AMPLIFIER



### Oscillating-crystal Circuits.

**A.**—The circuits are shown here. The L.F. amplifier will not prove to be as efficient as the H.F. amplifier when tried out, but gives about a 3 to 1 amplification factor; the H.F. should be about 15 to 1. You are advised to buy tested zincite and have it fused in an arc; with good zincite no great difficulty will be found in getting the crystal to oscillate.—S. H. D.

### Adding Grid Bias

**Q.**—As I experience some distortion from my receiver I would like to add grid

bias to obviate this. Can you explain how this may be added?—J. C. (Dover).

**A.**—Disconnect the I.S. terminals of each L.F. transformer from negative L.T., now connect the positive terminal of the grid battery to L.T.— and wire each I.S. terminal to a separate negative wander plug for attaching to the negative side of the grid battery.—L. A. C.

### Neutralising a Standard Three-valver

**Q.**—I have a three-valve tuned-anode H.F. detector and L.F. receiver, and wish to neutralise the H.F. stage and so overcome the oscillation nuisance. I might mention that a potentiometer is not used in my set. Can you explain how I may effect the above?—P. R. (Dorking).

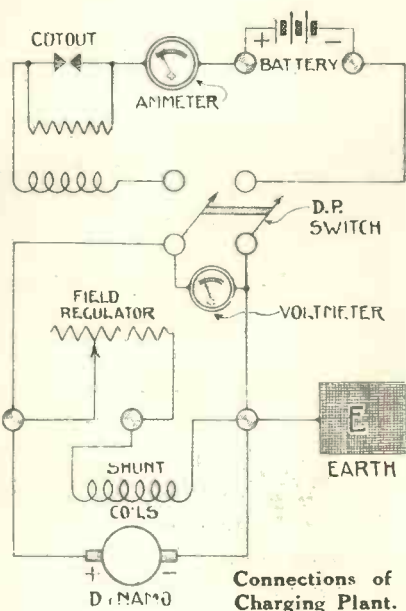
**A.**—The method we advise is as follows:—Fit another single coil holder by the side of your present anode coil and connect one side of the coil holder to the grid of the H.F. valve, the other side being connected to one terminal of a neutralising condenser. Connect the other terminal of this condenser to L.T.— A No. 150 coil inserted in this extra holder will be about correct for ordinary broadcast reception.—L. A. C.

### Accumulator-charging Difficulties

**Q.**—Having difficulty in getting my accumulators charged locally, I have installed a dynamo and an accumulator-charging panel. I am puzzled, however, because my voltmeter will only show 3

or 4 volts, whatever the state of charge may be in the cells. Is there anything wrong with my connections, of which a sketch is enclosed?—W. T. (Seaford).

**A.**—The equipment appears from the



Connections of Charging Plant.

sketch to consist of a dynamo with four terminals only, one of which is earthed to the frame, a double-pole main switch, an automatic cut-in and cut-out, ammeter, variable resistance, two charging terminals, and three dynamo terminals.

It is hard to know exactly what the dynamo connections are from the few details supplied, and the same applies to the cut-out.

The variable resistance appears to form an independent circuit from the cell circuit, but without knowing the arrangement of the dynamo connections one cannot be certain if it is meant to use this as a shunt regulator, or as a series resistance between the dynamo and cells in the main charging circuit.

The only thing quite certain is that the voltmeter is wrongly placed, as it measures the potential after current has passed through the cut-out coil and consequently the voltage drop due to coil resistance causes it to give a lower reading than the dynamo or the cell voltage.

As the circuit submitted is so involved a simplified diagram has been prepared and is given herewith, on the assumption that the dynamo is shunt wound, with separate main and shunt terminals, one terminal of each being earthed.—A. H. C.

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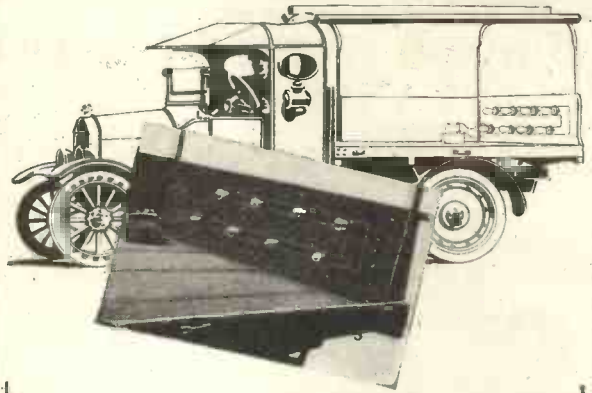
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EIGHT Lotus Valve Holders fitted with large power valves and fixed to tailboard of a Ford motor lorry, driven over rough roads for 30 miles survived the test.

