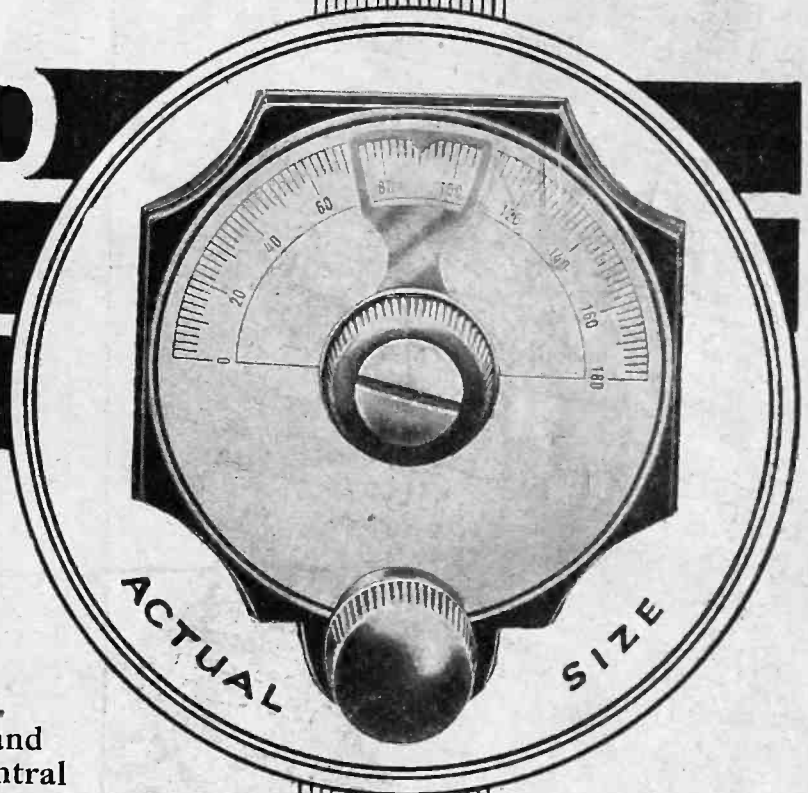


# Announcing

## The New **ORMOND GEARED DIAL** \*\*\*



A new geared dial of novel movement and most elegant design.

The frame is constructed of best quality bakelite of great strength, highly polished.

Both fast and slow motion are provided.

The former, by lifting the driving knob and throwing drive out of gear, enables central bush knob to manipulate the condenser spindle direct. Slow motion is obtained by giving driving knob slight twist, pressing into gear and operating in the usual manner.

The Aluminium dial is in direct connection with the heel screw, a Terminal is provided for separately earthing the dial; the latter may then be used as an anti-capacity earthing shield. Ratio approximately 10 to 1.

Cat. No. R/360.

Price 2/6.

*The  
Perfect  
Dial –  
with a  
Perfect  
action*



**2/6**

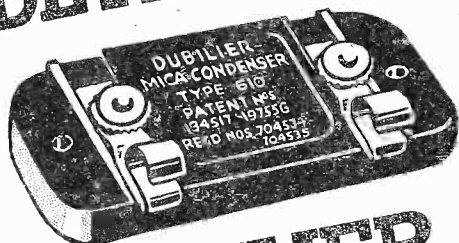
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Ormond House, Rosebery Avenue, London, E.C.1

Telephone: Clerkenwell 5334/5/6 and 9344/5/6.

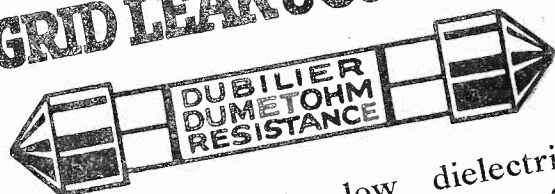
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MORE EFFICIENT  
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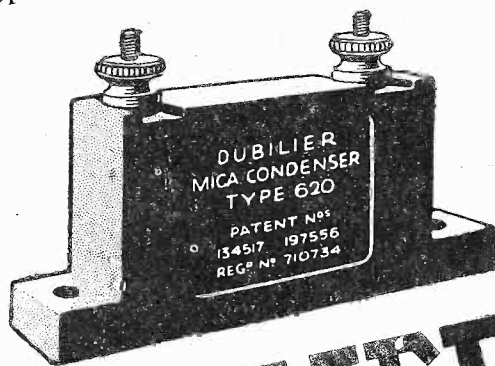
**DUBILIER  
GRID LEAK & CONDENSER!**



**THE** extremely low dielectric losses and the high degree of accuracy of Dubilier Mica Condensers are well known.

These qualities make them invaluable in any radio frequency circuit and especially so in the grid circuit of a cumulative grid detector where very minute high frequency currents are dealt with and where even small losses have an appreciable effect.

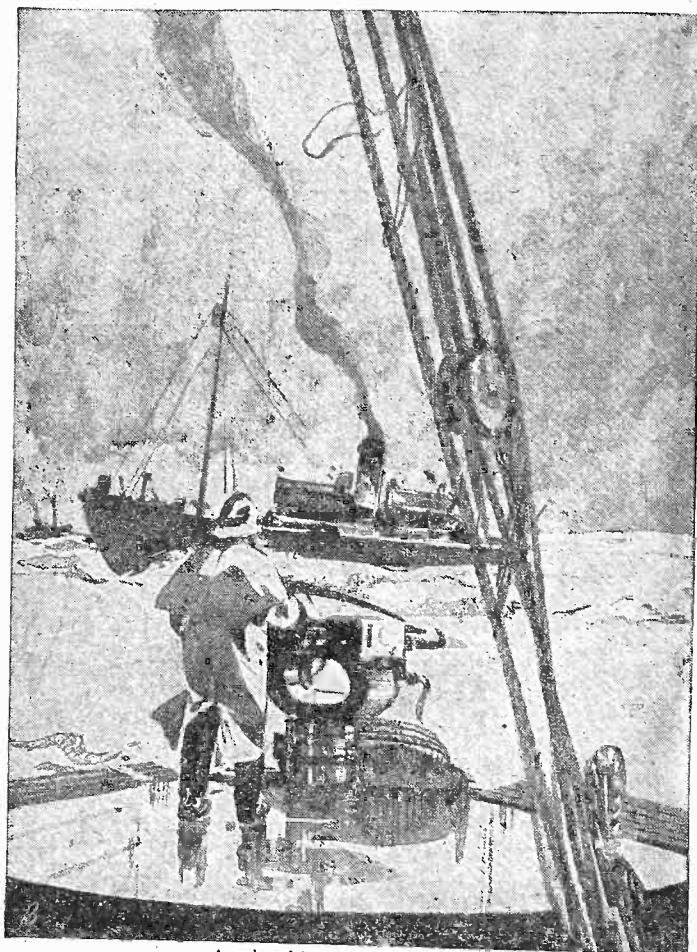
Specify Dubilier for your next set.



**DUBILIER  
CONDENSERS**

Dubilier Condenser Co. (1925) Ltd.,  
Ducon Works, Victoria Road, N. Acton, W. 3.

**When buying Valves  
-Remember!**



At the Harpoon Gun.

**Whaling Fleets at sea for months on end keep in touch with the world through Radio. They use Marconi Valves because of their unfailing dependability.**

Imperial Airways—The B.B.C.—Metropolitan Police—Empire Wireless Communications—Trinity House Lightship and Beacon Stations—Croydon Control Tower and Large Passenger Liners all

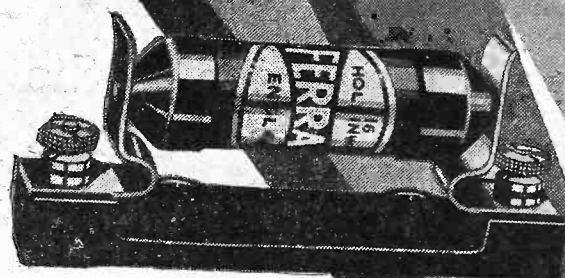
**USE  
MARCONI  
VALVES**





The Standard  
for all good  
Sets.

*Write for Leaflets and particulars,  
also booklet of Ferranti Radio  
Components.*



# FERRANTI COMPONENTS

FERRANTI LTD.

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Every Reader of "P.W." will receive  
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In response to innumerable requests we have prepared a  
**COMPLETE GUIDE TO  
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**—FOR  
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Don't miss this! It is absolutely invaluable to the man who wants to get the best from his set.

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**USUAL PRICE**

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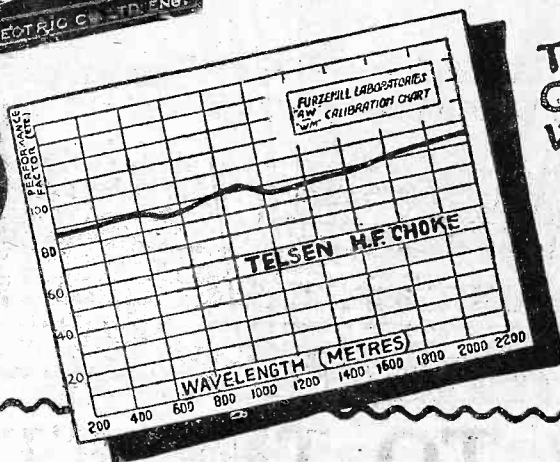
**ORDER NOW**



# JUST LOOK AT THIS REMARKABLE NEW H.F. CHOKE!



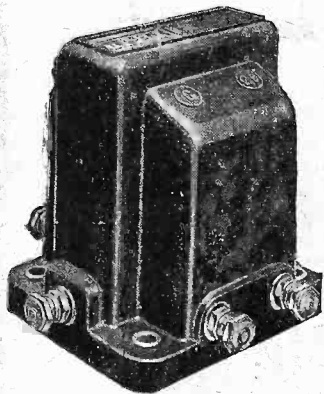
**2/6**



## THE TELSEN H.F. CHOKE WITH THE WONDERFUL CURVE

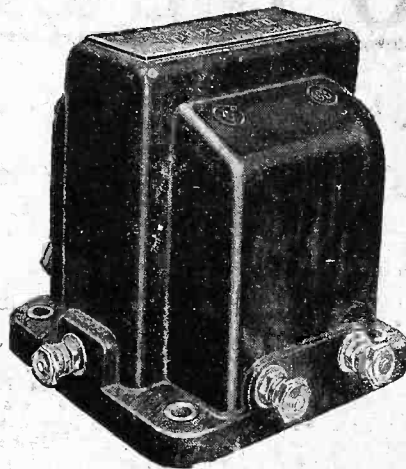
The remarkable performance of this new Telsens H.F. Choke will be appreciated from the accompanying graph, showing the curve of this component, which is the result of a standard choke test carried out by J. W. Reynier, B.Sc., A.M.I.E.E. at the Furzehill Laboratories. It is designed to cover the whole wave-band range from 18 to 4,000 metres; has exceptional low self-capacity and is shrouded in genuine Bakelite. Inductance 150,000 microhenries. resistance 400 ohms.

Price **2/6** each



Telsens "Ace" Transformer, the ideal model for all Portable Sets, and where space is limited, gives perfect reproduction throughout the musical range. Shrouded in genuine Bakelite, with new windings and core, fitted with earth terminal. Made in ratios 3-1 and 5-1.

Price **8/6** each

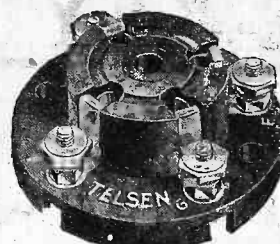


Telsens "Radiogrand" Transformer, new model, shrouded in genuine Bakelite, with new windings and core, fitted with earth terminal. Made in ratios 3-1 and 5-1.

Price **12/6** each

Telsens 7-1 Super Ratio "Radiogrand" Transformer, giving enormous amplification with perfect reproduction shrouded in genuine Bakelite with new windings and core, fitted with earth terminal.

Price **17/6** each



Telsens Valve Holders. Prov. Patent No. 20286/30. An entirely new design in Valve Holders, embodying patent metal spring contacts, which are designed to provide the most efficient contact with the valve legs whilst allowing the valve to be inserted or withdrawn with an easy movement, instead of being subjected to undue strain which often causes damage and loss of efficiency to the valves.

Low capacity, self-locating, supplied with patent soldering tags and hexagon terminal nuts.

Price **1/-** each

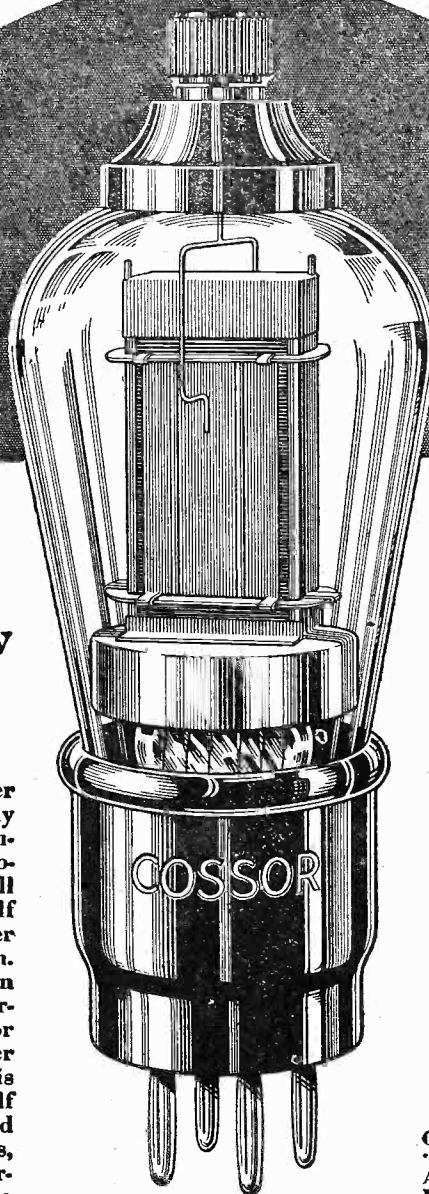
# TELSEN

## COMPONENTS

Highest actual amplification!

— due to its  
abnormally low  
inter-electrode  
capacity

The effective H.F. amplification per stage that can be obtained in any Screened Grid Set is largely controlled by the inter-electrode capacity of the S.G. Valve. It is well known that the lower the self capacity of the valve the greater its effective stage amplification. Important features in its design and construction permit the inter-electrode capacity of the new Cossor 215 S.G. to be reduced to the order of .001 micro microfarads. This is substantially lower than the self capacity of any other Screened Grid Valve on the market. It follows, therefore, that this new valve permits a big increase in effective amplification. In fact, results are obtained which, a year ago, would have been considered quite impracticable.



Cossor 215 S.G. 2 volts,  
15 amp. Impedance 300,000.  
Amplification Factor 330.  
Mutual Conductance  
1.1 m.a/v. Normal working  
Anode Volts 120. Positive  
Voltage on  
Screen approx.)  
60. Price **20/-**

THE NEW  
**COSSOR**  
**215 S.G.**

**G R E A T E S T   E F F E C T I V E   S T A G E   G A I N**

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♥ 6259

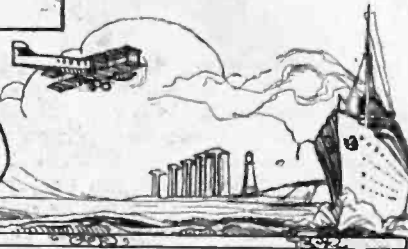
# Popular Wireless

## LARGEST NET SALES



Scientific Adviser:  
Sir OLIVER LODGE, F.R.S.  
Chief Radio Consultant:  
CAPT. P. P. ECKERSLEY, M.I.E.E.  
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Technical Editor: G. V. DOWDING, Associate I.E.E.  
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**BLUE PRINTS BUCKSHEE!  
A BIG BARGAIN.  
SHORT-WAVE RESULTS  
A GOOD TALK.**

## RADIO NOTES & NEWS

**THE COUNTY CHAMPION-  
SHIP AT THE RADIO SHOW.  
SOUTH OF THE LINE  
NEXT WEEK.**

### Blue Prints Buckshee!

**W**HAT do you think of your two shillings' worth of Blue Prints that are placed inside the pages of "P.W." this week? They are given away absolutely free, gratis and for nothing, to everyone who plunks down threepence and picks up the *Pride of the Bookstall*, viz., namely, i.e., that is to say, "P.W."

They say it is more blessed to give than to receive, and honestly it warms and superheats the cockles of my heart to think of what you lads are getting this week!

### Like Flowers in Spring!

**T**HEY come to you, those blue prints, as bright and as new and as blue as violets in spring. And you might think they just happened—cropped-up like weeds do, when nobody was looking! But there you would make a major error, for those blue prints represent knowledge, experience, toil of hand and sweat of brow.

Each one is a worked-out, tried-out, gingered-up and best-yet circuit, guaranteed by "P.W."—Britain's Leading Radio weekly.

### "Ariel"—Auctioneer.

**T**HE more I think of it the more enthusiastic I get! I feel like the auctioneer "who stood in this market place full forty years." You know the kind. "P.W." is no stranger to you. There is nothing here to-day and gone to-morrow about the radio paper that began before broadcasting, and that still has the largest net sales of any radio weekly in the world!

And when offering you weekly this quintessence of the cream of British radio journalism, we do not ask for five bob, four-and-six, three bob, half-a-bar, one and a kick, ninepence, or even a tanner, but we publish and provide it, printed on both sides of the paper, full-stops and commas thrown in, profusely illustrated and packed with technical tips, for the sum of threepence only!

### A Big Bargain.

**A**ND just one word before I leave the subject. When you open your free gift and find that it occupies most of the available floor space with perhaps a rod, pole or perch over, do not grumble because we did not make it smaller.

Those blue prints are drawn exactly to scale, each one is the self-contained soul of a go-getter set, and if ever there are any blue prints in this whole wide world, you can bet it will be "P.W." that supplies them. (Probably buckshee at that!)

Yes, sir! Those Blue Prints are certainly IT, for they give you all the information you want—at a glance.

### THE WIRELESS BABY



Even "babies" were pressed into service during the autumn army manoeuvres, and here one is shown carrying a complete wireless installation.

### Heard the Nonet?

**M**IDLAND wireless listeners who have been mourning the lot of the Midland Wireless Orchestra are greatly comforted by the advent of the Midland Wireless Nonet. A "Nonet" is a combination of nine players, and a merry wag once described it as "one over the eight."

If they keep off chamber music and live up to this happy description they should do well, shouldn't they?

### A Bugle Call Across the Atlantic.

**T**HE other day they had an American Legion ceremony in the Arlington Cemetery, Washington, and in order to get the right touch they had bugles blown by the American Legion in Paris at 4.25 A.M. before the tomb of the Unknown Soldier. The bugle-calls were caught up by wireless and transmitted all over the States as part of the ceremony. Uncle Sam is a sentimental soul, isn't he? But he does believe in going the whole hog!

### Short-Wave Results.

**T**HE short-wave conditions are improving at last, and the ether is now less "puddeny" than at any time since last season. Our short-wave correspondent, "W. L. S.", who has been looking very crestfallen and bedraggled for months, has brightened considerably, and many readers have testified in no uncertain tones their pleasure at the change of affairs.

Listen to this clarion call from Clacton. "Yesterday evening I logged over fifty amateur stations on the 'Magic' Three. I heard the following prefixes: G.F., O.Z., P.A., D., U.O., T.S., S.M., H.B., E.A., F.U., O.N., D.V., and E.U. How's that for a few hours' listening?"

### Reading Morse.

**I**N case I should think he was pulling my leg this reader goes on to explain that the majority of these stations were  
(Continued on next page.)



## RADIO NOTES AND NEWS

(Continued from previous page.)

picked up on Morse signals. But he also says: "I don't think anyone can enjoy the short-waves properly unless they can read Morse."

It's certainly very nice to be able to dash and dot your way through all the stations, telephony or otherwise.

### A Good Talk.

I DO not often stray into a complimentary mood about broadcast talks, but I should like to say how much I enjoyed that thrilling talk some weeks ago by Major Yeats Brown on "Escapes from War Prison Camps." And, by the way, I wonder how many of you fellows have read those true stories of the prison escapes of some of our men from Germany, etc.?

For sheer hair-raising excitement and interest they beat any other books about the War I have come across. Get the one called "I Escape" from the library. You will have to sit up late, and prepare for prickles down your spine, but it's what I call a book.

### Manchester's Exhibition.

HERE'S Good Luck to the Manchester Radio Exhibition, which occupies the whole of the ground floor at City Hall, Deansgate, from October 8th to October 18th. I am afraid I shall not be able to get up to Manchester this year, which is a great disappointment when I recall the scenes of my youth and the possibilities of gaiety with which that city is well stocked! But still, duty first, as the policeman said when he stopped all the traffic to let the superintendent's wife cross the road.

### Radio Classes.

LONDONERS with a thirst for radio knowledge will be glad to know that the classes in wireless and high-frequency engineering have re-opened at the Polytechnic, in Regent Street, London, W.1. The facilities include a transmission lab. with a complete commercial installation for telegraphy and telephony (6 R A).

You can learn a lot about radio also at the Northampton Polytechnic, St. John's Street, London, E.C.1.

### The County Championship.

CONGRATULATIONS to Hertfordshire, which has paid Brookmans Park the prettiest tribute it is possible for a county to pay a radio station. For of all the counties of England, according to the latest figures, the percentage of families holding radio licences is higher in Hertfordshire, where Brookmans Park is situated, than in any other county!

Oxford and Surrey are both well placed, but at the time of writing Herts has it!

### Durham's Distinction.

AND who do you think is at the bottom in this race for a Lonsdale Belt for Listeners? Not little old Rutland, though Rutland has an average of 25.7 families against 30.9 which is the average all over the country. Essex, Staffordshire, Derbyshire and several others are below Rutland, and right at the bottom, down among the dead men, is county Durham.

I am sorry to say I do not know much about Durham as a county, except that they turn out a particularly fine brand of Light Infantry, but I have a feeling that Durham can do much better than this.

### At the Radio Show.

BEFORE the Radio show fades into a dim and distant memory I must tell you of my trying experience there with Victor King. I was feeling a bit tired of all the pushing and bustle, when he rushed up from behind me, gripped me by the arm and said, "Come with me. Quick, and I will show you the absolutely cutest little thing in the Exhibition."

I dodged with him right across the floor, up those stairs, across the gallery, into the Empire Hall, following him and expecting to see I-knew-not-what wonder in wireless,

### SHORT WAVES.

#### EASY FAME.

One advantage of the wireless is that nobody can stop you singing a duet with a famous artist if you want to.—"Sunday Pictorial."

"Clocks are being married to radio," we read in "Pearson's Weekly."

We only hope that matrimonial discord won't be set up.

Wireless Announcer (forgetting himself): "And here is another S.O.S. Will David Brown—DAVID BROWN—send back the tinner I lent him at Easter, as it is urgently required?"—"Passing Show."

#### VERY TENDER.

"The faculty of listening is a tender thing, and soon becomes weary and satiated," wrote Martin Luther.

But what about our three million odd licence holders?

"When he speaks a whole nation listens."

"A man of importance, eh?"

"No; a wireless announcer."

— "Answers."

One day the farmer's hand was very pleased with himself. He had found out how they got the "news" on the wireless. He had seen the accumulators going into town to be recharged. He had seen through that at once, of course! They sent those little "boxes" in when they were empty, and just had them filled up with the news and sent out again. Then they rolled out the news till the boxes were empty, when they sent them in again to be refilled.

It was bound to leak out sooner or later, but I don't know who is going to break it to the B.B.C.!"—"The Scotsman."

According to a contemporary, Faraday, Hertz, and Preece are among those who made wireless possible.

Perhaps so; but why not let bygones be bygones?"—"Humorist."

and when at last he reached his Journey's End he turned and with almost tears in his eyes, he said, "She's gone!"

What I said won't bear thinking about!

### The Los Angeles Limit.

THEY say that a Los Angeles lady listener is so fond of listening that she has fitted flex on her headphones so that they will reach to any part of the house. I hate to butt in on domestic affairs, but I'll bet that her husband won't care if she hangs herself with 'em!

### South of the Line.

IN a nice pally letter, which was posted at Durban, South Africa, "Sparks" gives me news that will gladden the heart of G 2 R B. This is what "Sparks" says:

"I heard G 2 R B at QSA 5 working

telephony when we were heeling 25 degrees south of the Equator about the middle of July. He was as strong as 5 SW, who started up later. Wave-length about 20 metres.

I cannot give my name and station since the Marconi Company does not allow us to write to the Press without permission."

Many thanks, all the same, "Sparks," and a good voyage.

### Time to Stop It.

I HEARTILY disagree with, much of this fantastic criticism of the B.B.C. announcers one sees and hears, but I must admit that I am in complete sympathy with the Middlesbrough man who grumbles about the inclusion of the word "time" in a sentence like this: "In two minutes time we are taking you over to Hull to hear Mr. Codfish give his weekly talk on 'Why Midge's Bite at Eventide.'"

This listener avers that "in a few minutes we are taking you over to Hull" would be a much cleaner way of saying it.

### Fine!

THE Yugo Slavian Government has passed a new penal code whereby any person who voluntarily or negligently misappropriates the current necessary to the working of a radio installation is liable to punishment by one year's imprisonment or a fine of 10,000 dinars."

I do not know exactly what a dinar is, but I should hate to shell out 10,000 of them, and as for one year's imprisonment—phew! It looks to me as though some enterprising Yugo Slav has pinched the Prime Minister's L.T. battery and this new law is the official come-back.

### The Radio Association.

IN our issue of August 30th, page 658, I expressed regret that this body had instituted "the degrees of Fellow and Associate," thus ape-ing certain learned societies of world-wide repute. The Hon. Solicitor of the Association thereupon announced that I am "most singularly ill-informed in making such a statement regarding these examinations—" It will be observed that I did not mention or even refer obliquely to examinations. What I wrote is plain and I think that my readers will agree that as an index of scientific learning there is no comparison between "F.R.A.," and, say, "F.R.S.," or "F. Inst. P." Still, the Association does not sell its degrees, as do some—which is greatly to its credit.

### Next Week.

I KNOW you think those Blue Prints will want a lot of beating, but I must say two words before I close down—"Next Week!" I have just had a peep at the free book to be given away with the next number of "P.W.," and I should be failing in my duty as an old pal of yours if I did not warn you to get your threepence ready. It's a winner!

If you want alternative programmes, if you are out for distance and foreign stations, if you want to turn your set into a pal-staggerer, get that book!

Miss your train, miss your bus, or miss the post to your best girl, but whatever you do don't miss the "Key to the Ether." They are printing them in thousands, but I bet that the demand will beat the printers!

ARIEL.

# IDEALS FOR THE B.B.C.

BY CAPT. P. P. ECKERSLEY M.I.E.E.

POPULAR WIRELESS continues its fight for the liberties of the listener. Recently I read the Editor's article on mediocrity. He was factual enough to quote my record as an example of achievement along the right sort of lines and he regretted that I no longer influenced the affairs of broadcasting to the same degree as of old.

I, too, regret it, believing that the potentialities of broadcasting have not been realised to the extent they might have been. I may sound conceited; I try to be perfectly frank and to look on everything as impersonally as may be.

I am interested in broadcasting; I am interested in the B.B.C. as an experiment in public service. I believe that broadcasting is the biggest cultural influence in the world to-day, and by that I do not mean anything to do with Education, as the B.B.C. uses the word.

I mean the B.B.C., more than any single existing agency, has the chance to help the great majority of persons to a wider appreciation of the world about them, and hence to a greater individual happiness.

Surely the more things one learns to enjoy the greater the potentialities of happiness? And surely the B.B.C. has the chance to bring into our homes that breadth of mind, hopefulness, optimism, enthusiasm and youthfulness that might lead us out of the present mess.

## Just Criticism

I have nothing against individuals in the B.B.C.; I am not sore that I am no longer "in the saddle." (Obviously not!) But, as a writer in POPULAR WIRELESS pointed out, the B.B.C. should welcome criticisms as such, and most the criticism of the "informed."

Thus, if what I write

A further outspoken article by our Radio Consultant-in-Chief, in which he constructively criticises British Broadcasting, and proffers some valuable advice.

hereunder, and perhaps again from time to time in other articles, seems to be no more than the cheekiness of a "gamin" cocking snooks at those who have banished him from their band, then this will be due to a failure of my powers of expression, not a true reflection of the spirit which inspires what is written.

## Banal Nonsense

It may be nothing to the B.B.C.; they can smile gently and frigidly and say, "Oh, but they don't know our problems," and talk banal nonsense about "it being impossible to please everybody." It isn't that. I was so interested to read the Editor's articles that I felt I might, in parallel, put

my point of view as I have so often put it to them.

My point of view is this: Broadcasting is an invention having this unique privilege: that it can bring the spoken word intimately into people's homes.

The written word wields a vast influence in its own sphere, the appeal of the sincerely spoken word is greater. Once recognised, this point of view should base all constructive policy.

But do the people at Savoy Hill make their chief interest broadcasting, as we understand it by that definition, or do they make it the Broadcasting Corporation, and their position in the Broadcasting Corporation?

Is a unit of the mob cloistered in one of those many offices interested most by the fact that now, at this moment, broadcasting is going on, words are being spoken, music played, plays crystallised into the actualities of the medium, or in the fact that he is allowed to have his secretary in his office instead of calling for a general office girl?

Does he come to the office bursting with a new idea to be "put up," or is he calculating some minute personal advantage over a colleague?

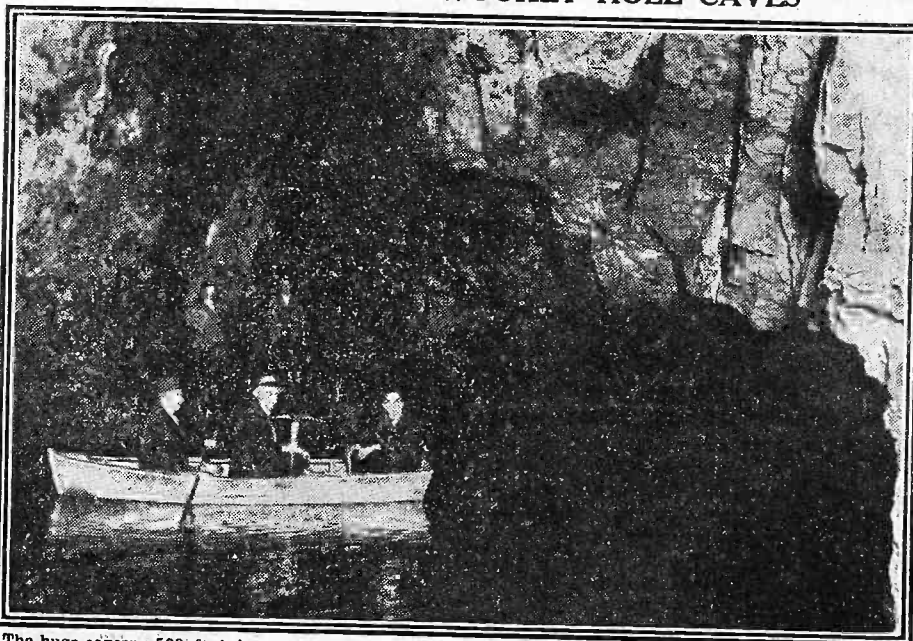
And the upper strata?

Are they learning to sit back only to dig themselves in on a pension at sixty, or to be famous for force of recognisable leadership? Is it the thing itself or the instrument of the thing?

## "Human Nature"

High-falutin nonsense? Yes, to those who say human nature is human nature and leave it at that. Yes, to the time-servers and mediocrities moving staff about from one provincial station to another. Yes, to those

(Continued on next page.)



The huge cavern, 500 ft. below ground, at the Wookey Hole Caves, Somerset, which was the scene of one of the Diversion items that were broadcast recently by Cardiff. We have had much correspondence about Wookey Hole, which seems to have aroused great interest.

## CORRESPONDENCE.

## AN AMATEUR SHORT-WAVER.

### MAKING YOUR OWN COILS.

### WATCH YOUR VOLTS.

Letters from readers discussing interesting and topical wireless events or recording unusual experiences are always welcomed; but it must be clearly understood that the publication of such does in no way indicate that we associate ourselves with the views expressed by our correspondents, and we cannot accept any responsibility for information given.—EDITOR.

## AN AMATEUR SHORT-WAVER.

The Editor, POPULAR WIRELESS.

Dear Sir,—It is now seven years since a photograph of my station appeared in your very interesting paper, POPULAR WIRELESS, and from the letters I received at that time and since, from your readers, I think the enclosed photograph will be of interest to your short-wave readers who often hear my station. A great deal of improvement will be noticed since September 15th, 1923. The centre shows transmitter, which is quartz crystal controlled, the frequency is correct to 1 per cent, a high degree of accuracy, the microphone key, speech amplifier and modulator may be seen in front on right. The special screened receiver is on the extreme left with a wavemeter above it which tunes from 10 metres upwards.

Thanking you in anticipation,  
Yours faithfully,

C. HEWINS, G 2 Q H.

Grimby.

## "MAGIC" THREE IN TRINCOMALEE.

The Editor, POPULAR WIRELESS.

Dear Sir,—May I add my voice to the chorus of appreciative praise about your "Magic" Three. I have just constructed same, and it is all that you claim for it.

Especially on the short waves it is marvellous. No hand capacity and no threshold howl whatever. I am now listening to P.C.J., which is coming in at full L.S.

5 S W also comes in at fair strength. I have also heard Sydney, Zessen, Nairobi, Java and a few others. On the broadcast band I get Bombay and Calcutta well.

Colombo is a bit weak after they changed over to 428 metres since June 1st, but quite good for a three-valver.

You promised me an article on Electrolytic rectifiers some time ago. Perhaps Dr. Roberts could give me a few hints as regards the best electrodes, solutions, etc.

In my set I use a Lissen output transformer in the last stage. The secondary goes to two terminals and the primary doing duty as a choke goes through a 4-mfd. condenser to two other terminals. I find the choke output gives me volume for short waves and the transformer secondary gives me quality for ordinary work.

I do not know whether this is technically correct but it does my job all right. Another hint as regards stopping L.F. howl! I found effective is to place a sheet of aluminium or any non-magnetic metal underneath the baseboard and earth it to E. terminal.

This stopped the howl in my case after all the usual remedies failed. Hope this will be useful to readers.

Again many thanks for the "Magic" and also for the many valuable articles in your paper.

Yours faithfully,

F. V. HERFT.

Fort Frederick, Trincomalee, Ceylon.

## MAKING YOUR OWN COILS.

The Editor, POPULAR WIRELESS.

Dear Sir,—As an addendum to the article "Making Your Own Coils" ("P.W." of May 17th), here is a variation of those described which might meet with the approval of other readers.

There are good stations just above and just below the range of a No. 35 coil on my set, and I have made a two-in-one coil, approximately a No. 30 and a No. 40, on the lines indicated in the article. I have used, however, a 2-in. former in order to match better the size of most commercial coils and to make the number of turns correspond more closely to the number of the coil.

Winding clockwise, a loop is twisted off at the 10th turn, and in all there are 38 turns on two banks.

The coil is placed on the mount exactly as described in the article, but the end from the last turn only is fastened to the mount pin. The other end and the loops are fastened to two terminals on top of the coil. These terminals are small, and are mounted on a strip of cardboard to which one coat of thin shellac has been given. Three cardboard spacers, one between the terminals and one at either end of the terminal "strip," keep the metal underparts of the terminals well away from the windings of the coil. The strip is fastened to the top of the coil by means of thread, and the whole coil, including the strip, is covered with Empire tape. To the socket of the coil mount goes a few inches of flex, with a small spade end, which is screwed under one or the other of the two terminals, giving a No. 30 or a No. 40 coil at will. Tested against a separate No. 30 and a separate No. 40 coil, no difference in volume or quality could be detected on either terminal; any losses, therefore, must be very slight; and I have one coil doing the work of two.

No. 100 and 150 coils (approximate) made as described in the article, but with No. 28 S.W.G. enamelled wire, necessitating two and three banks respectively on a 2½ in. former, give me very good results, and I intend applying the two-in-one scheme to the No. 150 later on.

Yours faithfully,

J. P. NAPPER.

Cardiff.

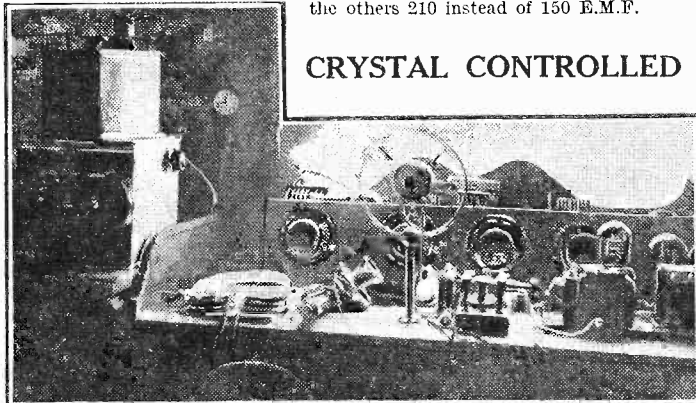
## WATCH YOUR VOLTS.

To the Editor, POPULAR WIRELESS.

Dear Sir,—I imagine that this incident about mains units or H.T. supply in any form might interest you and the readers of "P.W."

The other day I met a friend who had just installed a mains unit to supply H.T. to his three-valve set. And he was complaining bitterly how much reaction he was getting, and how tuning became impossible.

So I volunteered to go round to his residence and see the apparatus. The moment the current was turned on the set flew into most violent reaction, and no matter what direction the reaction condenser was rotated, the effect was the same. I asked him what voltage his valves took. The reply was, "I don't know." Having procured a catalogue, we looked them up and found that the screen-grid valve was getting 96 volts instead of 60 volts, and the others 210 instead of 150 E.M.F.



Mr. Hewins' fine amateur transmitting outfit (call-sign G 2 Q H) is crystal-controlled. Note the microphone.

Always notice what voltage your valves are meant to take, and see that you are giving that amount, as it may save no end of trouble and lead to better reception. Most valves never require their maximum voltage.

Wishing POPULAR WIRELESS every success and good luck.

Yours faithfully,

J. G. MATHIESON.

Ireland.

## IDEALS FOR THE B.B.C.

(Continued from previous page.)

who say that after all it isn't so bad! But it's not like that to me; I love broadcasting.

It isn't so bad, they say. No, it's very good. I am the first to say it. Itemised, the programmes are good. I should say none better in the world.

The B.B.C. is efficient to a degree, so efficient that some of our big businesses would pay bigger dividends if they got Sir John Reith to set about their incompetent slacknesses.

But that is not the point. The result of good material and superlative organisation is that the B.B.C. dishes out flat slabs of programme in a highly methodical way, and the composition and ingredients are guaranteed pure, healthy and nourishing.

But what's the fun in that? and how does it help true appreciation of food? Mental food, if you will have it, out of its analogy.

I want to see the broadcasting service brought to that pitch that when a burning question is tossed this way and that among the newspapers (who must think first of their circulation) people say, "What does the B.B.C. say about it?"

## Why Not Be Topical?

And I want people to be able to trust the B.B.C. to get someone to say the right thing—spiritually the right thing, culturally the right thing, factually the right thing. Unemployment—why not say outright that a new spirit is wanted about the whole thing, and that all this bolstering of inefficiencies will never work?

*The Disfigurement of London* by these new buildings—why not an outspoken call to our better feelings as regards to-day's greedy vandalism? Such things would bring far more respect for the moral qualities of those who direct our broadcasting than any amount of denial of rational entertainment in favour of a surfeit of formal religion.

I must disclaim any desire to do away with religious broadcasts; I believe they have considerable value, but as that is so obvious, why need they fear an alternative?

It's the spirit of the thing that must change. Younger-minded people not ashamed to speak the truth from the heart, devoted to the service, anxious to amuse, to laugh, to cultivate optimism—and not dreary jesters, and call it Vaudeville.

There is a chance still. Try new things. Get rid of false culture, of the highbrow intellectual speaking his dreadful dialect out of the depth of his conformist soul, and let real people with real things to say go ahead.

## Younger Talent Required.

Let some of the younger talent have more say, let some of the younger enthusiasms have play; don't let the old men and the set minds find a reason for turning everything down!

It's so easy to turn things down and wait for others to turn up. Specially when you have a charter giving ten years. Ten years—Epilogue: A few more years shall roll—but I am conscious of a failure to express that spiritual revolution that should come and make broadcasting young again.

It's sad just to have to talk about it rather than the chance to do it. I wonder how many will write me letters beginning, "You may be a good technician, but I advise you to stick to your own job. Of all—"

I hope a lot, because that is much better than indifference. I made all my old B.B.C. listener friends of the writers of just such letters, in the days when we were young.

**DON'T MISS THE  
FREE GIFT**

With "P.W."

**NEXT WEEK**





**A**FTER Olympia, the second great radio event of the year is the Manchester radio exhibition. This year, it runs from Wednesday, October 8th, till Saturday, October 18th, and it will be opened on the first day by Sir John Reith.

It is the seventh of a very successful series of wireless exhibitions promoted jointly by the Manchester "Evening Chronicle," the Radio Manufacturers' Association, and Provincial Exhibitions, Ltd.

#### Larger than Last Year.

Olympia was larger than ever this year and it is certain that the Manchester Show, too, will be much increased in size. It will occupy the whole of the ground floor at City Hall, together with the recent extensions, and it will afford northern enthusiasts an opportunity of seeing exactly what radio has to offer this year.

There were many unable to get down to London to visit the Olympia exhibition, but Manchester will offer them an excellent alternative. Every leading firm in Great Britain will be represented by receivers, speakers and components, while there will be firms showing that were not present at the London Exhibition.

The B.B.C. always takes a keen interest in the Manchester Show and provides it with admirable backing. As before, they will be broadcasting the opening speeches and much of the special entertainment material that is being provided.

The Manchester exhibition will not be as large as the Olympia show, that is fairly certain, but it will lose little or nothing in that. The exhibits will be very representative and visitors will see everything worth while that Londoners were able to view.

#### A Friendly Show.

One of the criticisms raised against Olympia was that, if anything, it was too large. Undoubtedly, there is a limit above which little is gained by increasing the mere size. Visitors get weary of an apparent repetition of similar exhibits.

Manchester gains, too, in the fact that firms are able to show new season's products they were unable to complete for the London exhibition. This was very noticeable last year, and some dozens of interesting new products made their first appearance at the City Hall, Deansgate.

Also, inasmuch as most of the Stands are somewhat smaller, there is a tendency to limit the exhibits only to important and outstanding lines.

The City Hall display always seems to be a rather more friendly or homely assembly than the general run of exhibitions. In a metaphorical sense, there seems to be a cheery smile over the whole of the building. Perhaps it is characteristic of the North, but the visitors talk among themselves as well as with the various stand attendants without the reserve that is common between strangers in the South.

Somehow, also, the presentation at Manchester seems to be unusually enthusiastic, but then the Manchester "Evening Chronicle" is a source of inspiration that would make anything go, and Provincial Exhibitions, Ltd., certainly know how to put a show over.

Undoubtedly, even those who "did" Olympia should make an effort to go

will be, the attendance will break all records.

There was a time when the Manchester Show was considered by a good many to be an unnecessary duplication of Olympia, but no one suggests such a thing these days. That is proved by the very wide support it receives.

Manchester itself is a great city, and within a few miles it has Liverpool, with an even larger population, and all around are dotted great towns of vital industrial importance.

#### A Special Article.

Then again, it must not be forgotten that Manchester is within comparatively easy reach of Ireland and Scotland. It is very many miles nearer these parts than is London. Further, there are always hundreds, if not thousands, of American traders in Liverpool and Manchester. In view of all this it is obvious that the Manchester Show is necessary to the welfare of radio.

Next week, I am going up there to report on the exhibition for the benefit of "P.W." readers. Special arrangements have been made to run my article through so that it can appear while the exhibition is still in progress.

I must say that I am looking forward to this journey with very great interest indeed. I do not feel that I saw everything that the industry has to show at Olympia. But even if every exhibit were identical with those on view at the London exhibition, I should still consider the journey very well worth while.

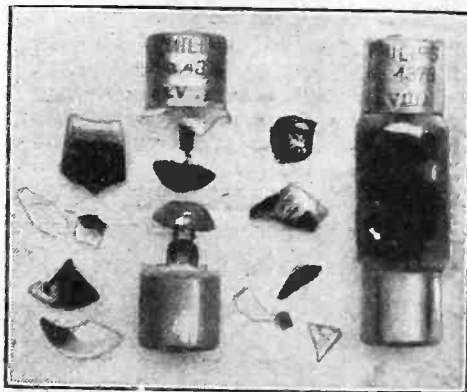
#### The Common Link.

It does you good to mingle with the crowds conjured up by another city. It widens your horizon and you learn that your own "home town" is far from being the centre of the universe.

Moreover, past experience has proved to me the strength of the common link that radio can form between people living hundreds of miles apart. For instance, at Manchester you hear radio matters in Yorkshire and Lancashire dialects, but they are radio matters that would strike a note of sympathy in any southerner enthusiast.

And there will be plenty of Scotsmen and plenty of foreigners at the Manchester Radio Exhibition, too. Indeed, the radio element of the whole country will be focused on the City Hall, Deansgate, between 3 o'clock on Wednesday, October 8th and Saturday, October 18th.

#### THE FUSE BLEW!



The fuse on the left was blown to bits when lightning struck an aerial equipped with a Philips Aerial Discharger. This device was quite able to deal with further such "demonstrations" when a new fuse was fitted.