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3/9

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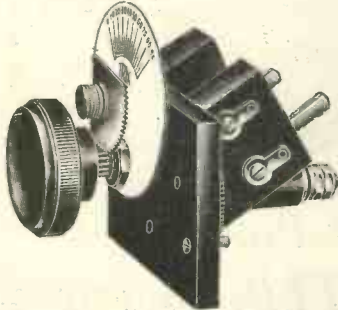
2/6

VALVE HOLDER Without Terminals

2/3

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London, E.C.4.

# Continental Notes

**O**F course, you all know Radiolo! On every occasion when you have listened to Radio-Paris you must have been struck by his breezy announcements. Radiolo was the "cloak of anonymity" with which this station tried to disguise Mons. Marcel Laporte. For nearly four years he acted as sole announcer at the Radio-Paris studio.

By the time these notes are in print, however, I am very much afraid you will hear his voice no more, as I am told he is relinquishing his duties to return to the stage.

### His Career

Marcel Laporte began his career as an employe on the Paris-Lyons Mediterranean Railway; since then he has been both actor and impresario.

But I will let you into a secret. Owing to the extended hours of the transmissions, Laporte could not always be on duty at the Radio-Paris studio, and during the last few months a second Radiolo was chosen to double the part of announcer, in view of the close similarity in voice.

But Monsieur André Gaudette, although endeavouring to copy the original, is not an actor by profession; he is a Professor of Latin and Greek at the Paris University. It was only by sheer coincidence that he was chosen for the job.

I wonder whether the present announcer will possess the talent of lending a romantic touch to market prices and stock exchange quotations! Radiolo chanted these bald facts as if they had formed part of a recitation in grand opera.

\* \* \* \*

For the coming winter season the Berlin broadcasting station proposes to give to its listeners one operatic performance each week. Arrangements have been made by which twenty-four works are to be relayed from Berlin theatres during the season, namely, sixteen from the State, and eight from the municipal opera houses.

From the studio a further twenty operas are to be broadcast this winter,

and the programme includes names of famous composers from all periods, from the antiquated Gluck to the ultra-modern Strauss.

The average Berliner is a great lover of high-class music, and the German capital is in the favoured position of being able to afford four opera houses, which during ten months of the year are packed from floor to ceiling.

\* \* \* \*

As you are aware, most of the Berlin concerts are relayed to the Königswusterhausen high-power transmitter, but during the last few weeks a simultaneous broadcast has also been given by a 3-kilowatt station on a wavelength of 54 metres.

Although these tests were purely of an experimental nature, they have been highly satisfactory inasmuch as from a number of foreign reports received they have conclusively proved that the transmissions on the shorter wave, although of less initial power than the regular broadcast, have been picked up at very considerable distances.

Mark you, in each case, listeners have dilated on the fact that their reception had been marred by neither atmospherics nor morse!

### Short Waves

In view of the fact that concerts on the low wavelengths put out by U.S.A. stations are now regularly received in Central Russia on simple one-valvers, with aerial reaction, it is also proposed to erect an experimental transmitter at Vienna in parallel with the Rosenhügel station. Reports also reach me that both Moscow and Leningrad contemplate similar plants.

Should all these plans mature, it appears to me that in this kingdom we are not making true progress. As it is, in view of the increased power of some of the Continental stations—Germans, in particular—many listeners in this country secure reception of foreign concerts on ordinary crystal receivers; in fact, cases are reported where the foreigner has cut out the local transmission.

(Continued on page 388)



# THE 1927 FIVE

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Set of 4 Aluminium Shield Plates **12s.** per set

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**NOTE.**—When ordering Resistors please state make and type of valves used and voltage of accumulator.