North next week. The City Hall itself is, in my opinion, an ugly affair, a sombre, depressing building, at least in its external appearance, and even Mancunians will agree, I am sure, that the setting is most uninspiring. That part of Deansgate is one of the very duller parts of Manchester, and when it is raining—!

But once you have passed through the doors of the City Hall it is like walking into a new world.

There is every indication that the seventh of the series will indeed be a lucky seventh, and if the interest in radio displayed in London is duplicated in Manchester, and there is little doubt that it

# THE B.B.C.'s NEW PRAYER BOOK.

By THE EDITOR.

"... a new cult has started—the cult of non-sectarian radio worship... a new type of religion is being hatched out at Savoy Hill."

**W**ILL the B.B.C. start a new religion? It looks like it; and whether the Mahomet of a new radio cult will come to the listener, or the listener to the Mahomet, is obviously no difficult problem to solve: the Prophet will come to the listener, via the microphone, whether the listener likes it or not.

If some people consider the idea suggested above absurd, we would answer that the conclusion we draw is not without a solid foundation.

A few days ago we learnt that the B.B.C. had compiled its own prayer book for the broadcasting of prayers and services. In short, a new cult has started—the cult of non-sectarian radio worship, with official B.B.C. sanction.

## No Fear of "Revivalism."

The "Evening Standard" bluntly says we do not want revivalism by microphone. There is no fear of that; the B.B.C.'s prayer book is very non-sectarian. It is, in fact, something almost original, and for that reason suggests that a new type of religion is being hatched out at Savoy Hill.

Nevertheless, the new prayer book is interesting. Included in it are suggested forms of service, meditations for the close of Sunday programmes, collects from the Book of Common Prayer, prayers translated from the Roman Catholic missal, and prayers for feasts, celebrations, and other such special occasions.

Although we understand that the book was submitted to several prominent Churchmen, it does not contain any evidence of having received their approval, let alone their blessing—possibly because of the very clever way the non-sectarian style of the book is observed throughout.

Some have suggested that the B.B.C. have overdone the religious side of broadcasting, and that the B.B.C. should be the servant of every denomination.

## A Clever Compromise.

The last suggestion is obviously absurd. If the B.B.C. were to observe the logical consequences of such a policy, it would take years to deal with every sect, denomination, etc., known to the worshippers in this world. For obviously being the *British Broadcasting Corporation*, with a wide audience of overseas listeners—which will be tremendously larger when the new Empire station is ready—the B.B.C. could not, in common fairness, confine its religious broadcasts to the Christian denominations only! (Of course, it would; and that's where the fallacy lies; and hence the new prayer book.)

B.B.C. prayers, therefore, effect a novel and rather clever compromise, and if the new idea is not overdone the B.B.C. will be able to congratulate themselves on having solved a tricky problem in a way which, although it may not please those who dis-

approve of such strictly non-sectarian worship, cannot but fail to demonstrate the spirit of impartiality which animated Sir John Reith in preparing the book.

## A BRAILLE DIAL



This is a crystal set designed especially for the blind. The dials are calibrated, in wave-lengths, with Braille markings.

The trouble will be, in all probability, when, in the course of time, the new prayer book acquires the status of a sectarian publication—the sect of Savoy Hill (or

perhaps Portland Place), and we may yet see, as a direct consequence, the foundation of a sect of B.B.C. converts.

If so, another religious controversy and a Dis-establishment Bill for Savoy Hill are certainly indicated.

A long-wave wireless station which is to be erected at Rasin, near Warsaw, for the Polish Broadcasting Company, will be the most powerful broadcaster in Europe. The station, which is now being finally tested by the Marconi Company, will operate on a wave-length of 1,411 metres on 158 kw. in the aerial, almost the maximum power allowable under The Hague Convention to any European station.

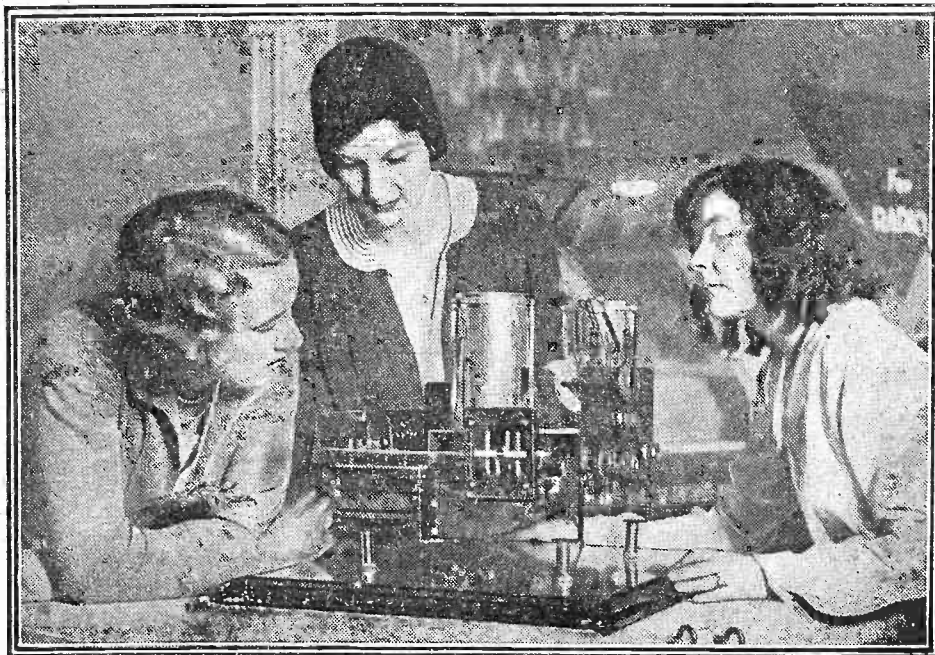
## Colossal Power.

The power of the new Warsaw station can be understood from a comparison with 5 X X at Daventry, which has a power of 25 kw. in the aerial, and by the realisation that it will be more than 150 times as powerful as the first London 2 L O broadcasting transmitter, which was shown at the Wireless Exhibition at Olympia.

The various parts of the transmitter are contained in aluminium and glass panels completely screened from one another to avoid interaction, and the last amplifier stage contains eight of the largest valves ever manufactured commercially by the Marconi Company. These huge valves are each of 100 kw. A valve drive of absolute precision has also been provided in order to ensure that the station will remain accurately on its allotted wave-length and to prevent it from interfering with other transmissions on neighbouring wave-lengths.

The aerial at Rasin will be of the half-wave type, terminating in a feeder house underneath the aerial. Feeder lines from the transmitting hall to the feeder house will convey the energy to the aerial, which will be carried on two masts 600 ft. high and 750 ft. apart. These will be the highest masts in use at any of the European broadcasting stations. A complete broadcasting system, including several relay stations, will also be sent out to Poland.

## MAINS SETS FOR MODERN MISSES



The recent exhibition at Olympia was remarkable for the keen interest displayed in the radio gear by ladies. Here you see some of them examining a three-valve all-mains set.



# The "EASY CHANGE" THREE

Here are some interesting supplementary details about this attractive and highly efficient wave-change three-valver. You will find complete constructional details on the sheet of free blue prints given away with every copy of this week's issue.

By the "P.W." RESEARCH DEPT.

THE preparation of a batch of set designs for one of our free gift blue-print sheets is an event which is always looked forward to with pleasure in the "P.W." Research Department.

## WHAT YOU WILL NEED.

- ✓ Panel, 18 in. × 7 in. (Trolite or Lissen, Paxolin, etc.).
  - ✓ Cabinet, with baseboard 10 in. deep to fit (Pickett or Camco, etc.).
  - ✓ .0005-mfd. variable condenser (J.B. or Lissen, Lotus, Dubilier, Ormond, Polar, Forno, Ready Radio, etc.).
  - ✓ .0001, .00013 or .00015-mfd. differential reaction condenser (Lotus or Lissen, Polar, Igranice, Dubilier, J. B., Magnum, Parex, Wearite, etc.).
  - ✓ On-off switches (Lotus and Benjamin, or Lissen, Igranice, Bulgin, Junit, Ormond, Red Diamond, Wearite, Pioneer etc.).
  - ✓ Single coil holders (Red Diamond or Lissen, Lotus, Igranice, Wearite, Bulgin, Magnum, etc.).
  - ✓ Sprung type valve holders (Benjamin or W.B., Igranice, Lotus, Lissen, Wearite, Telsen, Dario, Bulgin, Junit, etc.).
  - ✓ .0003-mfd. fixed condenser (Lissen or T.C.C., Ediswan, Ferranti, Dubilier, Mullard, Goltone, etc.).
  - 1 .0002-mfd. fixed condenser (Dubilier, etc.).
  - 1 2-meg. grid leak (Dubilier or Lissen, Igranice, Ediswan, Mullard, Ferranti, etc.).
  - 1 R.C.C. unit with  $\frac{1}{2}$  meg. anode resistance and 1 or 2 meg. leak (Lissen or Dubilier, etc.).
  - ✓ H.F. choke. (Ready Radio or R.I., Lissen, Lewcos, Varley, Telsen, Lotus, Dubilier, Watmel, Wearite, Magnum, Parex, etc.).
  - 1 Fuse and holder (Bulgin or Magnum, etc.).
  - ✓ L.F. transformer (Igranice type J, or Varley, Lissen, Telsen, R.I., Ferranti, Mullard, Lewcos, Lotus, etc.).
  - 1 Terminal strip, 18 in. × 2 in.
  - 10 Terminals (Ecelex or Belling & Lee, Igranice, etc.).
- Sockets, plugs, flex, screws, G.B. battery clip, etc.

For one thing, the production of these designs is accompanied by certain special difficulties which are not met with to the same extent in our usual run of sets, and they are just the sort of difficulties which stimulate the keen designer.

For example, there is the fact that once these blue prints are published they become part of the "P.W." series, and we know that they will be drawn upon by intending constructors for quite a long time to come.

Consequently, we have to take the greatest care to ensure that they are not merely up to date, but will stay so for as long as possible.

## Only the Best.

This means that one must review all the recent developments, and decide which of them are real and permanent improvements on previous methods, and which are merely novelties likely to be replaced by something better quite soon. Thus, there is no doubt about the continuance of differential reaction, but there are plenty of other things which are by no means so assured in their position, and a careful decision is called for in their case.

All this means that a "P.W." blue-print set is particularly attractive from the intending constructor's point of view. He knows that if he decides upon one of these he can be reasonably certain that it will be a set sure to remain up to date for at least as long as he is likely to keep it in use. (If we know our constructor, he will be sighing for something bigger and still more powerful before it has become obsolete!)

It means, too, that every detail has been carefully chosen as being truly representative of the best in modern radio, and as being, moreover, in the opinion of an expert, likely to remain the best way of doing that particular thing for a long time to come.

Then, again, another difficulty of the stimulating kind for the designer confronts him in the choice of component types he may use in a blue-print set. We have a very definite rule about this, to the effect that only parts of absolutely standard types, and of which there are lots of alternative makes available, may be employed in these receivers.

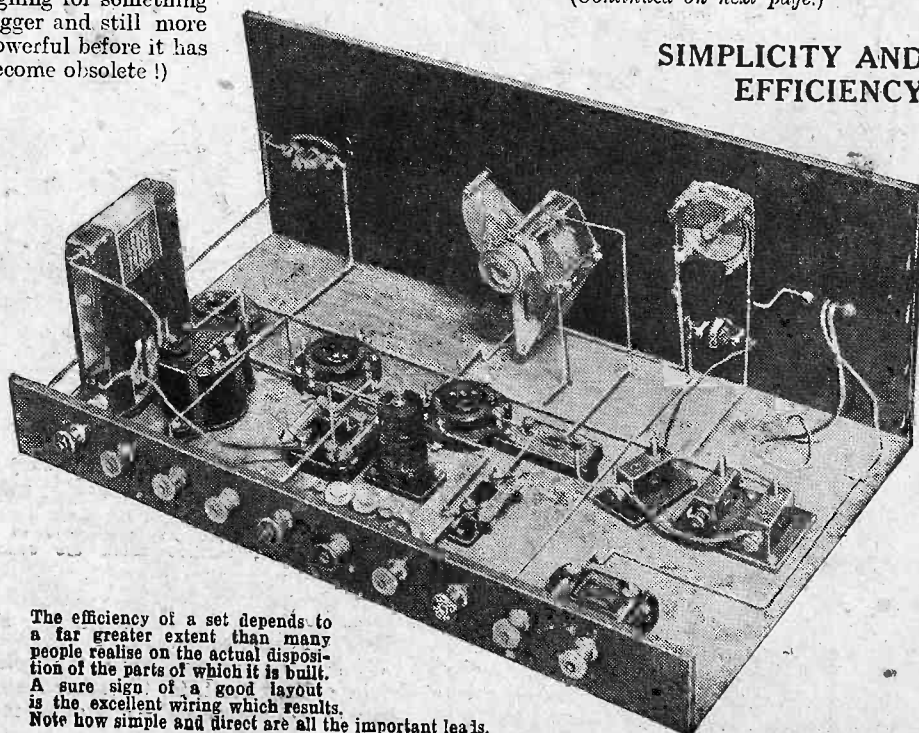
The reason for this rule will be pretty obvious when you remember how long our readers in different parts of the world continue to regard each blue-print design as more or less of a standard for that particular type of receiver.

## What It Means.

The effect of the rule is to compel the designer to work within very definite limits. He must get the outstanding performance and up-to-date qualities he wants by dint of ingenuity and hard work, and not by the easy method of using special coils and other parts to suit some particular scheme.

(Continued on next page.)

## SIMPLICITY AND EFFICIENCY



The efficiency of a set depends to a far greater extent than many people realise on the actual disposition of the parts of which it is built. A sure sign of a good layout is the excellent wiring which results. Note how simple and direct are all the important leads.



## THE "EASY CHANGE" THREE.

(Continued from previous page.)

An incidental advantage of the rule from the intending constructor's viewpoint is this: since every part required is of a fully standardised nature he can be pretty sure of being able to assemble any given "P.W." blue-print receiver very largely from the stock of components he will have on hand.

### An Ever-Popular Combination.

The three-valver you see illustrated on these pages forms an excellent illustration of the points we have just outlined. Blue Print No. 58, given away with every copy of this week's issue, provides you with complete practical details of this extremely attractive instrument, but there are still quite a number of interesting things we should like to tell you about.

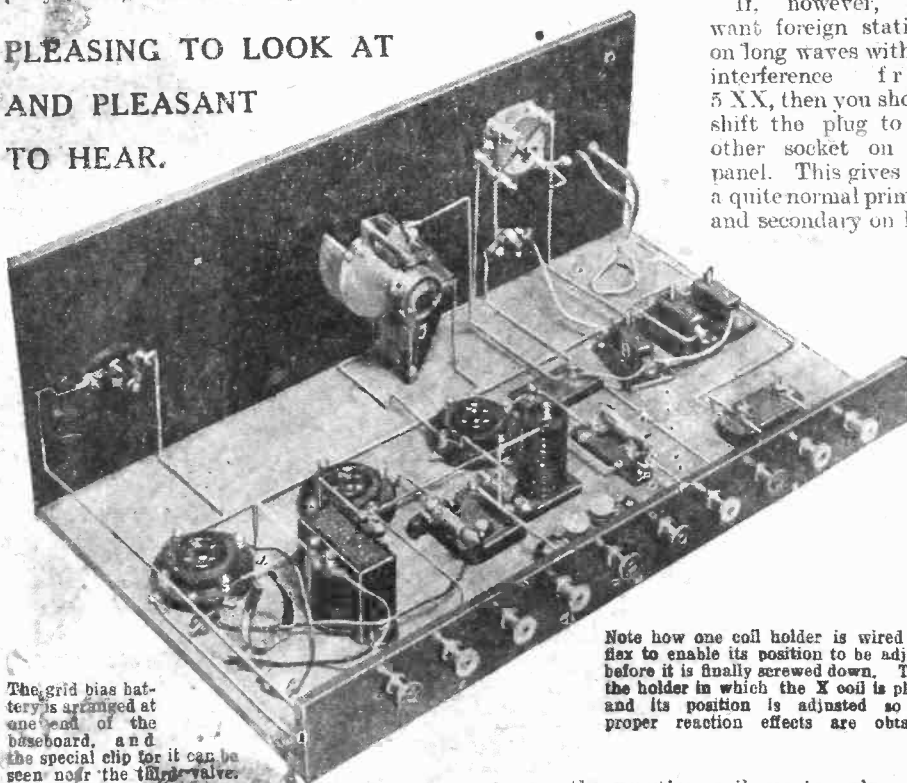
What we set out to produce was a version of that ever-popular combination, the "detector and two L.F." set, with a really outstanding performance and extreme simplicity of construction and operation.

That we have succeeded you may well believe when we tell you that we began the preliminary work on this and the other sets in the group as long ago as last May, and that we were extremely satisfied with it when it went through its final tests.

### An Extremely Attractive Set.

As you now see it the receiver is an extremely attractive example of its type. It has sensitivity and selectivity well above the normal level of its type, it has a delightful, simple and efficient wave-change arrangement calling for very few coils (only three), and it is easy to operate.

## PLEASING TO LOOK AT AND PLEASANT TO HEAR.



The grid bias battery is arranged at one end of the baseboard, and the special clip for it can be seen near the third valve.

True, it has only one tuned circuit, and so you must not expect it to deal with the most adverse conditions close up to the station without a rejector, but for all other purposes its selectivity is ample.

Its sensitivity, too, is likely to provide a pleasant surprise for those who believe that at least one H.F. stage is needed to get foreign stations on the loud speaker. Given anything like a decent aerial the "Easy Change" will do it, and with ease.

The wave-change scheme is rather interesting, for it is so simple that one might excusably suspect it of inefficiency until you look into the details.

First of all, note that on the medium waves the "X" coil,  $L_3$ , is used for tuning and aerial coupling, by closing  $S_2$  and putting the panel plug in the appropriate socket. Coil  $L_1$  is the reaction winding, and this serves on long waves also by virtue of the special positioning of the coils (see note on blue print).

### Switching Scheme.

The long-wave secondary coil,  $L_2$ , is also in circuit on medium waves in parallel with the "X" coil, but since it is very large in comparison it has a negligible effect on the tuning range of the circuit, and of course, losses are kept well down in this way. (It is one of the best of wave-change methods.)

To go over the long waves you open  $S_2$  (put it to "off"), and the low-wave coil,  $L_3$ , thereupon goes out of circuit to all intents and purposes. If all you want is 5 X X you will in most cases find you can then get it at particularly good strength, by re-tuning to some point near the bottom of the dial.

If, however, you want foreign stations on long waves without interference from 5 X X, then you should shift the plug to the other socket on the panel. This gives you a quite normal primary and secondary on long

Note how one coil holder is wired with flex to enable its position to be adjusted before it is finally screwed down. This is the holder in which the X coil is placed, and its position is adjusted so that proper reaction effects are obtained.

waves, the reaction coil serving also as a primary or aerial-coupling coil.

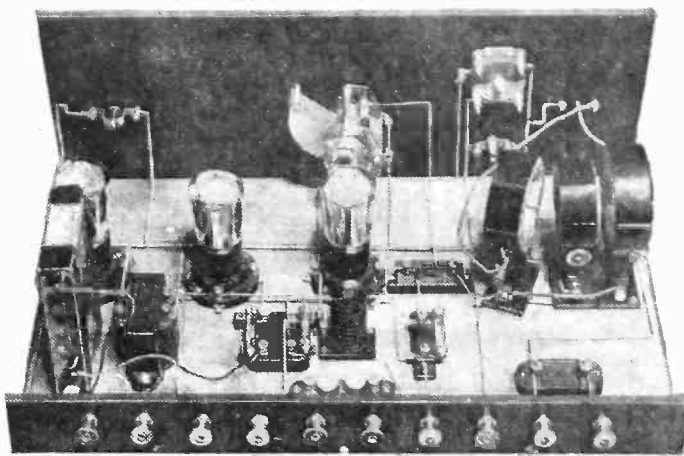
With this we can leave the general details of the circuit, for the other features you will be able to make out quite easily for yourself on the blue print.

Now there is a little point about grid bias we should mention. If you look at the photo on this page you will see that the original set was fitted with a single clip for a grid bias battery, placed near one corner of the baseboard.

### Position of G.B. Battery.

This clip will hold a single 9-volt G.B. unit in an upright position, as you will see

## READY FOR WORK



All finished and ready to try out. One coil is set out at a slight angle to the others for reasons stated in the text.

in the photos on the previous page, which shows a Lissen unit actually in place. Now this amount of bias voltage is not enough for the super-power type of valve, and if you use one of these you must provide rather more.

To enable this to be done we have left an open space on the baseboard between the middle valve socket and the panel. There is ample room here to stand a couple of 9-volt units side by side, and if you join them up in series you will have 18 volts available for biasing purposes.

### A Point to Remember.

This should be enough for even the largest of the super power valves which are at all likely to be used in a set of this type.

Mention of grid bias voltages reminds us of a little matter concerned with the life of G.B. batteries which applies to all sets. We raise it here because it seems to be not too well understood by many, and it is rather important if you are to get the best possible service and life from your valves.

It is this: People are often lulled into a false sense of security about the state of health of their grid bias battery by the perfectly correct reflection that it is delivering no current. It does not follow, however, that it will therefore inevitably have an indefinitely long life.

That is by no means the case. Small dry cells have a limited life whether giving current or not, and it pays to keep an eye on the condition of your G.B. After all, it is cheaper to buy a new bias battery than to replace a power valve whose emission has vanished!

**NEXT WEEK**  
**THE KEY**  
**TO THE ETHER**  
**A MAGNIFICENT FREE GIFT**

# NEXT YEAR'S SETS

By Victor King



SOME philosopher or other has said that it is "idle to speculate as to the future." It certainly is. In my opinion, it is "idle" to speculate in anything—especially stocks and shares. But that is by the way, and don't forget that judicious investment is a very different thing!

However, I am neither going to speculate nor prophesy in this article; I am going to try to give you my ideas as to the trend of radio development,—and tell you what I think is the common goal of we set designers.

## Wild Prophecies.

Nothing makes me get more hot under the collar than the wild optimism of our self-constituted scientific prophets. I mean those people who will tell you what the future of a thing is going to be almost before that thing has been discovered or invented.

We got it in "extenso" when the dull-emitter valve first made its public appearance. "The day of the 'cold valve' is now very near at hand," was the sort of thing that was bleated by our pseudo-scientific soothsayers.

Television sent them into ecstasies of prediction. "You'll see the boat race on your parlour screen before another year is through," they blathered.

That sort of thing does a grave disservice to the true scientist in that it tends to rob him of the dues justly earned by his concrete achievements.

And the real fallacy that lies at the root of all wild speculation of the kind to which I have referred, is that everything must *progress* for ever and ever. A science, such as radio, may progress as a whole, but in its march it may leave many outworn units behind.