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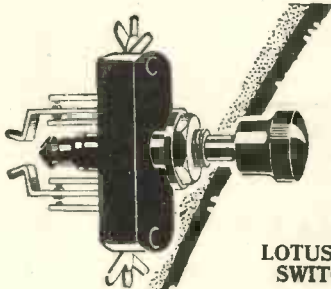
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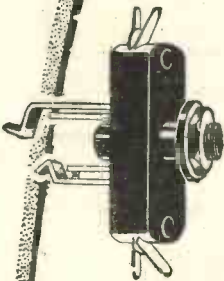
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## Continental Notes (Continued)

With the readjustment of European wavelengths, it is hoped that the conditions may be bettered, but there still remains the fact that in some parts of the United Kingdom the listener can secure greater volume by tuning-in to the Continent.

The growth in the number of valve sets on this side must be surely due to the fact that on any evening it is now possible to hear transmissions from several European broadcasting centres.

\* \* \* \* \*

### A German Station

Since my last notes were published we must add the name of a further German broadcaster to our list. It is that of the Free City of Danzig which, transmitting on a wavelength of 272.7 metres for the present, relays the bulk of its programmes from its neighbour, Königsberg.

In the same way as a railway station dumped down in a thinly-populated district soon sees a small town grow around it, so the advent of a broadcasting plant, be it only a studio, rapidly increases the number of local licensed listeners.

Although Danzig may from time to time supply its own radio entertainment, it is fully expected that within the next three months its following will have so grown in size that it will be possible to make the station an independent one, convert it from relay to main, and increase its power.

This is all to the good, for it provides an extra opportunity to the distant "fan" to listen to local celebrations and fêtes, thus giving him, by this means, a closer insight into the artistry of yet another corner of the world.

\* \* \* \* \*

Of all European countries, there appears to be little doubt that Germany to-day is the one showing the greatest enterprise in the extension of its broadcasting service. Apart from the present installation of a new 60-kilowatt transmitter at Langenberg (Rhineland), and the proposed increase of the Königswusterhausen plant to twice that power, plans are now being put forward for the construction of a further relay station at Freiburg, in Baden.

In reality, the new scheme is directed to satisfy the requirements of

the very large number of Alsatians who have immigrated to that district since the return of Alsace-Lorraine to France. It is proposed to relay a portion of the Stuttgart programmes, to utilise the existing studio at Mannheim, and to install a further one in the city of Karlsruhe. Freiburg itself will supply performances from the Municipal Playhouse, as well as dialect plays from the local Alsatian Theatre.

There appears little doubt that the new transmitter will be used for the purposes of propaganda, as in view of the fact that the French Posts and Telegraphs Department are so dilatory in their undertakings, the city of Strassburg finds itself for the present without any broadcasting service. Its German-born inhabitants must, therefore, look forward with pleasure to entertainments supplied from over the border.

\* \* \* \* \*

For the present, transmissions from the land of the Soviets remain "wropt in mystery." From reports which are received there appears very little doubt that broadcasts from Moscow, at least, are well received in certain portions of the United Kingdom. Curiously enough, most of these proofs are given by listeners from the Midland districts, and it is seldom that the Russian concerts have been heard in London.

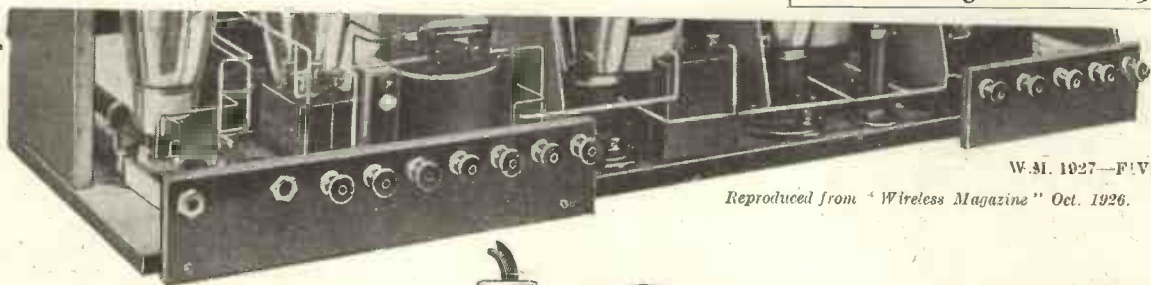
### Increased Power for RDW

For many months past rumours have been current regarding the increase in power of the Moscow (RDW) transmitter to 100 kilowatts. At the time these notes are written the official Radio Peredacha programmes still give the energy of that station as 15 kilowatts. It should, however, be borne in mind that Moscow (RDW) and Chablovka, of which so much has been said, are two different stations, the latter lying at some little distance to the south-east of Moscow.