## What About the Crystal?

What about the crystal detector? Will that progress until it enables you to work a loud speaker on very distant stations? Personally, I don't think it will, but if some regard that as a faint possibility, I'll remind them that a wonderful invention of Marconi's, known as the Mag-

A famous set designer looks a little way ahead, but does NOT indulge in speculation. He is so au fait with current radio conditions that he does not need to draw on his imagination, although, as those who know his work will agree, he is very well endowed in that respect, too!

netic detector, was at one time an almost revolutionary invention. But after serving the radio world very faithfully for many years it was superseded and is now absolutely obsolete.

And so with the Electrolytic detector, the cross-box which revolutionised medieval

wars, the flint and steel for lighting fires, the candle-snuffer, the fish-tale gas light, wooden warships with sails, etc., etc. They all served their various purposes well, and reached their individual zeniths, and then faded out as they were displaced by things that could do the same sort of jobs better, or were found unnecessary owing to changing conditions.

## We Never Know.

Therefore, to return to radio, why should it be regarded as certain that articles now in daily use, or just in the process of being brought into use, should be with us for ever, improving and improving and keeping on improving?

The valve, for instance, is now quite ubiquitous. And it is continually being improved. The new valves have wonderful characteristics, but for all we know there may be a little boy at school in Poland or Putney, or, for that matter, a little girl nestling in a cradle in Carolina who is destined to cause the banishment of the valve by inventing some quite new method of detecting and amplifying radio signals.

The present methods in anything, radio, television, lighting, heating, may, in the distant future, be regarded as quaint dead-ends. But I must not lay myself open to the criticism of speculation!

However, you see how easy it is to beat these prophet chaps at their own game.

## On Surer Ground.

If we discuss next year's sets, we are on surer and surer ground. Barring revolutionary discoveries or inventions (which are very few and far between, whatever the daily papers say) the progress of radio set design seems to be on fairly orderly lines.

It seems evident that the all-mains type of set is due to become more and more popular, for power supplies are being rationalised and are being more widely used. Further, it is apparent that people are getting less suspicious and less timid of the mains.

With increasing popularity, mains  
(Continued on next page.)

## "VARIETY" AT HOME



Miss Gracie Fields, and Mr. Pitt, her husband, listening-in at home with a new Mullard Orgola set. Miss Fields has, of course, frequently broadcast.



## REMARKABLE NEW VALVES

Authentic details of new valves that operate without any filament heating, and of others that have external control electrodes.

By OUR OWN CORRESPONDENT.

NOT just new types of old valves, but completely new valves, built up on different principles; principles which have been tried innumerable times in many laboratories but have reached the practical stage only now.

In the one case there are the new Arcotron valves developed by the German Telefunken people, and in another case there are the new Photovalves working without the usual low-tension current, which, however, are not quite "ripe" for the market as yet, although one firm already makes them.

### External "Grid."

In the case of the Arcotron, the firm wished to develop a cheaper valve for the cheap kind of all-mains local station loud-speaker receiver working with two or three valves. The Arcotrons are on the market in two types; one as rectifier, that is as detector valve, and one as L.F. amplifier valve. The difference between the two lies in the amount and kind of gas contained in the valve.

The "grid" is in the form of an outer metal coating on the glass bulb, the anode and the

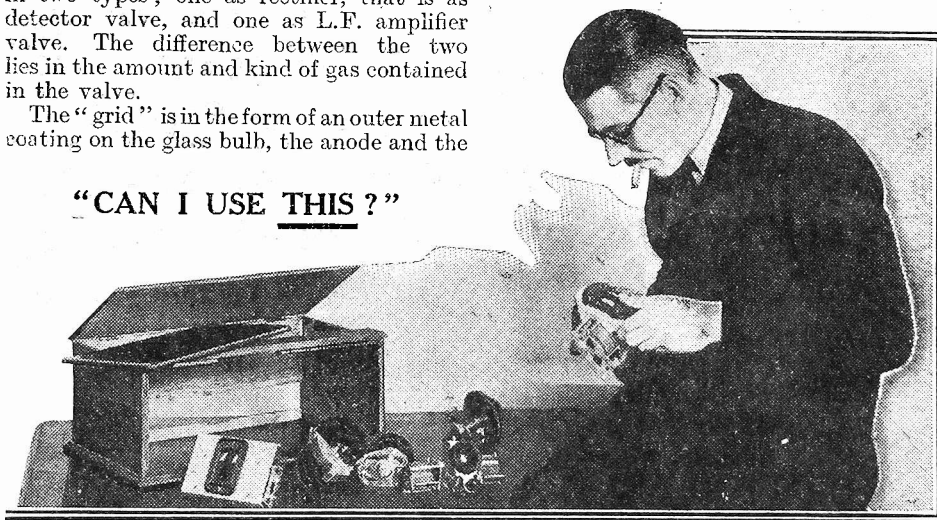
sensitivity of certain chemicals to light. The cathodes of the Photovalves are made of light sensitive materials so that the moment light strikes them, they begin to emit electrons, and naturally they vary the intensity of the electron emission according to the intensity of the light striking the valve.

Now there are several methods of having a permanent and unvarying source of light. One can have an electric lamp on D.C. mains burning near the valves, but in the case of A.C. of even as high as 50 cycles per second one gets hum owing to the slight variation in the intensity due to the A.C. "hills and dales."

### Another Method.

Then there is a much better method of having a source of light. Have a small neon tube or ray close to the cathode and have it fed from the anode source of current. This type of valve reminds one of a second kind of light-sensitive valve recently described by Seibt.

This works on a similar principle. A neon ray is made to pass between two electrodes and electrons are drawn off from this ray by means of the usual anode. In the case of this valve, which really is not light sensitive but uses a ray of ignited gas as a cathode, the voltages have to be very high, especially for the neon ray.



Mr. Victor King, one of the world's foremost radio set designers, and the most outspoken wireless critic of the day, examines some components preparatory to evolving a new receiver design. Victor King writes articles only for "Popular Wireless" and its associated journals—yet another compliment to the unrivalled position held by "P.W."

directly-heated cathode are within. Owing to the "grid" being away from the cathode there is a comparative freedom from mains hum and general insensibility of the valve to smaller variations of the cathode temperature.

### How It Works.

The action is quite simple to explain. The variations of potential applied to the outer coating of the valve influence, by way of the glass, the stream of electrons flowing to the anode. The only difficulty in older types of this valve which had no practical use was the necessity of making the form of the valve so that the outer coating on the glass would have a sufficient influence on the interior happenings, and this has been obtained by the very thin and flat form of the whole.

The new Photovalves rely on the same principle as the photo-electric cells, i.e. the

## NEXT YEAR'S SETS.

(Continued from previous page.)

sets, and components for mains sets, will, of course, get much cheaper. But even taking all this into account, I do not think that battery sets are going to be ousted for a long while yet in this country.

No doubt the day will come when the idea of having to have your own little power supplies will be regarded as incongruous. But before that day arrives the mains will have to be connected to every house just as is water at the present time. And then people would no more think of having a battery set than they would now dig wells in their gardens to get water for the radiators of their motor-cars.

If you disregard the power side of the set you still have many things to think about. What of wave-change switching? Nearly every set these days gives you a choice of at least two wave-bands, and you generally go from one to the other merely by operating a small panel switch.

### Three-wave Switching.

There is still room for improvement here, and I think you will see it take the lines of bringing in a third wave-band, this being rendered available by the same one or two panel switches. And this third one will, of course, be the short wave-band.

Already at least one commercial set has wave-change switches between the short and medium waves. This is the first time that that has been done, I fancy. Anyway, there doesn't seem to be a very big step between that and having all three bands "on the panel" and without changing coils.

But does the ordinary "household" set want the short waves? I can hear some of you asking. Well, that is just a wee bit debatable, but then the short waves may hold some surprises in store for us in the quite near future. Even now one does not have to have much in the way of a set improvement that will make the short waves just as easily "tunable" as the long waves. The "Magic" series of sets shows that. And, say what you will, short waves are fascinating and the only things that will "spike their guns" from the ordinary listener's point of view are the international programme relays the B.B.C. may undertake on a world-wide basis.

### In Your Hands.

Selectivity, sensitivity, simplicity, plus inexpensiveness, are what we designers are aiming at all the time. You can be sure that we won't tuck short-wave switching on to those of our sets that are intended as "household" outfits (as opposed to special experimenter affairs), or, indeed, anything else, unless it can be done without sacrificing any of the above qualities or unless there is a real public demand for them. After all, it is the amateur enthusiast who sets the pace in receiver design, and "P.W." readers have much more to do with the progress of radio than they probably realise.

So it really amounts to this: you and your fellow listeners and amateurs know, or should know, the way radio is going, because it is going in the direction you want it to go—or as closely in that direction as it can be made to go.

In the case of Ardenne's Photovalves more or less normal voltages can be used, only one drawback being experienced. The emission of the cathodes he has used up to now is not very great, even when exposed to brilliant sunlight. For that reason the Photovalves as yet would seem to be best for resistance capacity amplification.

It will be interesting to watch for the first really commercial use of the Photovalves, though we already have the first sets working with the Arcotrons. But the Photovalve incorporates quite new principles, and they do seem to provide one way of getting away from L.T. batteries and current supplies.

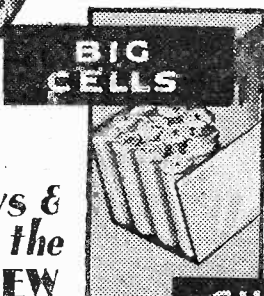
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# C.P.C.

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**LISSEN NEW  
PROCESS H.I.  
BATTERY—  
the battery  
with the  
LONG LIFE**

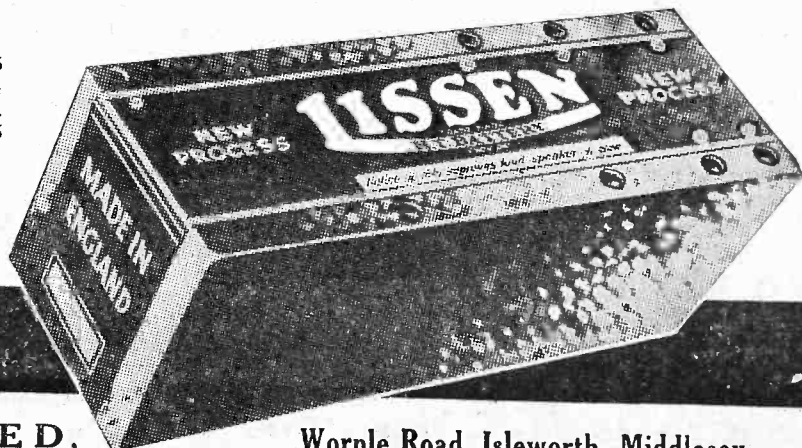
Choose your battery on the basis of "Current per Cell" content, and you will choose a Lissen Battery. Because the cells of the Lissen Battery are big and supercharged with High Tension current, put there by the Lissen Secret Process.

The energy flowing from each cell is smooth and without the slightest sign of ripple or hum. Choose a Lissen Battery and your loudspeaker will find the battery eager to show the power it contains and for how long that power will last.

*Ask for a Lissen Battery by name at any one of 10,000 Radio Dealers, but insist upon it firmly.*

#### PRICES

60 volt (reads 66) 7/11	60 volt (Super Power) 13/6
100 volt (reads 108) 12/11	100 volt .. " 22/-
120 volt .. .. 15/10	4½ volt Grid Bias 10d.
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60 volt (For Portable Receivers) 7/11	16 volt .. " 2/-
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**LISSEN LIMITED,**

Worple Road, Isleworth, Middlesex.

# NOTES FROM THE NORTH.

All the latest news about the North Regional and Scottish Regional High-power stations, and other matters of interest in the North.

From OUR NORTHERN CORRESPONDENT.

THE three lattice steel masts which are to hold the North Regional aerial 500 ft. above the ground at Moorside Edge have sprung up like mushrooms. They are now very nearly finished, and the work has reached the stage when it looks decidedly exciting to the layman.

The erectors seem to enjoy going to work some 400 ft. up, however, and as the masts sway gently in the breeze they calmly go on with their job of bolting together the 18-ft.-long sections which are hoisted up to them by cranes. They warn any landlubber who approaches below to keep clear of the mast because if a workman were to drop a nut from that height it would hit the man on the ground so hard that there would be a job for the Slaithwaite undertaker!

## The Moorside Aerials.

The masts are already a conspicuous landmark for many miles around, and on clear days the workmen have wonderful views across the Yorkshire moors and beyond the town of Huddersfield, which is five miles away.

Moorside Edge is the name of the heather-covered plateau selected by the B.B.C. as the site for the North Regional station, and as it is 1,000 ft. above sea level the tops of the masts will be 1,500 ft. above the sea, which is higher than the tops of any other wireless station masts in this country.

The masts are similar to the 5 X X masts at Daventry. They stand on spherical bases which allow them a certain amount of sway in a gale.

The aerial which will radiate the National programme on 301.5 metres will be suspended between two of the masts, and the aerial for the North Regional programme on 479.2 metres will hang between one of the masts and the third mast. Thus, one of the masts will support an end of each aerial.

## Testing Before Xmas.

The station building is now completed, and the heavy machinery is being installed. This is a big job. The heavy parts have to be transported up steep hills to reach the site—I say “parts” because machinery like the three 300-h.p. Diesel engines has to be assembled at Moorside Edge, the complete engines being too big and heavy to be conveyed there complete. These engines will drive the dynamos which will supply the power for the transmitters.

A B.B.C. official tells me that it is not possible to say anything definite about when the transmitters will start to transmit, but he adds that “public tests on one transmitter should be heard before Christmas.”

I asked this official whether he thought the opening of this station would give a fillip to public interest in broadcasting in the North of England. He replied by pointing out how the licence figures have steadily increased during 1930, and by saying that he thought that one of the

reasons—though not the only one—was the opening of the London Regional station.

“Not only has there been an increase in the number of licences this year,” he said, “but there has been an increase in the rate of increase, compared with previous years.” He gave me these figures, which show the margins by which, in each year, the total number of licences exceeded the total for the previous year:

1927	.. .. .	121,563
1928	.. .. .	128,010
1929	.. .. .	162,432
1930	.. .. .	201,854

It is impossible to tell how many of the 201,854 extra licences taken out in 1930 (the years are counted up to the end of July) were due to the opening of the new London station, but if Brookmans Park has helped to boost the figures it seems certain that Moorside Edge will do so next

are assured that modern sets will cope with the changed conditions.”

By no means all listeners will have modern sets to receive Moorside Edge, however, and the B.B.C. is preparing to help listeners to overcome troubles similar to those which occurred when Brookmans Park opened.

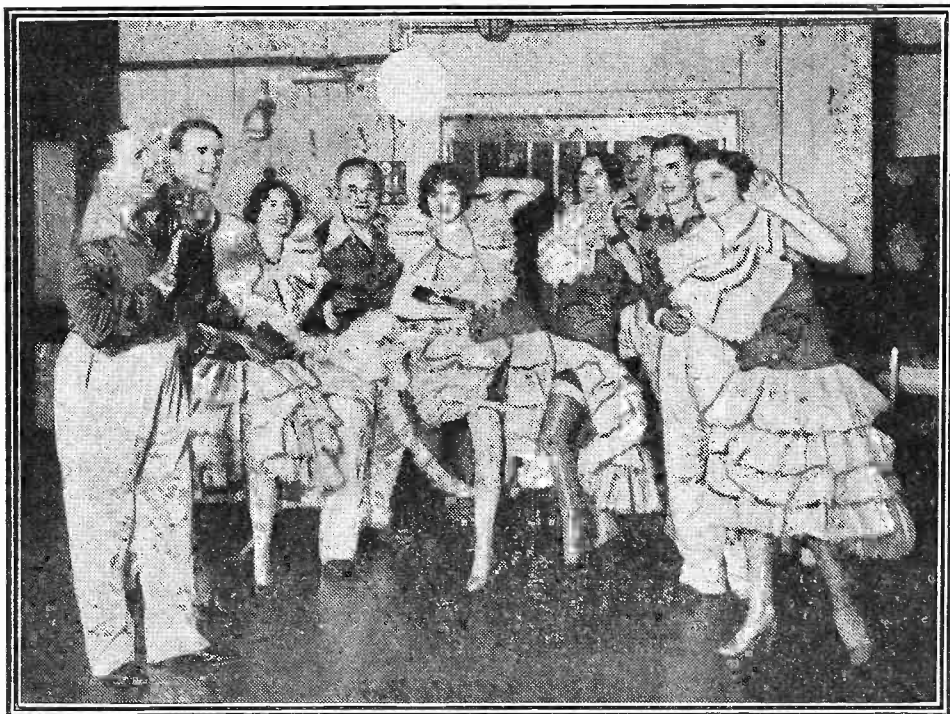
A protest has been made at Liverpool against the selection of 479.2 metres as one of the Moorside Edge wave-lengths. It is feared that shipping radio will interfere with this transmission, and it is stated that reception in Liverpool of the Midland Regional transmission on this wave-length is mutilated by ship Morse.

## Western and Scottish Stations.

The B.B.C. has announced that when the North Regional transmitter takes this wave-length the Midland Regional station will take Glasgow's wave-length (399 metres) and Glasgow will take Manchester's (376). The Manchester station will, of course, be dismantled.

Now that the B.B.C.'s mobile transmitter has arrived on the Quantock Hills, in Somersetshire, and is testing for the West Regional station site, many listeners are wondering what has happened to the proposal to build a Scottish Regional station near Falkirk. There have been no

## THE QUESTION—TO DRESS OR NOT TO DRESS?



Getting the right atmosphere in the broadcast studio is a matter which is always receiving attention. Some producers believe that the only way is for the artistes to don the usual stage costumes, a practice in which Mr. Ridgeway believes, for here are the performers rehearsing for one of his recent productions.

year—and even more so, for the North of England as a whole is less well served to-day than the South was before Brookmans Park opened.

## Liverpool's Grumble.

There is one advantage in the North of England obtaining its Regional station a year later than London. The manufacturers have had a year's experience with the problems of dual programme reception, they have mastered the boggy of interference, and, in the words of the chairman of the Radio Manufacturers' Association, Captain J. W. Barber, “Northern listeners

apparent developments in this connection recently.

There have been “goings-on” behind the scenes, however. I am able to state that the mobile transmitter tested three sites, all near Falkirk. They are all considered technically suitable for the Scottish station.

The delay is due to negotiations for the purchase of one of the sites, which is near the road to Slamannan. It is believed that these negotiations will be successfully concluded very soon, but in the event of their breaking down, the B.B.C. has the other two alternative sites to fall back on.

**BETTER RESULTS THAN EVER BEFORE**

Range, quality, volume—all are improved if you use the Mazda AC/SG in the H.F. stages of your all-mains set. It is a remarkable valve with a colossal amplification that will enable you to bring in the most distant stations with a clarity and volume which you have never before experienced.

Selectivity also is assisted because the large magnification allows you to use a degree which will ensure maximum selectivity and amplification.

WITH  
THE  
**MAZDA  
AC/SG**

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Amazing  
**MAZDA**  
**RADIO  
VALVES**

**MAZDA AC/SG  
CHARACTERISTICS**

Fil. Volts	- - - -	4.0
Fil. Amps	- - - -	1.0
H.T. Volts	- - - -	200
Amplification Factor	- - - -	1200
Mutual Conductance (MA/V)	- - - -	3.0

**PRICE  
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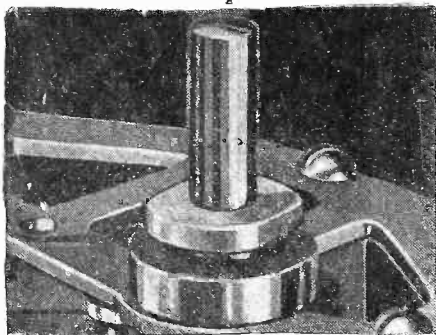
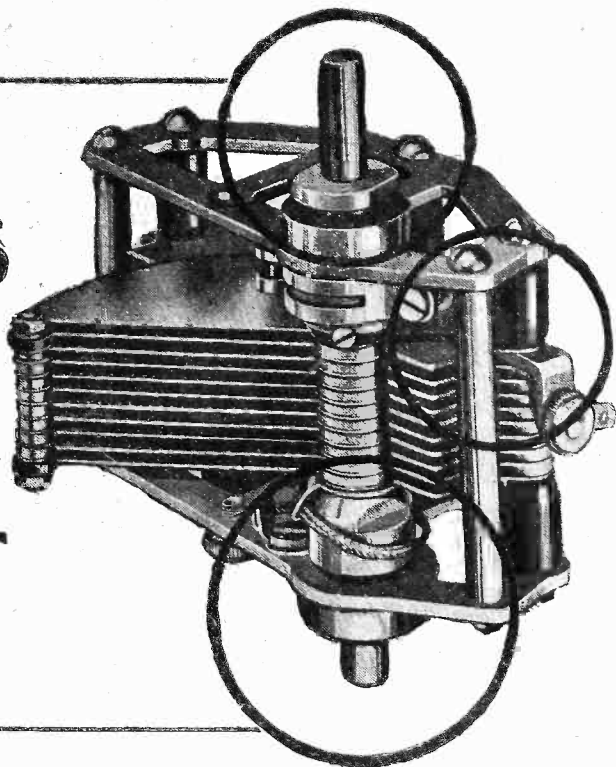
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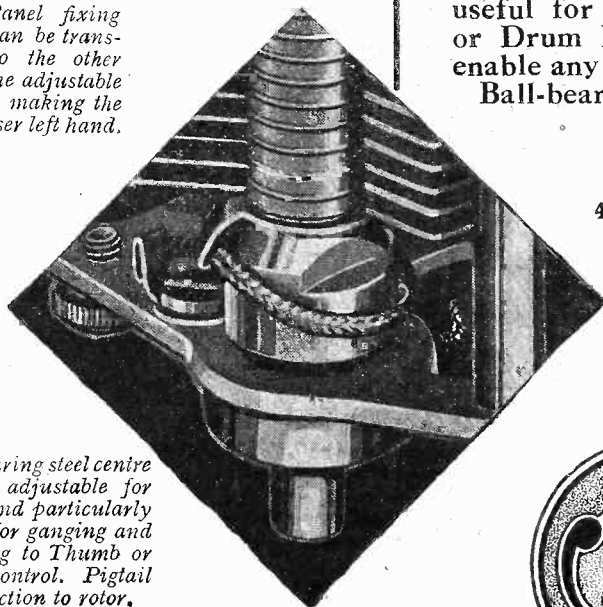
V.82



# Features that matter



*This Panel fixing Bush can be transferred to the other end of the adjustable spindle, making the Condenser left hand.*



*Ball-bearing steel centre spindle adjustable for length and particularly useful for ganging and attaching to Thumb or Drum control. Pigtail connection to rotor.*

Here are some features of last year's outstanding success—The J.B. Universal Log Condenser.

It is exceptionally rigid, with frame and vanes of extra hard brass. Its insulation is highly efficient, and stray capacities and eddy-current losses are minimised by cutting away all surplus material.

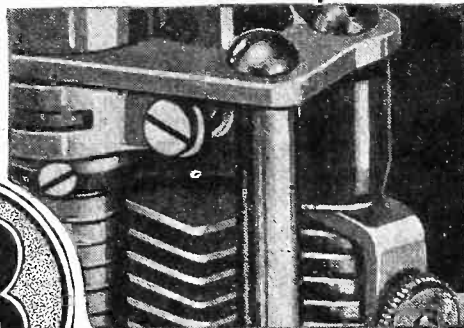
A special feature lies in the steel Centre Spindle, which is adjustable for length. This is particularly useful for ganging and for attaching to J.B. Thumb or Drum Dials. The bush is specially designed to enable any panel from  $\frac{1}{16}$ " to  $\frac{1}{4}$ " to be used.

Ball-bearing centre spindle. Pigtail connection to rotor

#### PRICES:

•0005	9/6	•00025	8/9
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4" J.B. Bakelite Dials. Black 1/6 extra.  
Mahogany 2/- extra.



*Showing the well-known J.B. adjustable tension to centre spindle.*



PRECISION INSTRUMENTS



**R**UNNING a radio band is a far more complicated business than most listeners suppose. Quite apart from the actual broadcasting, there is a vast amount of office work, organisation, programme arranging, and rehearsing to be got through. There are letters from listeners to be dealt with, suggestions to be considered; and new dance numbers are brought to my notice every day with a view to including them in my programmes.

It is extraordinary how very few people appreciate the extent of such work "behind the scenes." Some time ago, I received a letter from a well-intentioned but sadly misguided lady which brought home the truth of this rather forcibly. She said:

#### Some Extra Work!

"Dear Mr. Payne,—As you broadcast only for an hour or two each day, you will doubtless be anxious to take on some extra work. If your manner and appearance is suitable, I can engage you two hours daily to give piano lessons to my little girl of eight.

"For this I could pay you 10s. a week, and also provide you with your tea. Also, if you are serious-minded—and my nephew speaks highly of you in this respect—I am willing to pay you an extra half-crown a week to take my child into the park, and explain to her the beauties of Nature.

"I might add that this is an excellent opportunity to improve your position as I have several influential friends to whom I can introduce you."

#### Making Up a Programme.

I do not say, mind you, that every listener thinks I have as much spare time on my hands as this particular correspondent, but many people assume that my work starts and finishes with my actual broadcasting. Why, rehearsals alone occupy far more of my time than my microphone appearances! It is safe to say that for every hour I spend with my band before the microphone, I give at least three hours to rehearsals.

I have other points to consider which do not confront the leader of an ordinary dance band. Numbered amongst our listeners are thousands of people who do not dance. They deserve to be considered just as much

**The organisation behind a radio dance-band is very much larger than most of us might imagine. In this breezy article Jack Payne gives us a glimpse behind the scenes.**

as the dancing fraternity. I will go further—they have just the same right to be considered.

Consequently, in making up a programme, I have to bear in mind the two entirely different groups of listeners—the non-dancers who must be *entertained*, and the dancers who, above all other considerations,

### GIVE YOURSELF A PAT ON THE BACK



One of Britain's most popular broadcasters—Jack Payne.

demand time and rhythm. To the latter class, dance music is merely a means to an end. To the former it must be an entertainment in itself.

That is why you will find a comparatively large percentage of my programmes consists of novelty numbers. By this I mean we are

continually introducing songs with comic patter and cross-talk, and tunes which enable us to bring in a good number of unusual effects. In doing this, we introduce an element of entertainment which is lacking in the programme of a band which caters entirely for dancers.

#### Letters from Listeners.

The letters I receive from listeners have long since passed the three hundred a week mark. Some are genuinely helpful—these, I need hardly say, are the most welcome, many are diverting, and a few are—well!

The attention I give to my various correspondents occupies a considerable portion of my time, as you may guess. But I am always anxious to learn what listeners think of our performances.

I think the most astonishing letter I ever had was from a young man who, it seemed, was annoyed with me. "I am in a serious difficulty about you," he wrote. "I don't know what to do about it. I have a fiancée—there's nothing unusual in that, I know—but a little while ago I rigged up a wireless set for her.

"Every time I call on her now, she asks: 'Why don't you sing like Jack Payne?'"

#### The Tunes of Today.

I hesitate to write on the "sympathy" which every wireless performer hopes exists between himself and his unseen audience, for so much has already been said and written on the subject. But it is, nevertheless, an actual fact that a microphone performer, whether he be a soloist or one of a large band, rarely gives of his best unless he feels his audience is with him. Therefore, the knowledge that we are giving satisfaction to our listeners always "keeps us up to the mark," as the saying is.

Through the medium of wireless I have endeavoured to prove there is no connection between the tunes we know to-day and the "jazz" of the war years. There cannot be the slightest comparison between those two vastly different types of compositions, for they are the products of two entirely different eras. Jazz, as we once knew it, has gone for ever.

You may still prefer the symphony orchestra to the saxophone. It is purely a matter of personal taste. So why worry?

## LATEST BROADCASTING NEWS.

## GROUP LISTENING.

INTEREST OF LOCAL  
AUTHORITIES—CANADA'S  
PRIMA DONNA—SIR JAMES  
BARRIE—LORD BEAVER-  
BROOK—PROGRAMME ITEMS

GROUP listening has secured a big hold in the North despite the fact that its inauguration was delayed until some considerable time after other parts of the country were well away with schemes to foster organised plans for getting the greatest benefit from broadcast adult education talks.

Two Area Councils are working; one whose activities cover the counties of Cheshire, Lancashire and Westmorland, the other looking after Yorkshire. Preliminary experiments, from the first year's operations, have brought encouraging results, and it is anticipated that there will soon be no fewer than 150 listening groups in the Northern Region.

The Carnegie Trustees are taking an active interest in the scheme in Yorkshire and at Burnley, where the new Central Library was recently opened, a special listening room is being provided where an up-to-date receiving set will be installed for a group which is to start early in October.

## Interest of Local Authorities.

At Leeds the local education authority is supervising group listening in connection with Women's Institutes, the members of which meet in schools, and the Trade Union Council is also exploring the potentialities of broadcasting in their educational work. This is being done particularly through Trade Councils at Bolton and Brighouse.

An essential part of successful group listening is the appointment of competent leaders for the discussions which follow the broadcast talks, and with a view to coping with this side of the work special courses of instruction for likely students have been organised. The Yorkshire Summer School at Saltburn, working in conjunction with the Yorkshire Area Council, have just completed two successful courses in which more than thirty students participated. Most of the students already possessed experience of leadership and their intention is to conduct groups in their own localities this autumn.

## Canada's Prima Donna.

Sarah Fischer, often described as Canada's most distinguished prima donna, will be the solo artiste in a programme devoted to French and Spanish music which the National Orchestra of Wales is giving for West Regional listeners on Saturday evening, October 25th.

Miss Fischer, who is well known to London audiences for her work at Covent Garden during the 1924-25 season, broadcast from Cardiff about two years ago when she took part in a Canadian programme arranged in connection with a special Empire Week. She has also appeared at the Opera Comique and took part in the Mozart Cycle at the Paris Festival in 1928.

## Sir James Barrie.

Sir James Barrie is to broadcast again. This will be good news to Scottish listeners, and possibly to many others, for it is decided to include his speech in the National and London Regional programmes when he is installed as Chancellor of the University of Edinburgh at noon on Saturday, October 25th. Sir James is equally as good a broadcaster as he is a writer, and while his previous broadcasts have been rather of the light-hearted kind, it is possible that listeners will hear him adopt a more academic style of oratory on October 25th.

## Lord Beaverbrook.

Lord Beaverbrook was to open a series of broadcasts on Empire Trade on October 16th. This has now been postponed to a date towards the end of November not yet determined. It is probable that Conservatives, Labour and Liberal representatives will reply to the "Chief Crusader."

## Programme Items.

Speeches by Mr. Lloyd George, the Lord Chancellor, Lord Sankey and Sir Henry

Lytton will be relayed from the Savoy Hotel to National listeners on Tuesday, October 21st, the occasion being a luncheon in honour of Sir Henry Lytton of the D'Oyley Carte Opera Company. Listeners may also hear a song by Sir Henry, who is, of course, a famous old Savoyard.

In connection with the League of Nations Banquet on Thursday, October 30th, from the Guildhall, London, which, as stated in our last issue, will provide listeners with another opportunity of hearing the Prince of Wales, there will be also a speech by Lord Grey of Falloden, who will preside at the Banquet which is in honour of the delegates to the eleventh Assembly of the League of Nations.

## Lord Knutsford Again.

Lord Knutsford, Chairman of the London Hospital, who has not appeared before the microphone since he made his historical appeal which resulted in the greatest response ever made by listeners, is to give a talk for National listeners on Tuesday, November 4th, in which he will speak on "Nursing as a Career."

Dame Ethel Smyth is visiting Northern Ireland on Friday, October 24th, to conduct some of her own compositions during the opening concert of the Belfast Philharmonic Society, which is to be relayed from the Ulster Hall at 8 p.m. The programme will also include "The Master Mariners," by Dr. Thomas Wood, a work for chorus and orchestra, and which, it will be remembered, was broadcast from the Belfast studio nearly two years ago.

Saturday, October 18th, brings Mr. Bransby Williams to the microphone in a new rôle when "The Incredible Adventures of Roland Hern" will be broadcast.

## PRUNING AND TUNING



Alderman Thompson of Brighton—who has gained a great local reputation for pruning unnecessary expenditure from the town's Budget—spends his spare time in tuning-in.

## FOR THE LISTENER.

By "PHILEMON."

Whilst staying in Italy our contributor listens critically to the Continental stations and decides that they are good—in parts.

## Leo Fall.

THE English programmes did not take any notice, but continental stations, with their passion for anniversaries, have celebrated Leo Fall, with performances of his works everywhere. He died five years ago.

I always connected him with "The Dollar Princess," a gay and tuneful and amusing thing; but last Sunday night I heard "The Rose of Stamboul" from Milan, and I ranked him still higher in the world of Comic Opera. Milan let itself go in "The Rose of Stamboul," and no mistake.

I have rarely heard a performance so full of joyous abandon, and of so contagious a gaiety. I do not know who the vocalists were, but they were mighty good; and the whole affair had any amount of dash and brio and elan, and any other word you can think of to suggest high spirits.

Happy the man who can be remembered with such exhilarating cheer! Sunday night, too!

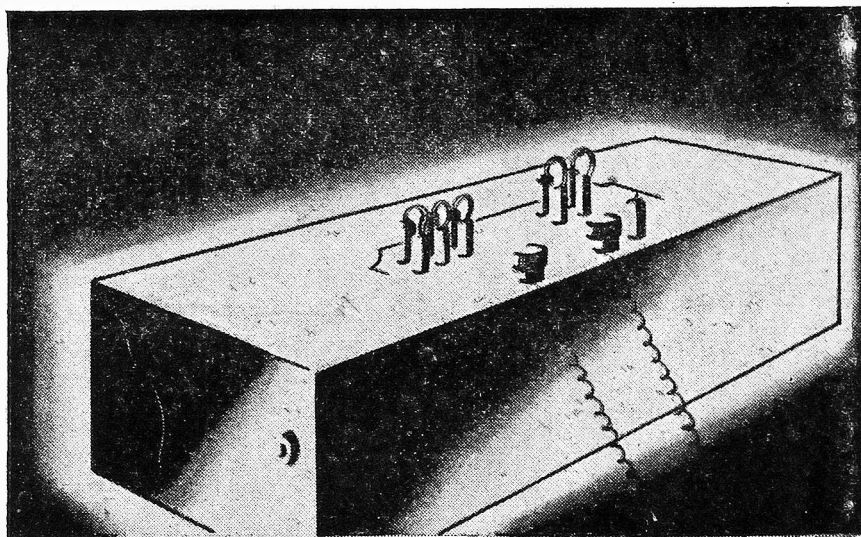
## Across the Channel.

If you have a set which will put you in touch with continental stations, I advise you to try them occasionally, for, though I am patriotic to the marrow, there are some things you get better here than at home. I assume that you will try chiefly for music.

For opera, get Rome or Milan. For orchestral music, and part-singing, get one or other of the German stations. Many English listeners, if they attempt continental listening at all, rarely get farther than Radio Paris; but, in my opinion, the programmes from this station are not a patch on the German ones, either for general interest or efficiency.

(Continued on page 256.)



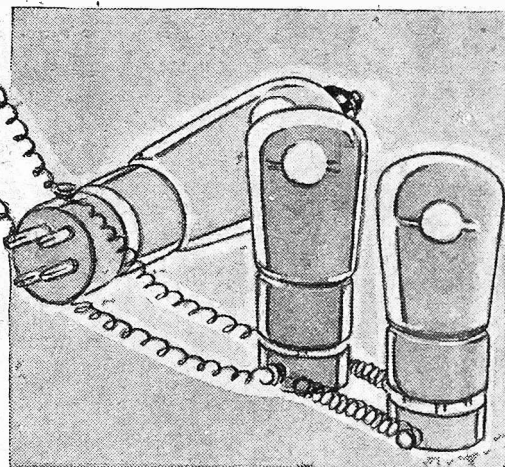


## Make your Battery Set All-Electric

### The Six-Sixty A.C. Mains Conversion Equipment is suitable for practically any Battery Receiver

*No internal wiring alterations.  
Specially selected Six-Sixty A.C.  
Valves and Six-Sixty 4/5 pin  
valve holder adaptors.*

The new Six-Sixty A.C. mains equipment enables you to turn your present battery receiver into an all-mains A.C. operated set. No need to scrap a satisfactory set—just adapt it. The dimensions of the complete Six-Sixty conversion equipment do not exceed those of the previous batteries, while the unit is specially designed to co-operate with specially selected Six-Sixty A.C. valves. Nowhere else can you obtain this advantage—valves and mains-conversion unit built by the same manufacturer to suit each other and work together.



The Unit can be obtained correctly built for any A.C. house supply. It is fitted with L.T. terminals giving 4 volts and up to 5 amps. H.T. tappings of 60, 75, 100, 120, 150 and 200 volts and Grid Bias tapping of —1.5 to —20 volts are provided—any three H.T. or two G.B. values being available for use simultaneously. Automatic Grid Bias is provided—the most modern and expensive arrangement. A further advantage is that the H.T. leads from the set are not removed when once inserted.

Dimensions, 13" x 5½" x 4".

Power Unit alone (H.T., L.T. and G.B.) - - £6 6 0

Complete Conversion Equipment from - - £8 5 0

Made by the makers of the famous Six-Sixty Valves.

Write for leaflet giving particulars of complete range, including new Six-Sixty Valves, Six-Sixty Cone Speaker Assembly and Cone Speaker Paper, Six-Sixty Turntable, Six-Sixty Valve and Set Tester, Six-Sixty Valve Adaptors, Six-Sixty Gramophone Pick-up Attachments, Six-Sixty Grid Leaks and Holders.



# SAY SIX-SIXTY

(B.V.A. RADIO VALVES AND EQUIPMENT)

Six-Sixty Radio Co., Ltd., Six-Sixty House, 17/18, Rathbone Place, Oxford Street, W.1. Telephone: Museum 6116/7.



**KLI 1926**

# Osram Valves

## for A.C. Mains Sets

"The General Electric Company can fairly be called pioneers of the indirectly heated valve."

*Wireless World*, Sept. 17th, 1930

**The FIRST**  
*indirectly heated valve -*  
**was an OSRAM**

The **LATEST** OSRAM Indirectly Heated Valves still lead because they combine all the essential points of an A.C. valve —

**Absolute Reliability.**

**Ample and LASTING Electron Emission.**

**Stability in use.**

**High Electrical Efficiency.**

**No hum.**

**Absence of parasitic noises.**

### The NEW OSRAM M.4. Series

	Amplification Factor:	Impedance:	Price:
OSRAM MH4	35	16,000	15/-
OSRAM MHL4	20	8,000	15/-
OSRAM ML4	9	3,000	17/6

and the wonderful OSRAM MS4 screen grid valve preferred by the leading manufacturers of A.C. Sets for Stability, Efficiency and Absolute Reliability - Price 25/-

**MADE IN ENGLAND**  
Sold by all Wireless Dealers

Write for Booklet "OSRAM VALVES  
for A.C. Mains & Rectifying Valves"  
OV 5568.



# CAPT. ECKERSLEY'S QUERY CORNER

**SHOCK FROM THE L.S. CHOKE—WHEN THE VALVE GETS HOT—IS IT THE ACCUMULATOR?—“UP TO SCRATCH.”**

Under the above title, week by week, Captain P. P. Eckersley, M.I.E.E., our Chief Radio Consultant, comments upon radio queries submitted by “P.W.” readers. But don't address your queries to Captain Eckersley—a selection of those received by the Query Department in the ordinary way will be dealt with by him.

## Shock from the L.S. Choke.

J. R. N. (Chislehurst).—“I have added an output filter to my set in order to prevent the H.T. from flowing through the loud-speaker windings. To my surprise I find that if I touch the speaker terminals I get a shock. Does this mean that the output filter is not working properly?”

It might do, of course, but you must do this test.

Stop any signals coming into the loud speaker at all, disconnect aerial switch, and try when the B.B.C. is off (any time Sunday practically) and then touch the loud-speaker terminals.

If you do *not* then get a shock your output filter is blocking off your H.T. D.C. volts. But when you restore conditions of working there are volts of alternating-current modulation, are there not? I mean if there were no volts across your loud-speaker terminals, how is the thing going to make a noise?

It's possible to get quite unpleasant shocks due to pure H.T. volts of modulation even though all D.C. is blocked off. The cure is not to touch when working.

## When the Valve Gets Hot.

“PERPLEXED” (Strood).—“How hot should the bulb of a super-power valve get?”

“I am using one of the 2-volt type with 150 volts H.T. and the recommended grid bias. Yet after half an hour or so the glass becomes almost too hot for me to bear my hand on. Is this in order?”

Oh, yes. That's all right. Never be afraid of a little heat.

Catch hold of the bulb of your electric light (one that's doing its duty in a central position, not that one economising for you in the hall), and you'll realise, as the professor said after a discussion on a vexed subject, “it's difficult to get light without heat.”

It's difficult to get power without the appearance of heat, vide a lorry of 1912 make carrying a ten-ton load up Kirkstone Pass. Go down to Brookmans Park and see a cascade of water pouring over a grid of pipes and steaming because that water's cooling valves in the station.

A super-power valve has to get rid of a lot of waste heat, because to get some reasonable power into useful form in a loud speaker a lot of power must be expended in the valve. The heat is due to electrons bombarding the anode of the valve.

## Is it the Accumulator?

H. McG. (Glasgow).—“Although the makers of the L.T. accumulator in my portable receiver state that it is impossible to spill any of the acid under any circumstances, I find that there has been some leakage of acid and the ‘floor’ of the receiver is quite damp.”

“The performance of the receiver has also been falling off lately, and recently the reaction control ceased to function entirely

back from charging is clean. The deterioration of the set could come about by acid getting on to components or by the level of the acid in the accumulator being too low (due to leak).

Try the voltage of the accumulator while it is working. And finally if these hints do not help you write to the makers.

## “Up to Scratch.”

A. G. (Cheltenham).—“Do you consider pick-up reproduction is possible, say up to 5,000 cycles, without the attendant needle scratch? If so, can you kindly offer suggestions for overcoming the noise?”

This is a difficult question. It involves the variables of (1) What amount of scratch will you stand for? (2) What do you mean by reproduction “up to” 5,000 cycles? (3) What is the usual ratio of wanted sound and unwanted on the records you play?

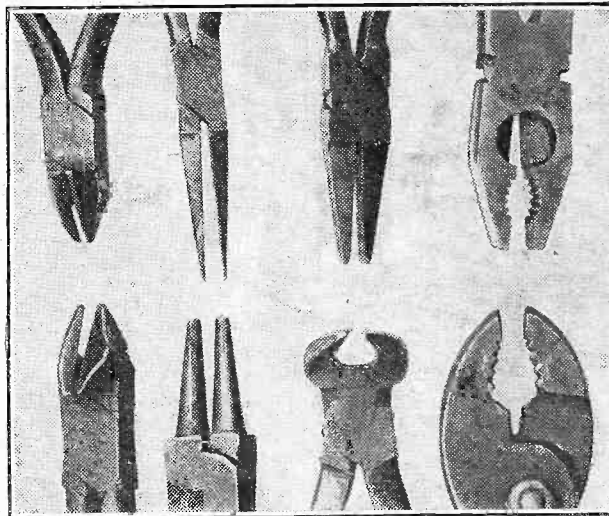
I mean by (1), if you are amplifying very much indeed scratch is inclined to be more noticeable than if reproduction is weaker. (2) Do you mean you want to hear something of 5,000 cycles or full amplitude at 5,000 cycles? If you want to hear something but do not want full reproduction scratch can be eliminated to a greater extent than if your conditions

are full reproduction at 5,000 cycles.

(3) If you play jazz records there is such a continuous noise that scratch is not noticeable. But if there is constant variation between *ff* and *pp* scratch comes in. Then there's the balance of “needles” against “results”!

It's all very difficult. But you can overcome the noise the more as you cut off high frequencies. A lot of my friends just shunt the pick-up with a spot of capacity. It seems to help!

## “PLIERS, PLEASE!”



Don't forget that when buying pliers and similar tools you can get different sorts for different operations, and that a wise choice in the first instance will simplify all your constructional work this winter.

although I am unable to discover any obvious cause for this, such, for instance, as a run-down H.T. battery.

“Do you think that the spilt acid can in any way be responsible for the present poor performance of the receiver?”

Makers are nearly always right, but they cannot get over occasional faulty workmanship.

It may be your accumulator is faulty and leaking. It may be it does spill, of course, but in view of what the makers say this is unlikely.

It may be that you charge your accumulator in situ and that acid spray makes it look as though the acid were leaking. It may be that those who charge your accumulator for you stand it in acid and let the spray damp it and everything else.