The plans of the U.S.S.R. were to combine all broadcast telephony transmitters in one locality, namely, at Chablovka, under the title of Komintern. The smaller plants scattered over the capital would then be scrapped.

JAY COOTE.





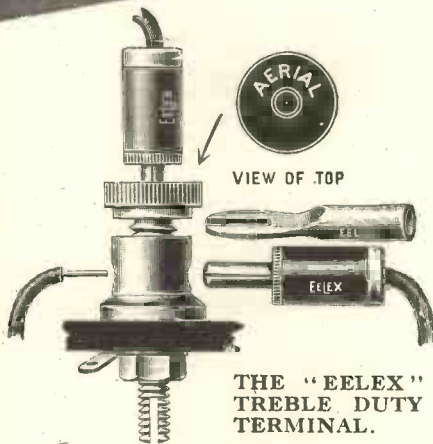
W.M. 1927—FIVE.

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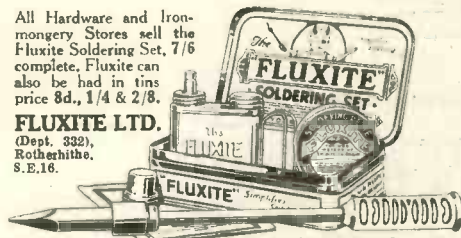
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2 Gridleaks (3 and 5 Meg.)		5	0
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### 2-VALVE AMPLIFIER, 35/-

1-Valve Amplifier, 20/-, as new; Valves, D.E. '06, 7/-; Headphones, 8/8 pair; New 4-Volt Accumulator, 13/-; new 60-Volt H.T., guaranteed, 7/-; 2-Valve All-Station Set, 24. Approval willingly.  
Write for free bargain list.  
**M. Taylor, 57, Studley Rd., Stockwell, Londpn.**



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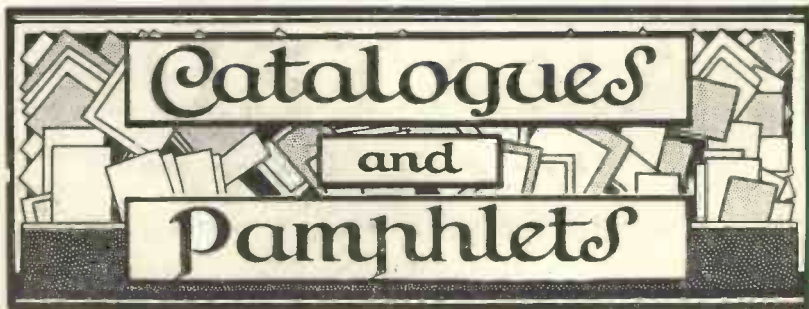
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**C**ONCLUSIVE proof of the efficiency of Lotus valve holders is furnished in a description of a novel test which was made recently, which forms the subject of a pamphlet sent to us by Garnett Whiteley & Co., Ltd., of Lotus Works, Broad Green Road, Liverpool.

An instructive leaflet entitled *Aids to Better Reception* and the latest price list of small radio measuring instruments are two new publications recently received from the Sifam Electrical Instrument Co., of 95, Queen Victoria Street, London, E.C.4.

"Press-button" sets are the subject of an interesting leaflet received from Felcourt Products, Ltd., of Great Felcourt, East Grinstead.

Particulars of an umbrella-type portable aerial have been sent us by Harold Ashton, A.M.I.E.E., of 8-10, Bull's Head Chambers, Hopwood Avenue, Manchester.

Full particulars of Symphony receivers are given in a well-printed catalogue received from A. J. Stevens (1914), Ltd., of 122-124, Charing Cross Road, W.C.2.

Containing 28 pages, an interesting booklet entitled "Concerning Dubilier," has just been issued by the Dubilier Condenser Co. (1925), Ltd., of Victoria Road, North Acton, W.3.