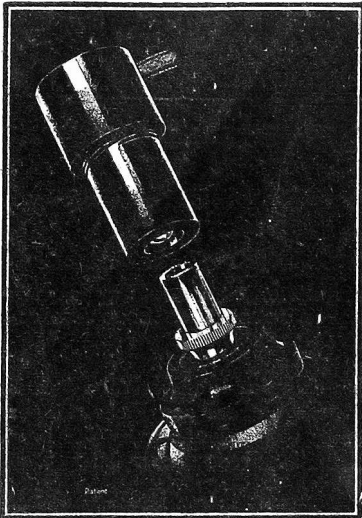
See if the accumulator when it comes

## ANOTHER FREE GIFT

with next week's  
POPULAR WIRELESS



# SAFETY FOR SIXPENCE

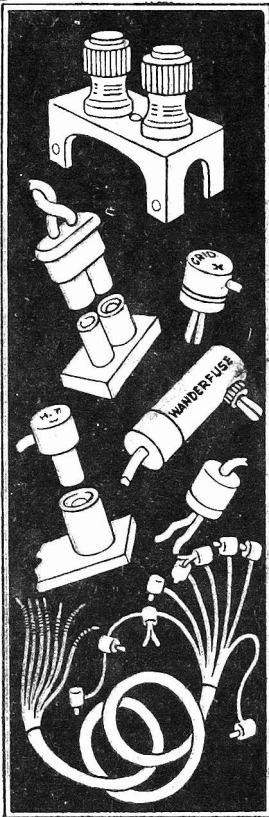


SUPPOSE you "blew" your Screen-grid Valve to-night . . . Sixpence would have saved it. The Belling-Lee S.G. Anode Connector is entirely insulated. Even if it touches exposed metal parts at earth potential your valves are safe and your H.T. supply too.

Just push it over the Screen-grid Anode Terminal in place of the usual nut. Then forget it. Strong spring grip—compact—side entry for flex—a special loading device grips the braid as well as the wire.

S.G. Anode Connector 6d. each.

For Screen Grid or Pentode.



Patent

## TWO NEW COMPONENTS

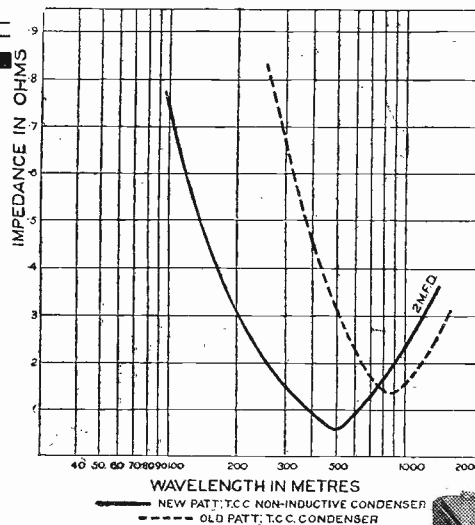
The new Terminal Mount, Price 8d. The new "Wander-fuse," Price 1/6. Spare fuses (150 m/a), 9d. each.

Belling-Lee Terminals: Type "B," 6d. Type "M," 4d. Type "R," 3d. Wander Plug, 3d. Safety Plug and Socket, 9d. Twin Plug and Socket, 1/6. Indicating Spade Terminal, 4d. Battery Cords, 9 way, 5/9. (Also made in 5, 6, 7, 8 and 10 way.)

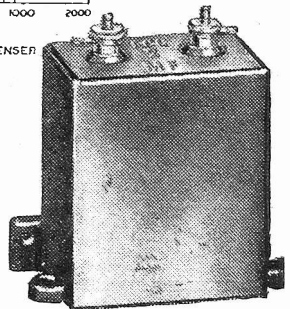
**BELLING-LEE**  
FOR EVERY RADIO CONNECTION

Advt. of Belling & Lee, Ltd., Queensway Wks., Ponders End, Mdx.

# Non-inductive Condensers *the Latest* **T.C.C.** *Development*



Here's the latest T.C.C. development—a Non-Inductive Condenser at no extra cost. The advent of the Screened Grid Valve has emphasized the need for a condenser having the minimum of impedance in order that small, high frequency currents may be readily passed. How the new T.C.C. Non-Inductive Condenser achieves this result is shown on the curve above. The ordinary 1 mfd. condenser has a resonant point at about 900 metres whereas in the new T.C.C. Non-Inductive Condenser this has been reduced to nearly 500 metres. Be wise: always use



Available in all capacities from .005 mfd. to 2 mfd. from all wireless shops.

The above illustration shows the T.C.C. 2 mfd. Non-Inductive Condenser in moulded case 3/10.

Telegraph Condenser Co., Ltd., N. Acton, W.3

**T.C.C.**  
**CONDENSERS**

Always ahead in Condenser Design



For all round service in a domestic receiver, the combination of a screened grid high frequency amplifying valve, a detector and a pentode output valve cannot be bettered. In a correctly designed receiver, these three valves give results definitely superior to the best 5-valve set of a few seasons ago, from the point of view of range, sensitivity and quality—and for a

very much lower expenditure of both low and high tension current.

Such a combination, even in the hands of the merest novice, should render possible the reception, at good speaker strength, of a reasonable number of foreign transmissions as well as the local stations.

The following types should be employed in a screened grid, detector and pentode combination:—

L.T. Supply	Mullard Screened Grid	Mullard Detector	Mullard Pentode
2-volt accumulator	P.M.12	P.M. 2DX	P.M.22
4-volt accumulator	P.M.14	P.M. 4DX	P.M.24
6-volt accumulator	P.M.16	P.M. 6D	P.M.26
A.C. Main	S.4V or S.4VA	354V.	P.M.24 or P.M.24A

# Mullard

## THE MASTER VALVE

THE name of this fine set gives you the key to the whole idea underlying its design. "Maximum power" was what we set out to give, and maximum power for its size is just what it has got.

Taking it all round, it is the most sensitive and selective receiver, with the greatest amount of real hefty punch, that we have

#### SOME COMPONENTS —

- 1 Panel, 21 ins. × 7 ins. (Lissen or Trolite, Paxolin, Becol, Resiston, etc.).
- 1 Cabinet, with baseboard 10 ins. deep to fit (Cameco or Pickett, etc.).
- 2 3-point on-off switches (Red Diamond or Bulgin, Ormond, Wearite, Ready Radio, etc.).
- 2 '0005-mfd. variable condensers (Lissen or Lotus, J.B., Formo, Dubilier, Ready Radio, Ormond, Polar, etc.).
- 2 Slow-motion dials if condensers not slow-motion type (Igranic or Lissen, Ormond, J.B., Lotus, Ready Radio, Formo, etc.).
- 1 '0001, '00013, '00015-mfd. differential reaction condenser (Dubilier or Lotus, Lissen, Ready Radio, Wearite, Ormond, J.B., Magnum, Paroussi, etc.).
- 1 Filament Rheostat (Wearite or Gecophone, Lissen, Igranic, etc.).
- 1 L.T. switch (Bulgin or Igranic, Lissen, Lotus, Benjamin, Red Diamond, Junit, Wearite, etc.).
- 6 Single coil holders (Lissen and Lotus, or Igranic, Bulgin, Wearite, Magnum, Red Diamond, etc.).
- 4 Sprung valve holders (Formo or Igranic, W.B., Benjamin, Lotus, Lissen, Bulgin, Wearite, Junit, Magnum, etc.).
- 1 '0002-mfd. fixed condenser (Dubilier or Lissen, T.C.C., Ediswan, Ferranti, Igranic, Mullard, Goltone, etc.).

yet managed to produce with the aid of entirely standard parts. (Note that it uses plug-in coils.)

#### A Surprising Circuit.

It put up a really wonderful show on test, cutting out the Brookmans Park transmission with remarkable ease, and then bringing in an amazing string of foreigners

at genuine loud-speaker strength with very little reaction in use.

Altogether it delighted us, for we had set out to produce something really outstanding with the aid of a carefully thought-out selection of just such parts as we thought most of our readers would be likely to have on hand as a result of previous ventures in set building. Our tests showed that we had succeeded in even fuller measure than we had hoped for, hence the satisfaction.

That brings us to the second great feature of the "Maxi-Power": although it is a big set, and quite ambitious in the number of its special schemes and refinements, it can be built quite economically. There is nothing critical or special about its parts, and if you run over the list you are likely to be pleasantly surprised at the number of them you already possess.

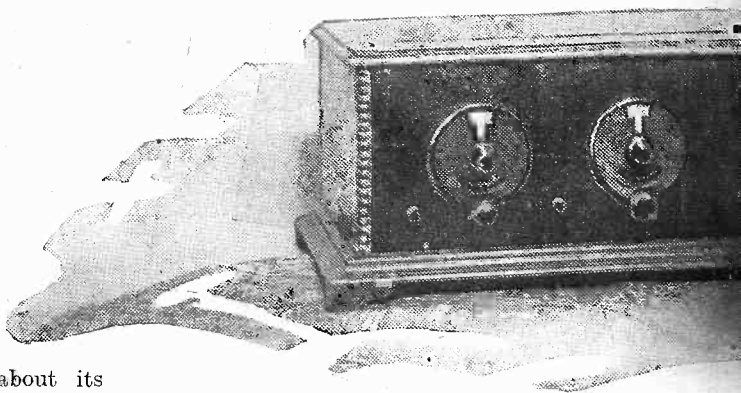
#### Easy Wave-changing.

It is, of course, a wave-change set, and much time and thought was expended in perfecting the plug-in coil arrangement finally adopted. It is a method possessing many outstanding advantages in the way of freedom from the losses so often present in wave-change switching circuits, reasonable number of coils required, and so on, but best of all is the extremely high efficiency it has enabled us to get from the screened-grid valve.

It gives you a real hard-working H.F. stage, with lots of "mag." and selectivity well up to the exacting requirements imposed upon by the Regional conditions. That gives the set a good start, and then following after it there is a modern high-efficiency detector circuit with differential reaction to give the signals another boost up.

Next comes a carefully designed low-frequency amplifying side which takes the clean, strong output from the detector and builds it up to really satisfying loud-speaker volume. The L.F. side was given

# The Maxi



One of this week's free gift blue prints gives complete to-the-minute long-range receiver. Below you will use and v

a good deal of thought, both as to circuit values and practical lay-out, and the result is an excellent combination of high magnification and superb quality of reproduction.

The blue print gives you the full practical information about the set, and you could build and work it successfully without reading a word of this article. However, there are quite a number of interesting things we can tell you about it.

For example, we can tell you something of the working of the circuit, which will no doubt interest those who like to know what goes on inside their sets.

#### Few Coils.

The first thing you will notice is that the wave-change switching is of the type which keeps all coils in circuit on long waves. Although efficient, this method is apt to result in a rather large number of coils unless care is taken.

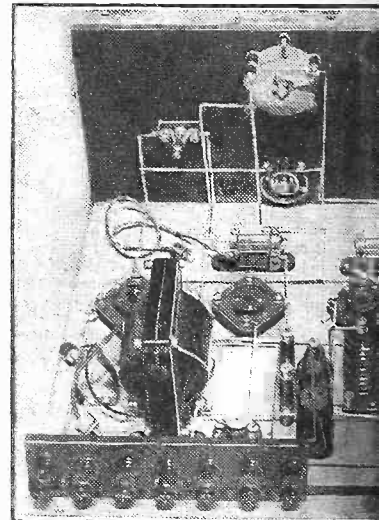
By making judicious arrangement of the circuit we have reduced the number to only three for the H.F. grid circuit and three for the intervalve coupling and reaction arrangements. In consequence the set is by no means complicated to wire up and is not nearly so bulky as this type is apt to be.

In the H.F. grid circuit you will see two plain low-wave coils and another for long-waves with a very simple kind of switch which gives an extremely effective throw-over from one wave-band to the other.

#### Simplified Switching.

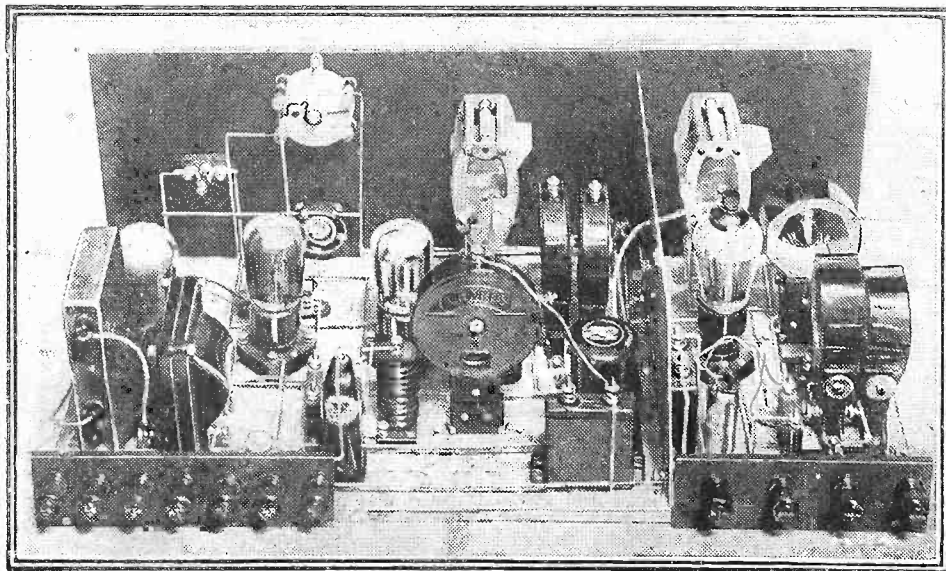
In the intervalve coupling circuit there is a very similar scheme. The only difference is that we are now dealing with the grid circuit of the detector valve, and so the "primary" portion of the circuit is used for inter-valve instead of aerial coupling.

#### THE POWER DI



Here is the L.F. end of this fine set, which is continued until finally a tremendous volume output is achieved.

#### ULTRA-EFFICIENCY WITH STANDARD COMPONENTS



A general view, which shows the impressive layout of this fine up-to-date receiver. Note how its special features have been achieved with the aid of entirely standard parts.



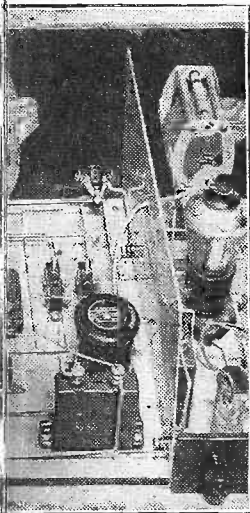
# Power Four

By The  
"P.W." RESEARCH DEPT.

Constructional details of this powerful and up-to-date interesting general notes about its

that the "parallel feed" lead from the anode of the S.G. valve goes to the point equivalent aerial lead in the previous circuits, and that the g-wave coil  $L_6$  is of the "X" type. The reaction circuit is of the differential variety, as we have already remarked, and here again we have a separate coil, with a consequent saving of space and simplification of wiring and tuning.

## TMENT



Building-up process is controlled power emerges from the

a little below it, but many people like to have definite control for volume. This we have ingeniously provided in the form of a filament control for the S.G. valve.

## ing Volume.

This type of control is particularly efficient in operation, for it can be made to give a very wide range of volume and does not upset the quality if used with a little discretion (don't use it to cut down the volume to a mere whisper: that sometimes introduces a little distortion).

A practical hint should perhaps be given in connection with the use of this volume control. The point is that some screened-grid valves have trouble with a considerable "time-lag" in other

words they heat and cool comparatively slowly.

In practice this just means that you should turn the volume control knob rather slowly, to give the valve filament time to respond. Otherwise one is apt to over-shoot the mark.

With that hint we can leave this part of the subject for the blue print itself really gives all the constructional information and practical data.

## The Alternatives.

We still have a little more space left, so we shall be able to clear up a few more points that may interest you.

First, there is the question of the alternative sizes for the long wave "X" coil, which is marked  $L_6$  on the blue print. You will observe that the specification for this is 200 or 250, and you may wonder why the alternative should be given when the coil is in a closed circuit where its size can be predicted accurately.

Well, the point here is that either size will serve, but the 200 is somewhat the more convenient of the two. However, many people will already have a No. 250, and No. 200 is a rather unusual size, so we gave the choice.

Size No. 200 is to be preferred because it gives a somewhat better tuning range (on long waves) and makes the second dial read more like the first one. The 250, on the other hand, will usually only just tune down to Hilversum, because also in circuit on the long waves is the coil  $L_5$ .

What it amounts to is this: If you have to buy the coil, make it a No. 200 X. If you already have a No. 250 X you can quite well use it, so long as you just understand the point about tuning range.

## On Long Waves.

Another point where there is a choice of coil sizes is in the primary of each lower wave coupling circuit. These primaries are marked  $L_1$  and  $L_4$ , and the effect of changes of size here is to govern selectivity. The smaller sizes quoted give the higher selectivity, but the larger ones generally mean better volume, particularly on distant stations.

Then there is a point about the working of the aerial circuit on long waves. You may wonder why there appears to be no provision for getting one of the usual coupling effects here, with a separate primary or an "X" coil.

The explanation is simple: We have got the right effect by

taking the aerial lead on long waves through the small fixed condenser  $C_9$  to the "upper" end of the long-wave coil  $L_3$ .

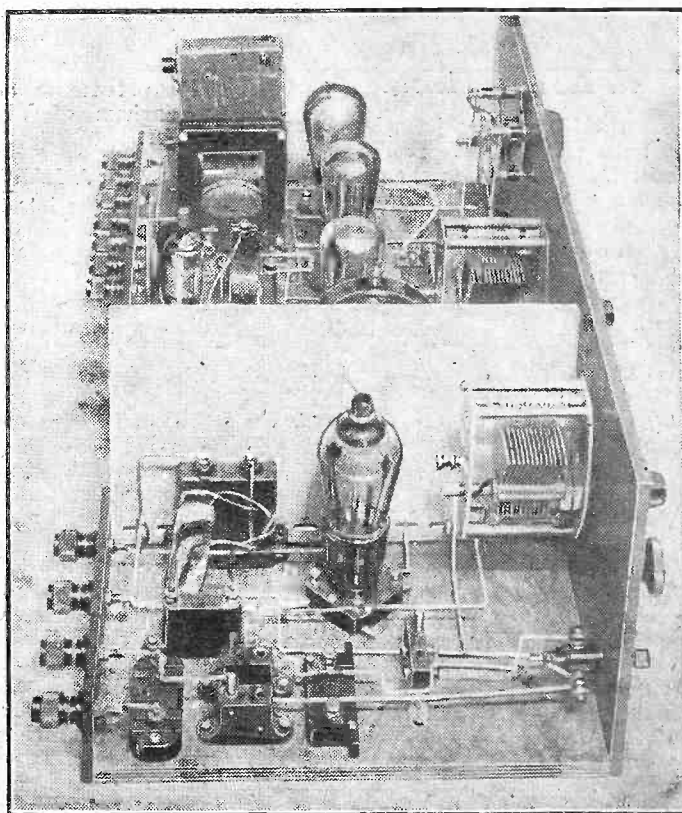
In this way we have got a coupling effect

## —YOU WILL NEED.

- 1 0001-mfd. fixed condenser (Lissen, etc.)
- 2 01-mfd. fixed condensers (T.C.C., etc.)
- 1 001-mfd. fixed condenser (Ormond, etc.)
- 1 0003-mfd. fixed condenser (Dubilier, etc.)
- 2 1-mfd. fixed condensers (T.C.C. or Lissen, Dubilier, Mullard, Hydra, etc.)
- 2 2-meg. leaks and holders (Lissen or Ediswan, Ferranti, Dubilier, Igranice, etc.)
- 2 H.F. chokes (R.I. and Ready Radio, or Lissen, Varley, Telsen, Lewcos, Watmel, Wearite, Dubilier, Magnum, Junit, Lotus, etc.)
- 1 100,000-ohms anode resistance and holder (Varley or Igranice, R.I., Lissen, Mullard, Dubilier, etc.)
- 1 Low ratio L.F. transformer (Ferranti or R.I., Lissen, Telsen, Varley, Igranice, Mullard, Lotus, Lewcos, etc.)
- 1 Fuse and holder (Magnum or Bulgin, etc.)
- 11 Terminals (Belling & Lee or Igranice, Eelex, etc.)
- 1 Standard "P.W." screen, 10 ins. x 6 ins. (Parex or Wearite, Ready Radio, Magnum, etc.)
- 1 G.B. battery clip (Bulgin, etc.)
- 2 Terminal strips, 6 ins. x 2 ins. and 7 ins. x 2 ins.
- Flex, wire, screws, plugs, etc.

which turned out to be quite suitable for this particular receiver. It naturally produces a valuable simplification.

## STRENGTH, SELECTIVITY AND PURITY



Note how simply the wave-change switching is worked out in the H.F. stage.

## FROM THE TECHNICAL EDITOR'S NOTE BOOK.

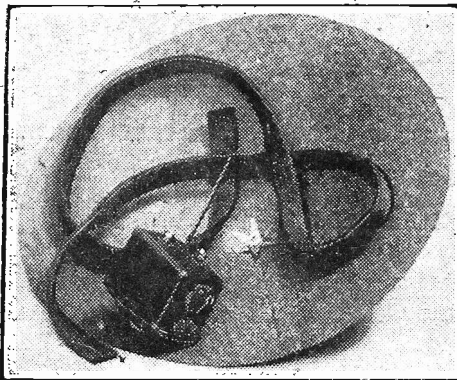
# Tested and Found—?



## MAKING YOUR OWN SPEAKER.

THE Six-Sixty people manufacture valves, and very good valves, too, but they also make a loud-speaker assembly. This consists of a unit, cone and cone-surround material. The price, all in, is 15s. A cabinet or baffle-board finishes the instrument.

The Six-Sixty cone paper is excellent stuff, and when used in conjunction with a Six-Sixty unit the results stand far



The Six-Sixty Cone Loud-speaker Kit.

above the 15s. cost as judged by present-day radio price values. You get excellent sensitivity and a most commendable evenness of response.

## G.E.C. PUBLICATIONS.

Three new G.E.C. publications it would well repay you for the trifling trouble of securing are:

- (1) "Wireless Guide."
- (2) Osram A.C. Mains and Rectifying Valves.
- (3) Osram Valves for power amplification; Osram photo-cells and Osram lamps for talking-picture apparatus.

Copies of these are available free on postal application.

## NEW PIONEER SWITCHES.

The new Pioneer switches have rounded contact springs, so that their active surfaces are considerably increased. As I have said on previous occasions, switches, though small, are important items, and if faulty can give rise to annoying troubles.

But I cannot see these new Pioneers developing faults. They are robustly constructed, and their designs are distinctly workmanlike.

The ordinary on-off type for filament

switching, etc., retails at 1s. 3d., while there is a triple contact variety at 1s. 6d.

These Pioneers are made, of course, by the Pioneer Mfg. Co., Ltd., and in that they are sound constructionally and have good panel appearance, I have no hesitation whatever in recommending them to "P.W." constructors.

## MORE IGRANIC LEAFLETS.

Two more Igranic publications have been issued, the one dealing with the Igranic Midget Radio Switch and the other with the Igranic 5-Watt Extra-Stage Amplifier.

## EELIX RADIO BULLETIN.

The recent number of the Eelix Radio Bulletin, which is issued by J. J. Eastick & Sons, is a particularly bright number, and in it is included a helpful article on volume control.