Wireless-cabinet parcels are dealt with in the new catalogue issued by Hobbies, Ltd., of Dereham, Norfolk, at 9d.

Gambrell "mains" receivers are the subject of leaflets obtainable from Gambrell Bros., Ltd., of 76, Victoria Street, S.W.1.

Liberty sets and components are dealt with in a catalogue issued by the Radi-Arc Electrical Co., Ltd., of Bennett Street, Chiswick, W.4.

"The Gentle Art of Choosing One's Panel" is the title of an interesting booklet, issued by the American Hard Rubber Co. (Britain), Ltd., of 13a, Fore Street, E.C.2, which can be obtained by sending a stamped addressed envelope.

Leaflets received from the Electron Co., Ltd., of 189, Regent Street, W.1, give details of additions to the Six-sixty range of valves.

From the General Radio Co., Ltd., of 235, Regent Street, W.1, we have received booklets dealing with new and improved apparatus.

Two new valves are the subject of a folder sent us by the Edison Swan Electric Co., Ltd., of 123-5, Queen Victoria Street, E.C.4.

From W. & G. Foyle, the well-known booksellers, we have received a catalogue of technical (including wireless) publications. The firm's address is just BCM/Foyle, W.C.1.

All kinds of Becol ebonite panels, tubes and dials are dealt with in a booklet issued by the British Ebonite Co., Ltd., of Nightingale Road, Hanwell, W.7.

A new loud-speaker called the Desmo is announced by Desmo, Ltd., of 31, Stoford Street, Birmingham.

A 36-page catalogue received from Radio Instruments, Ltd., of 12, Hyde Street, New Oxford Street, W.C.1, describes new lines in R.I. receivers and components.

Leaflets and booklets describing the Ethodyne and Ethophone sets and components have been sent us by Burndep Wireless, Ltd., of Blackheath, S.E.3.

The new Cosmos resistance-coupling unit is described in a folder received from Metro-Vick Supplies, Ltd., of Trafford Park, Manchester.

Copies of the new Marconiphone and Sterling log book can be obtained free of charge on application to the Marconiphone Co., Ltd., of 210-212, Tottenham Court Road, W.1.

Triumph components are the subject of a folder received from A. H. Clackson, Ltd., of 119, Fleet Street, E.C.4.

Copies of the Osram Wireless Guide can be obtained on application to the General Electric Co., Ltd., of Magnet House, Kingsway, W.C.2.

*By sending for a selection of the catalogues and pamphlets mentioned above you will be able to keep in touch with the latest developments in the design of wireless apparatus.*

*Unless otherwise stated, copies of the publications will be sent free and post free if readers mention the WIRELESS MAGAZINE when writing.*