## C.A.V. CATALOGUE.

C. A. Vandervell & Co., Ltd., have now issued their new radio accumulator catalogue, a folder dealing with an entirely new range of H.T. accumulators, and literature describing their jelly acid, non-spillable accumulators for portable receivers. These publications are now ready for distribution to interested readers.

## OBETA BATTERIES.

These have recently been reduced in price, in cases by more than one shilling. Obeta batteries are handled by F. L. Lesingham of Victoria Street, London, S.W.1.

## A MARCONI VALVE.

One of the latest Marconi valves is the PX4, and it has these fine characteristics. Impedance, 1,050 ohms; amplification factor 3.5, and mutual conductance 3.3. It is a four-volter, taking a filament current of .6 amp. and a maximum H.T. of 200 volts.

Its 4-volt filament rating brings it in line with the 4-volt mains valves and it can, in fact, be used in conjunction with these. It is, of course, a super-power valve suitable for the final stage of a pretty big set. The maximum anode current is 50 milliamps at 200 volts, so that you can see it is a "ten-watter."

It gives fine results, and is just the sort of valve you want to operate a moving-coil loud speaker. A particularly interesting feature lies in the fact that it has the heftiness hitherto associated only with super-power valves needing 300 or 400 volts H.T. Those radio enthusiasts who have D.C. mains should be particularly interested, for D.C. imposes an awkward voltage limitation that, hitherto, has debarred its owners from enjoying the use of the really "big" valves.

## BRITISH BLUE SPOT PRODUCTIONS.

The British Blue Spot Co., Ltd., has been formed for the distribution of the famous Blue Spot products, and also to provide for their manufacture in Great Britain. This company has taken over the staff and records of the Blue Spot department of F. A. Hughes & Co., Ltd., and have acquired substantial premises.

## NEW BLUE SPOT SPEAKER.

The Blue Spot people seem to "keep the ball rolling" to good effect. It is not so long ago that I chronicled the arrival of a new Blue Spot Unit. I have now the pleasure of saying a few words about the model 41K Blue Spot complete loud speaker.

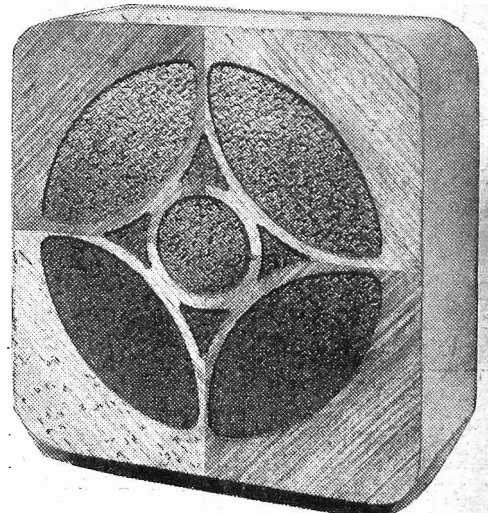
This speaker incorporates the Blue Spot 66K Unit, and it is built into a fine little

Manufacturers and traders are invited to submit radio apparatus of any kind for review purposes. All examinations and tests are carried out in the "P.W." Technical Department, with the strictest of impartiality, under the personal supervision of the Technical Editor.

We should like to point out that we prefer to receive production samples picked from stock, and that we cannot guarantee their safe return undamaged, as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are therefore framed up in a readily readable manner free from technicalities unnecessary for that immediate purpose.

cabinet having an attractive walnut finish. It retails at 50s. Its reproduction is bright and clear-cut, and its response is much wider—speaking in terms of frequency range—than many instruments costing two or

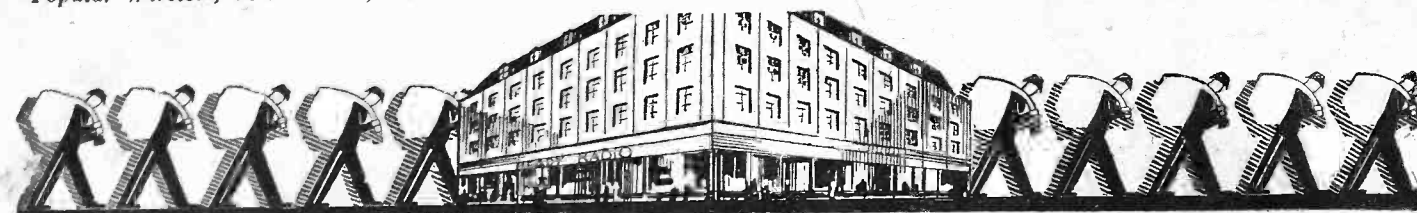


This is the 41K Blue Spot.

three times as much. "P.W." readers should make a point of hearing one of these Blue Spots at their local retailers.

## TWO-VALVE MAINS SET.

I have been reading some literature dealing with the two-valve all-electric set made by Gambrell Radio, Ltd. It employs a pentode and incorporates wave-changing, and seems to be a particularly attractive outfit.



# THE "EASY-CHANGE" THREE—"MAXI-POWER" FOUR

## PRICE LISTS OF APPROVED PARTS

### THE "EASY-CHANGE" THREE

	£	s.	d.
1 Ebonite panel, 18 x 7 ins. . . . .	6	0	
1 Hand-polished oak cabinet with 10 in. baseboard . . . . .	1	10	0
1 ReadRad .0005 variable condenser . . . . .	4	6	
1 ReadRad .00015 differential condenser . . . . .	5	0	
2 ReadRad on-off switches . . . . .	1	8	
3 ReadRad single coil holders . . . . .	2	6	
3 Benjamin vibrolders . . . . .	4	6	
1 ReadRad .0003 fixed condenser . . . . .	10		
1 ReadRad .0002 fixed condenser . . . . .	10		
1 ReadRad 2-meg. grid leak . . . . .	10		
1 Lissen R.C.C. unit with 1- and 1- or 2-meg. leak . . . . .	4	0	
1 ReadRad "Hilo" H.F. choke . . . . .	4	6	
1 ReadRad fuse and holder . . . . .	1	3	
1 Igranite type J L.F. transformer . . . . .	17	6	
1 Terminal strip, 18 x 2 in. . . . .	1	8	
10 Belling Lee terminals . . . . .	2	6	
1 Lewcos coil, No. 60X . . . . .	4	9	
1 Lewcos coil, No. 250X . . . . .	6	6	
1 Lewcos coil 100 . . . . .	4	6	
3 Valves as specified . . . . .	1	7	6
1 Set ReadRad Jifilink . . . . .	2	6	
1 ReadRad duograph dial . . . . .	6	6	
Screws, plugs, etc. . . . .	1	8	

TOTAL (including valves and cabinet.) **£7 2 0**

### THE "MAXI-POWER" FOUR

	£	s.	d.
1 Ebonite panel, 21 x 7 in. . . . .	8	0	
1 Hand-polished oak cabinet with 10-in. baseboard . . . . .	1	10	0
2 ReadRad 3-point on-off switches . . . . .	3	0	
2 ReadRad variable condensers, .0005 . . . . .	9	0	
2 ReadRad duograph slow-motion dials . . . . .	13	0	
1 ReadRad differential reaction condenser, .00015 . . . . .	5	0	
1 Wearite filament rheostat, 15 ohms . . . . .	1	6	
1 ReadRad on-off switch . . . . .	10		
6 ReadRad single coil holders . . . . .	5	0	
4 Benjamin vibrolders . . . . .	6	0	
1 ReadRad .0002 fixed condenser . . . . .	10		
1 ReadRad .0001 fixed condenser . . . . .	10		
2 T.C.C. or fixed condensers . . . . .	6	0	
1 ReadRad .001 fixed condenser . . . . .	10		
1 ReadRad .0003 fixed condenser . . . . .	10		
2 T.C.C. 1 mfd. . . . .	5	8	
2 ReadRad 2-meg. grid leaks and holders . . . . .	2	8	
1 R.I. H.F. choke . . . . .	7	6	
1 ReadRad "Hilo" H.F. choke . . . . .	4	6	
1 Varley 100,000 ohms resistance and holder . . . . .	7	0	
1 Ferranti A.F.3 L.F. transformer . . . . .	1	5	0
1 ReadRad H.T. fuse and holder . . . . .	1	3	
11 Belling-Lee terminals . . . . .	2	9	
1 ReadRad Standard screen, 10 x 6 in. . . . .	2	0	
1 ReadRad G.B. clip . . . . .	6		
1 Terminal strip, 21 x 2 in. . . . .	2	6	
2 Lewcos coils, No. 35 . . . . .	7	0	
2 Lewcos coils, No. 60 . . . . .	7	0	
1 Lewcos coil, No. 250X . . . . .	6	6	
4 Valves, as specified . . . . .	2	7	6
1 Set ReadRad Jifilink . . . . .	4	0	
Screws, flex, plugs, etc. . . . .	1	6	

TOTAL (including valves and cabinet.) **£11 5 6**

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**KIT C** with valves and cabinet . . . . . **£7: 2:0**  
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**KIT A** less valves and cabinet . . . . . **£7: 8:0**  
or 12 equal monthly payments of 13/6.

**KIT B** with valves less cabinet . . . . . **£9:15:6**  
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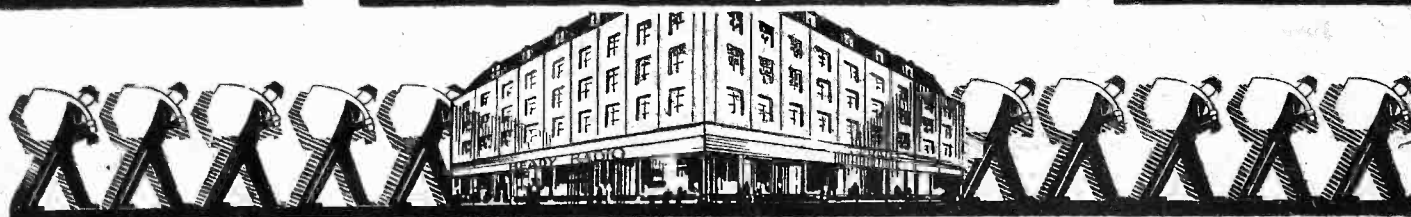
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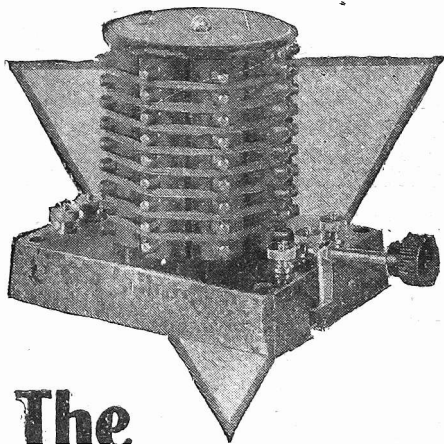
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All moulded parts of attractive Walnut-mottled Bakelite. Robust positive "push-pull" switch concealed in base.

Price complete 17/6

## THE WATMEL BINOCULAR H.F. CHOKE

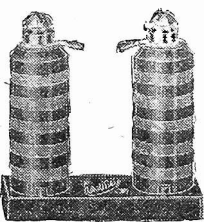
gives maximum efficiency, very low self-capacity and an extremely restricted field.

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Self Capacity - 1.6 m.mfd.  
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M.C.13.

## SHORT-WAVE NOTES.

By W. L. S.

Our expert gives you all the latest news about short-wave conditions and circuits.

ANYONE who spent an evening at the Show and is also a reader of these notes cannot fail to have been impressed by the *absence* of anything of great interest to the short-wave man. The number of new ideas brought into the short-wave field can certainly be counted on the fingers of one hand, and the number of commercial firms making and bringing before the public a short-wave receiver upon the other.

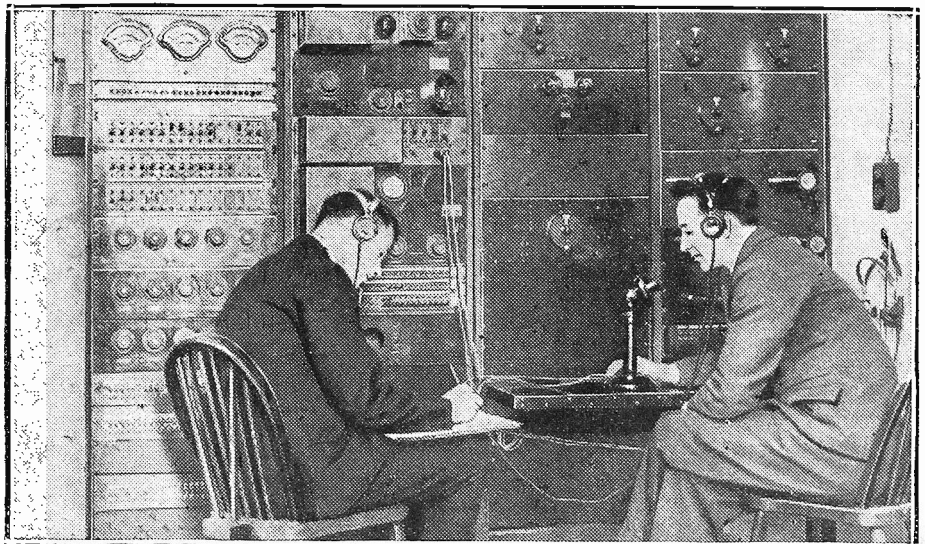
It is indeed strange that in this country the short-wave man is left so much to fend for himself. At the same time, I think this same fact has a lot to do with the undeniable success which several amateurs have met in this direction. After all, whether one receives or transmits, nothing is quite such good training as having to make one's own gear before one can get results worthy of the name!

small tuning condenser for tuning on the amateur bands (very small meaning of the order of '00002 or even '00001). To tune to the short-wave broadcast bands I have used in parallel with this something like a '0001 reaction condenser, which has been "pre-set" for whatever band I have wished to explore, all the tuning being carried out on the other.

### The Best Tuning Capacity.

I deliberately dropped this idea a few days ago and installed, in place of the two condensers, a single '00005. The immediate result was that the 20-metre amateur band occupied the 10 degrees between 8° and 18°. The strange thing was that I found I liked it! Tuning is naturally far more critical, but, given a good slow-motion dial—which I fortunately *do* possess—not really difficult, and I found that the benefit of being able to swing right round the band

## WORLD-WIDE RANGE OF RECEPTION



This is a view in the recently erected Post Office receiving station, situated near Baldock, Herts. It is in touch with Australia and other distant parts by means of short waves.

### Why is Britain Behind?

In the States there is a huge amount of standardised short-wave apparatus on the market; much of it can be obtained over here, but the price is, as a rule, rather higher than we have as yet been "educated up to." In America the public can see the value of paying a little more for a really "super-quality" article, whereas in England it is too often the cheap and shoddy article that sells best.

Speaking in terms of sets per member of the population, I should say that even some of the remote parts of the British Empire display a greater interest in short waves than we do ourselves. Lamentable, but true!

Although I have already been accused by well-meaning readers of changing my mind on the second and fourth Sunday of the month, I hasten to admit another change that has been brought on by experience. I have always advocated the use of a very

rapidly instead of having it spread over the full 100 degrees more than compensated for the extra difficulty in finding a station.

Then I tried a '0001 but did not like it at all. It would doubtless be in order for short-wave broadcast, but one simply cannot tune in weak amateur signals when the whole band, 280 kc. broad, occupies but 5 divisions.

The value for good tuning combined with a reasonably small number of interchangeable coils certainly appears to be about '00005.

Two readers, curiously enough, write to tell me of their success with indirectly-heated screened-grid valves for S.W. work, with D.C. on the filament. Not only is the well-known "buffer" effect obtained, but quite a large amount of amplification is also possible. It is well-known, of course, that the characteristics of these valves are far better than those of the directly-heated variety.



L.F., 5/6; H.F., 5/6; R.C., 5/6; Power, 7/3; Super-Power, 8/-; A.C. Indirectly Heated H.F. and L.F. 9/6 each; A.C. Directly Heated Power 9/6 each. A.C. Directly Heated H.F. and L.F. 7/9; Rectifying Valves 10/- each. Tungsram Photo-Electric Cells, Nava E., £2 : 17 : 6.; Nava R., £3 : 3 : 0.

One after the other new programmes come crowding in as your dial revolves. Stations you could not get before—programmes coming to life in your home from every part of Europe. TUNGSRAM VALVES have made the difference. TUNGSRAM VALVES give longer range to your set, give better selectivity too, and mighty volume. And though they cost less than any other valve of similar quality, yet they have longer life and economy in use. TUNGSRAM VALVES will give you better radio at less cost.

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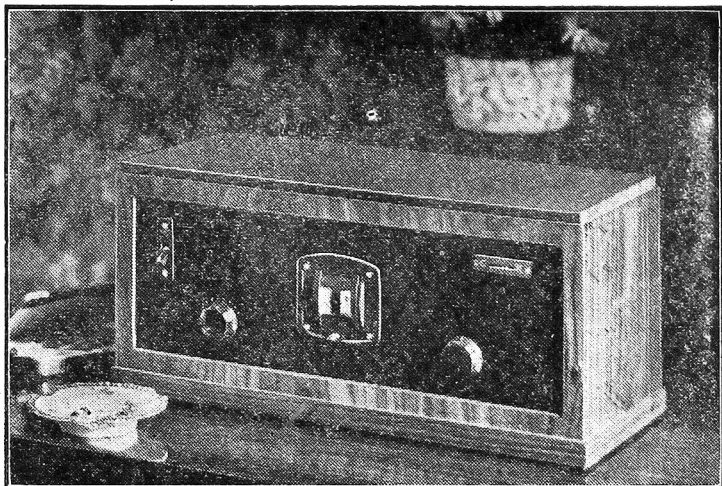
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ALL-ELECTRIC

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### SUCH SIMPLICITY—

You just plug in and listen to the clear, perfectly reproduced voice or sound of any of the best programmes at home or abroad.

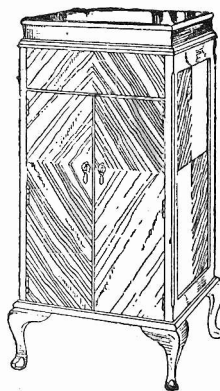
The four valves give power that thrills to handle. First the Screened Grid Valve. Then the detector followed by the first low frequency valve. And, finally, a super power valve, ensuring a surge of pure volume that is amazing in its vivid, exact realism.

The highly selective tuning dial picks out a variety of music with a simplicity that is amazing—then a volume control enough for a concert hall or to a whisper.

The most attractively finished Walnut case is a decoration to any room, and placed on top of the handsome cabinet speaker completes a musical instrument unequalled anywhere at the modest price of £25.

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Hear it demonstrated at our showrooms—then your local dealer can supply.



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M.B.



# MAKING MULTIPLE METERS

The full constructional details of an inexpensive, easy-to-make, triple-range A.C. voltmeter.

By C. P. ALLINSON, A.M.I.E.E., F. Inst. P. Inc.

WHEN I remember my early impecunious days at wireless—long before the war—when I used to see beautifully finished variable condensers, oscillation transformers (as we called them in those days), crystal detectors, and so on, all gleaming resplendently in gold lacquer and mahogany woodwork, I can sympathise with the plaints of the equally impecunious beginner at wireless of to-day.

Since most wireless components are comparatively cheap nowadays, his chief complaint to-day very often is that he cannot afford to buy the various meters that he covets, or, if he can manage to scrape up enough for a couple, there are at least four more that he needs.

Many experimenters have a couple of D.C. meters, but when they start doing some work on all-mains A.C. stuff they find they are stuck, for their meters are useless for testing the A.C. side of a circuit.

I thought, therefore, that a method of making up a cheap A.C. meter would be rather popular, and I had a look round to see what could be done.

## A Compact Meter.

The outcome of this "think" is the compact little three-range A.C. voltmeter you will see illustrated in the photographs.

This meter has a total range of 1 to 1,000 volts. It consists of a 0-10 voltmeter with a switch which multiplies the range by 10 (thus giving 0-100 volts), and next by 100, giving 0-1,000 volts.

It consists of a cheap moving-iron voltmeter, which registers equally on A.C. and D.C., with a couple of series resistances to give the desired higher ranges.

First of all, when purchasing the voltmeter, you want the flush fitting type, and if you ask for the cheapest meter they have

in the shop you will probably get the moving-iron sort.

The great thing to notice is that for D.C. testing the voltmeter has no polarity—i.e. the terminals are not marked + and —, and it does not matter which way round you put it on to the battery you are testing.

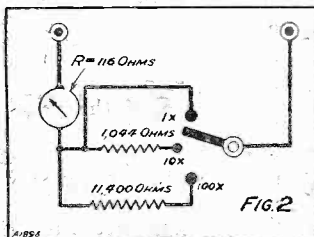
## The First Step.

Provided this condition is observed, the meter will also read on A.C. The range of the meter should be 0-10 volts.

The next thing to do is to find out what the resistance of the meter is. It is doubtful whether, with a cheap meter, the resistance value will be marked on the instrument.

If you have a friend with a resistance bridge he will check it up for you, otherwise you can do it yourself provided you have, or can borrow, a reasonably accurate milliammeter.

## SIMPLE CIRCUIT



You should be able to make the connection easily with the help of this simple circuit diagram.

the voltmeter across a battery of, say, 6 volts, and note the milliammeter reading. Fig. 1 shows how to do this.

Then, if the meter reads 60 milliamperes, for the sake of argument, and the battery voltage is exactly 6 volts, then the resistance of the meter is 100 ohms. Ohm's

$$\text{Law, } C = \frac{E}{R}, \text{ the formula you need to}$$

work the answer out. C is in amperes, E in volts, and R in ohms. Multiply C by 1,000 to give the answer in milliamperes.

## The Two Resistances.

I expect that with a cheap meter you will probably find that the resistance will lie between this value and 200 ohms; I doubt if it will be higher. The one I bought actually had a resistance of 116 ohms.

Now, in order to get the higher ranges you will have to connect resistances in series with the meter. For a 10 X range a resistance nine times as great as that of the meter itself must be used. In the case of my meter, which had a resistance of 116 ohms, a resistance of 1,044 ohms was wanted. For the 100 X range you will need a resistance 99 times as great; in this case it would be 11,400 ohms approximately.

Now, for all practical purposes a resistance of 1,000 ohms would be quite



The completed instrument has a particularly neat appearance, as you can see.

satisfactory in this case and I proceeded to wind one up.

If you buy one, be sure to get a really good, heavy wire-wound resistance, for on the full scale deflection a low resistance meter takes a fairly heavy current—in this case nearly 100 milliamperes—and a cheap resistance will burn out the first time you use the meter on the full scale.

The one I made I checked up on a Wheatstone bridge, and got it exactly the right value.

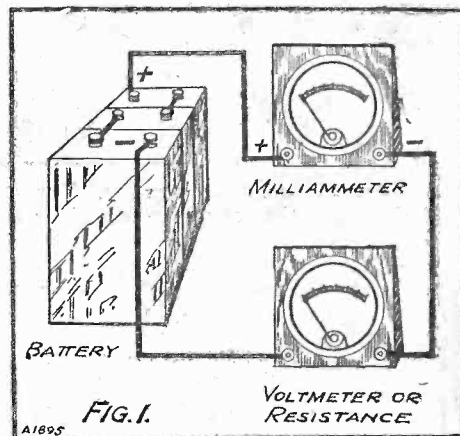
## Necessary Wire.