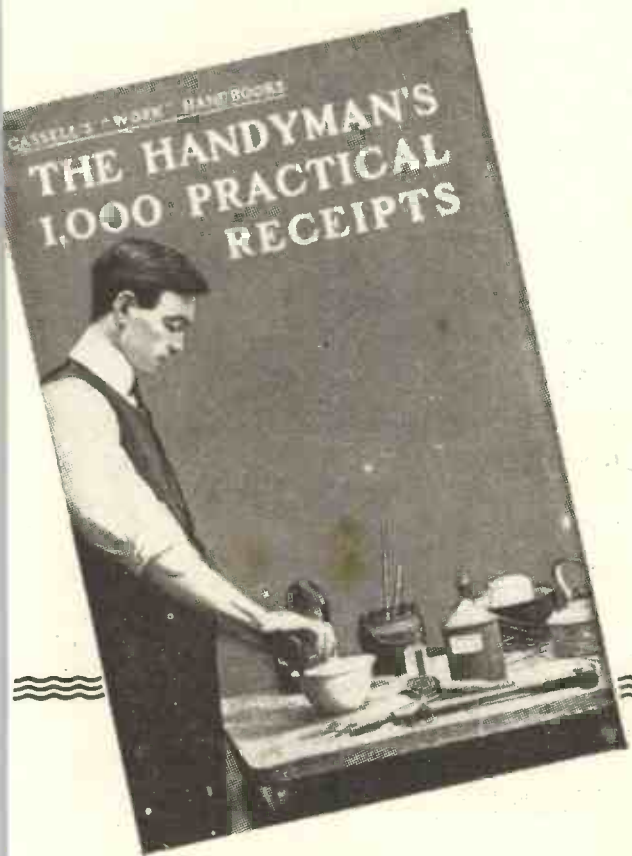


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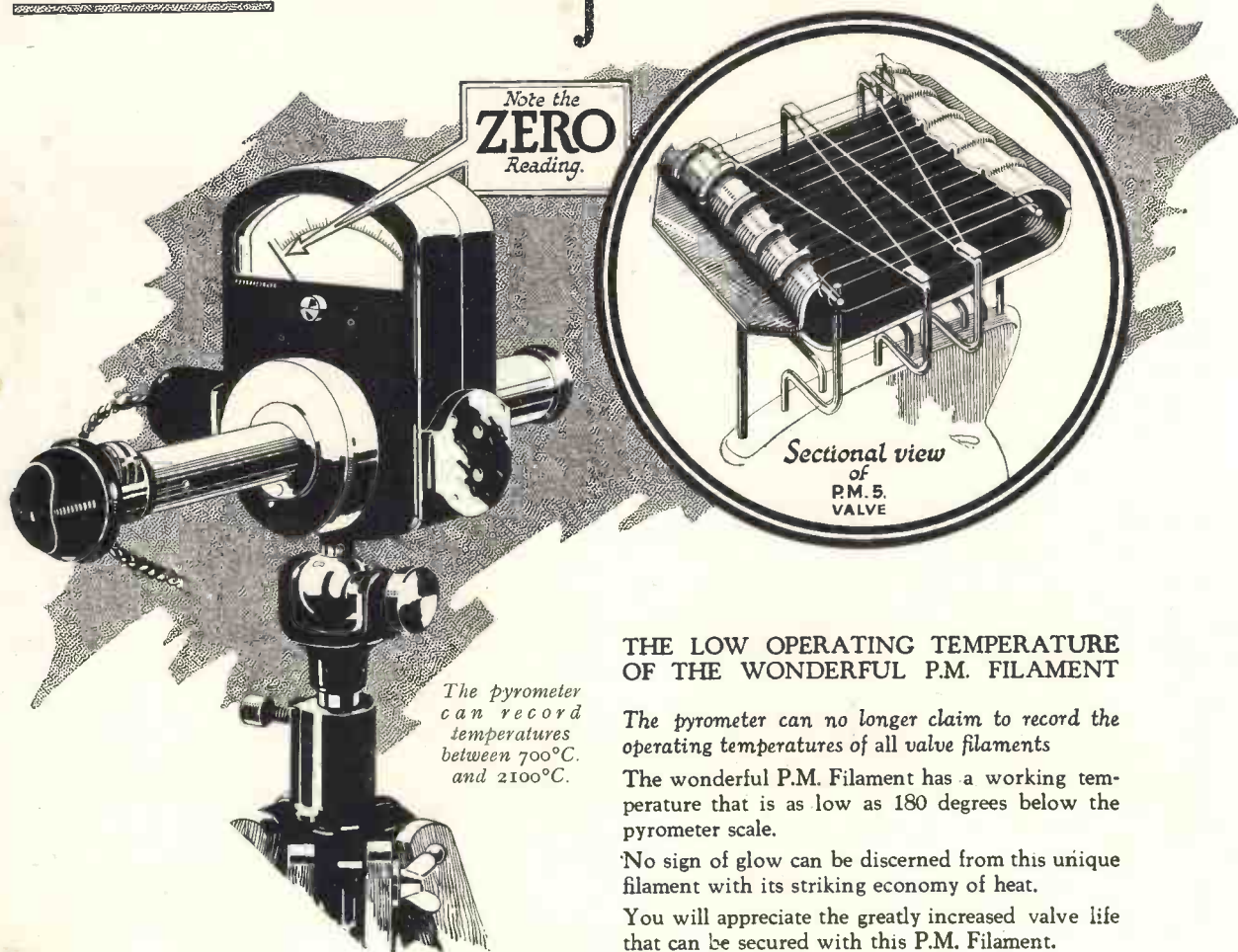
# The "Wireless Magazine" Buyers' Guide

(Numbers in brackets indicate issue in which advertisement appeared.)

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