For those who have no bridge the milliammeter may again be called into action, the resistance being connected in place of the voltmeter in Fig. 1. A resistance of 1,000 ohms will pass 1 milliamp for every volt applied to it. So if you have a 6-volt battery you adjust the resistance till it passes 6 milliamperes. If the battery shows a little over 6 volts, it may just have come off charge, get the current to read just over 6 milliamperes.

The wire to use for this resistance will be not smaller than 38 gauge D.S.C. resistance wire, which has a resistance of about 8 ohms per foot. You will therefore need about 125 feet, which is about 1/2 oz., or perhaps a little more, depending on the insulation covering.

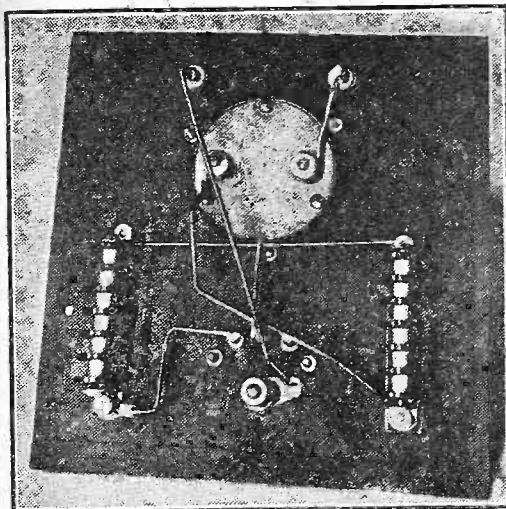
This wire will carry in the neighbourhood of 200 milliamperes at a rise of 100 deg. C., (Continued on next page.)

## A VITAL VALUE



Finding the resistance of the milliammeter.

## THREE RANGES



Although you can measure three ranges of A.C. voltages, the device is far from being complicated or costly.

## PROTECTING THE PANEL.

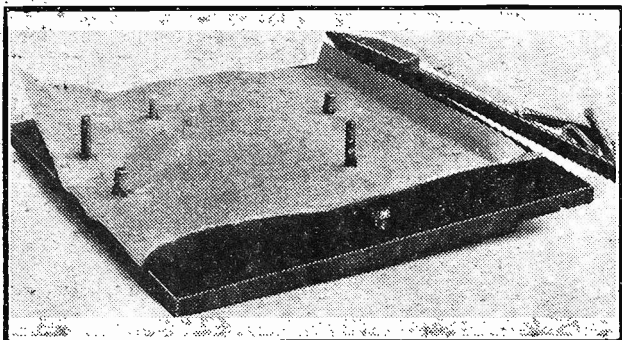
One of those little "brain-waves" that save such a lot of time, and make for tidiness and efficiency.

ONLY the tidiest worker manages to keep traces of solder and flux off the underside of his panel when soldering up the necessary connections, and, alas, we are not all tidy workers!

It is, however, a very simple matter to protect the panel from sundry traces of flux and solder when carrying out soldering operations by the straightforward procedure of placing a sheet of rather thick brown paper over the panel surface in the manner shown in the illustration.

The paper should be pressed down over the terminals, etc., and it should be turned up, more or less, at its edges in order to

### SO EASY TO DO!



A few seconds in putting the paper on, and a further few seconds in pulling it off, and all that dust and flux is kept from the panel.

prevent the escape of solder and flux at the edges of the panel.

On the completion of the soldering operations the paper is merely torn away, revealing a perfectly clean under-panel surface.

#### Simple Precaution.

This is a simple precaution which all constructors should take, for not only do flux and solder set up small leakages when their traces are left adhering to the panel, but the flux, owing to its sticky nature, tends in time to collect dust and grit, thereby increasing still further the possibility of surface leakages.

## MAKING MULTIPLE METERS.

(Continued from previous page.)

and this is its continuous rating. You will therefore see that it will safely carry the 100 milliamps that may be required without the slightest risk of burning out.

For the 11,400-ohm resistance, 11,000 ohms will do in practice. You will either need 11 times as much of the same wire, or, since this will be a little bulky, a finer gauge might be used, unless it is at all likely that it is going to be used a lot at full scale deflection on this range for long periods at a time.

For short tests—and I don't suppose you will want to test on 1,000 volts A.C. very often—a finer gauge can be used, since it will not be carrying the current long enough to heat up. A suitable gauge would be No. 42, with an approximate resistance per foot of 18 ohms. You will therefore need about 600 feet, weighing about 1 oz.

In any case, remember that the above figures are only approximate, as much depends on the actual wire used—whether it is Constantan, Manganin, Ferry, Eureka, etc.—and the weight of the covering. If you are in doubt, check up on the makers' actual figures for the wire they sell.

#### Sectional Bobbins.

The formers to use are purely a matter of convenience. I had some little sectional bobbins that did the job nicely, and I certainly advise the use of a longish bobbin so as to give ample heat radiating surface in case the meter is used constantly for long periods.

The bobbins used, and the method of mounting them between clips will clearly be seen from the photograph taken from the back of the panel. This view also shows the connections quite plainly, and used in conjunction with the circuit diagram in Fig. 2 will enable you to make the connections without the slightest difficulty.

The size of the panel is immaterial. Make it whatever is most convenient. Do put the instrument in a small box, however, since this will protect it; while the lid will be a convenient carrier for test leads. The box I have used was one I had knocking about, and I have no doubt you will be able to buy a suitable little case without difficulty for a small sum, if you haven't got one handy.

When using this meter to test a circuit of whose voltage you are doubtful, start with the switch on the 100 X position—i.e. to the right—so that if it should happen to be a high voltage the meter will be protected. If you get no reading, or a reading that is less than one unit of the scale, turn the switch to the 10 X position and proceed again according to the deflection that you get.

#### Very Useful.

You will find this meter extremely useful.

If you are doubtful whether the mains transformer is giving the heaters the correct voltage on load, use the meter and make sure. If you want to see what the regulation is like you can do so by taking all the valves out and noting the voltage on "no load." Then put them in one at a time, and note the voltage drop on each occasion.

You can also test the output voltage of the secondary winding, and provided that it is not greater than 500-0-500 you can measure across the outers. If it is higher, however, you must test between the centre-

tap, which goes to H.T. — and each outer in turn.

This will also show whether the two halves are identical. Since the meter also reads on D.C. you can then check up the voltage on the other side of the rectifier and carry out many other interesting experiments.

## A WEATHER-PROOF LEAD-IN.

The rain—and not the radio energy—runs away.

IT is of the greatest importance that the lead-in portion of the aerial circuit of a receiver should be maintained continually in as dry a condition as possible.

The photograph below depicts a very simple method of ensuring this condition.

All you require is a glass funnel having a rim-diameter of three or four inches. These articles are procurable at most chemist's shops, and they cost about ninepence each.

Place the funnel over the end of the lead-in tube, threading the lead-in wire through the stem of the funnel, as shown in the illustration. Then seal up the end of the funnel's stem with a blob of Chatterton's compound or sealing wax. The weather-proof lead-in will now be complete.

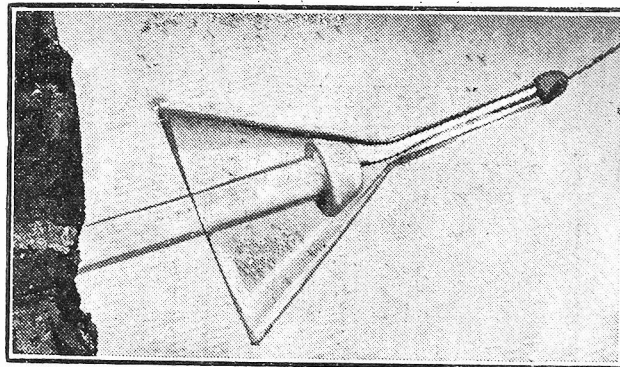
## NOISY RESISTANCES.

Building a set—Increasing selectivity—A soldering hint.

When an anode resistance is noisy do not scrap it before you make sure that the spring contact at the end of it has not worked loose.

When copying a set design take notice of such points as the relative positions of the valve holders and which way the grid and plate sockets face, as these make a great difference to the efficiency of the wiring.

## ALSO KEEPS OFF DUST



Besides protecting the lead-in against rain, you will find that this idea keeps the lead-in partly free from dust (See above).

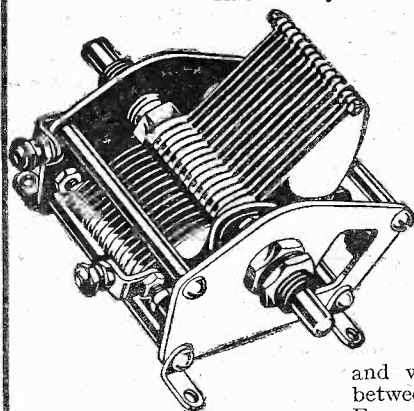
On simple sets troubled with interference a hank of wire of fifteen turns or so tied to the grid coil with cotton, joined to earth at one end and to the aerial lead at the other, often gives sufficient selectivity.

When soldering remember that as little fluxite as possible consistent with a good joint should be used, and as soon as this joint has been made, and while the metal is still hot, the superfluous fluxite should be wiped away.

# REJUVENATE YOUR SET!

The most efficient and economical way of renewing and improving the vitality of your receiver is to fit new modern-type condensers—making sure they are Polar.

Polar Condensers and Controls by their advanced design and wonderfully precise construction put new life into your set.

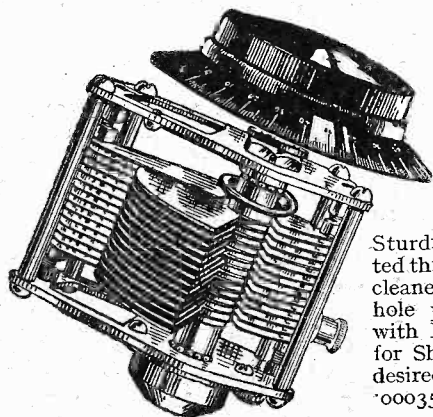


## POLAR "UNIVERSAL"

In addition to being perfectly fitted for normal use, this new condenser is specially adapted for ganging. The condenser is unaffected by the withdrawal of the spindle,

and when ganged the space between each unit can be varied. Four lugs ensure rigid fixing.

Locked rotor vanes. Suitable for right- or left-hand drum control or one-hole panel fixing. '0003, - 7s. '0005, - 7s. 6d. Phosphor-bronze balls 3d. extra.



## POLAR "IDEAL"

Has both Fast and Slow Motion control. Accurate tuning is easily obtained with the smooth yet firm action.

Sturdily built and constructed throughout of chemically cleaned hard brass. One-hole panel fixing. Fitted with Phosphor-Bronze balls for Short Wave working if desired. '0005 - 12s. 6d. '00035 - 12s. 3d. '0003 - 12s.

THE POLAR No. 3 possesses all the excellent qualities of the "Ideal" but is of the direct drive type only. A Slow Motion dial can be fitted if desired, but without this the condenser has a smooth yet precise action. '0003 - 5s. 6d. '00035 - 5s. 7d. '0005 - 5s. 9d. (Dial is extra.)

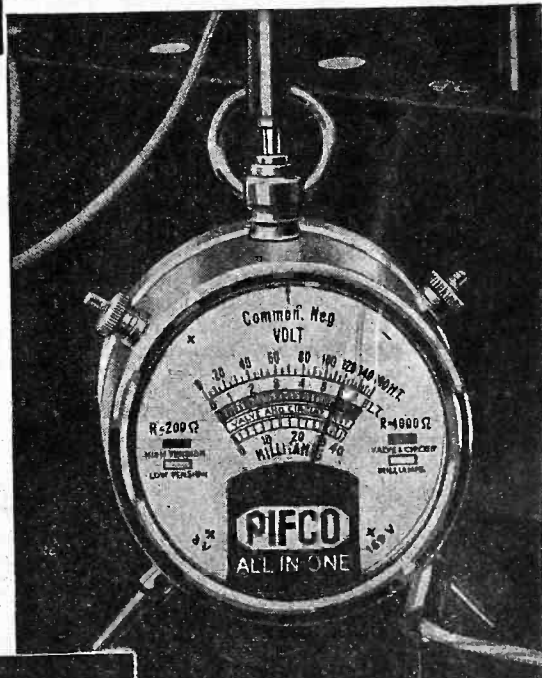
WRITE FOR THE NEW 24-PAGE POLAR CATALOGUE P—FREE.



Wingrove & Rogers, Ltd., 188-9 Strand, London, W.C.2



As Easy To Read As Clock Time!



TESTS VALVES  
FILAMENT · ·  
ANODE & GRID  
COMPONENTS  
AND CIRCUITS  
H.T. AND L.T.  
MILLIAMPS  
*Everything!*

## HAVE YOUR SET 100% EFFICIENT

Have you ever built a set that wouldn't work? Has a mysterious fault in wiring or component eluded your most thorough search? How many hours have you wasted and how many valves have you burnt out when you have

had trouble—how many times have you given up in disgust?

Well, from now on you can say goodbye to all that! The All-in-One Radiometer will test valves components, circuits, batteries, everything—quickly, safely and with absolute certainty.

For 12/6 you can have a wireless expert at your beck and call. You may be a radio fan or the veriest amateur, it matters not a scrap—the All-in-One will help you out. You can be sure of everything before you turn on the juice! The steady readings given on the dial are as easy to follow as the hands on your watch, and the instrument gives perfect accuracy—it has a beautifully finished calibrated mechanism that cannot let you down.

Ask your dealer for our Booklet or write direct to Pifco Ltd., Pifco House, High St., Manchester.

# 12/6

# PIFCO ALL IN ONE RADIOMETER

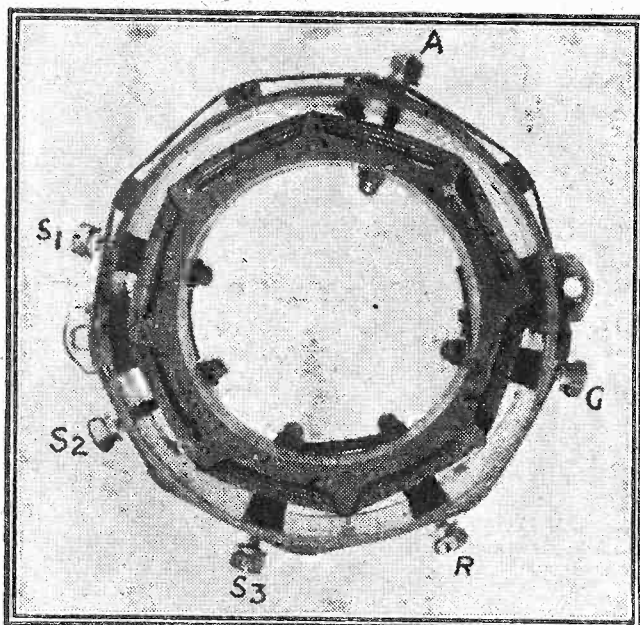




OUR new dual-range coil is going, we believe, to be one of the strongest features of our programme this season. It opens up a prospect of quite a new era of higher efficiency in wave-change

have noticed that certain wiseacres on seeing the unit have observed that since the long-wave winding is fitted quite closely inside the medium-wave one there must surely be heavy losses!

### SEEN FROM ABOVE



This plan view of a finished unit gives many important details. First, note the method of assembly: long brass screws pass right through formers and on being fitted with suitable nuts act as terminals. Secondly, observe carefully the markings of the terminals.

switching circuits than has been attained before, and with much greater simplicity in set construction and wiring.

The latter points are obvious ones, but we should like to stress the question of efficiency considerably. There seems to be something of an idea abroad that dual-range coils are necessarily full of losses, and this we want to dispel.

### No "Dead-End" Losses.

It may be true enough concerning many of the earlier types, but later research has shown how those losses can be cut down well-nigh to vanishing-point. It is now possible to design a dual-range unit which is well up to the standard of the best practical single-range types.

That is a strong statement, but we make it advisedly, for that is exactly what we have done in our new unit. We particularly want to emphasise this point, because we

That would be true if we used one of the older schemes in which the long-wave coil is short-circuited or left to cause "dead-end" losses on medium waves, but we don't. We connect it in parallel with the other winding for medium waves, and thereby wash out the usual losses.

### Very Adaptable.

So much for the efficiency question. The remarkable flexibility and adaptability of the new unit to all sorts of circuits you will see for yourself as the season progresses.

Now for the specification of the unit, so that you may make it up for yourself if you are so inclined. It is not really a difficult job, but, naturally, it is preferable that you should have had a little previous experience of coil construction.

On this page you will find the promised specification and constructional details of the new "P.W." high-efficiency wave-change coil. Designed by the "P.W." RESEARCH DEPARTMENT.

First you want a piece of ribbed former (eight or nine ribs will serve),  $2\frac{1}{2}$  in. long and  $2\frac{1}{2}$  in. in diameter over the ribs. In the ribs you must file a series of eleven slots with the edge of a narrow file, just as was done for the "Contradyne" coil. Slots to be about  $\frac{3}{8}$  in. wide, the full depth of the rib, with a space of about  $\frac{1}{8}$  in. between them (not critical).

This former is thus equipped to carry a slot winding in eleven sections. See lower photo on this page. Ten slots are for the long-wave secondary, and one is for the reaction winding, which serves for both wave-bands.

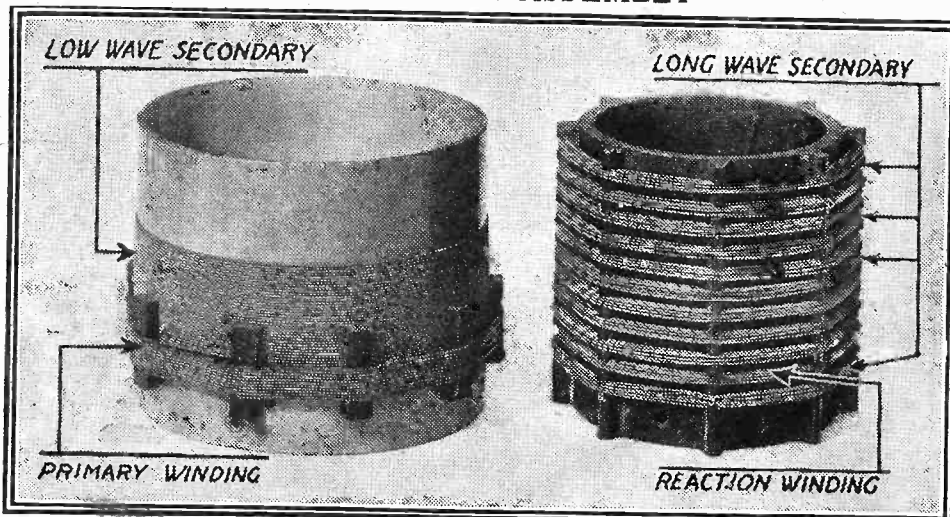
### Winding the Coil.

Now the windings. The reaction one goes in the second slot up from the bottom. Thirty turns of a fairly fine gauge, such as No. 30 D.S.C. wire.

The long-wave secondary consists of 25 turns in each of the ten slots, making 250 in all, of No. 26 D.S.C. Start at the bottom,

(Continued on page 250.)

### READY FOR ASSEMBLY



Here you see the outer and inner formers wound and ready for fitting together. Note particularly the position of the windings on the inner former in relation to those on the outer tube.

EVERYTHING

The  
**G.E.C.**  
your guarantee

ELECTRICAL

# Make the set that has made a nation wonder!

Stations 'romp' in  
owing to two specially  
sensitive Screen Grid  
Radio Frequency  
Amplifiers

Super sensitive  
detector stage passes  
on undistorted signals  
to audio frequency  
amplifier

Practically  
straight-line  
power amplification  
gives pure music  
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IN  
ENGLAND

One dial  
gang  
condenser  
tunes 3  
circuits

One knob  
switches  
all  
circuits  
to high  
or low  
wavelengths

## Osram MUSIC 4 MAGNET

You assemble the various parts of the "OSRAM MUSIC MAGNET 4" with the greatest ease directed step-by-step by a full size constructor's Instruction Chart. The best results are certain of attainment. You will be thrilled at the mighty power of this set (and yet it can whisper), its immense range and perfect purity and fidelity.

### SPECIAL FEATURES

- 1 The two Screen Grid Stages give extreme selectivity and sensitivity with an unrivalled range.
- 2 Enormous amplification with perfect stability is given by the complete shielding of H.F. Circuits.
- 3 Equal efficiency guaranteed on both wave length bands.
- 4 Change of wave length is effected by an external switch and the set need not therefore be opened.
- 5 Maximum ease in tuning with a single knob controlling triple gang condenser.
- 6 Assembly is the essence of simplicity.
- 7 Volume control is provided not only to act as such, but to procure extreme selectivity.

**HIRE PURCHASE TERMS.** You can either buy your "OSRAM MUSIC MAGNET 4" for cash or on these attractive HIRE PURCHASE terms: £1.3.6 deposit and 12 monthly payments of 18/6.

Sold by all Wireless Dealers.

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OSRAM VALVES  
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The "Osram Music Magnet 4"  
Instruction Chart  
The General Electric Co. Ltd.  
Magnet House,  
Kingsway, London  
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P.W.

Cut out coupon and paste on postcard or enclose in unsealed envelope. Halfpenny postage in either case.

**THE SET THAT BRINGS THE  
CONTINENT TO THE BRITISH ISLES**

Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2



# MY IDEAL CHILDREN'S HOUR



**"COLUMBUS,"** the Director of the Children's Hour, says "It would be as dangerous to generalise on the subject of children's tastes as it would be to generalise on the tastes of their elders."

Maybe; well, here are the opinions of some well-known radio folk on this important hour in the day's programme.

**CLAPHAM AND DWYER:** "Columbus," the Aunts and all the other personalities of the Children's Hour deserve all the laurels they can get (provided that the prickly bits of the laurels don't stick in them!) for it's not honey or easy money trying to be funny to the kiddies.

By Clapham & Dwyer, Vivian Foster, Rev. B. G. Bouchier, M.A., Leonard Henry, De Groot, Maurice Cole and Gracie Fields.

Bless their little hearts, they need wireless just as much as the grown-ups, and they get it—what with broadcast school lessons and a whole hour devoted to them. And what hard work it is compiling that hour!

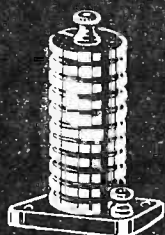
Nobody seems to know just what children want; that's the trouble. Critics write to Savoy Hill and say: "Your Children's Hour

is highly dangerous! I listened to it last night with my twins, and tried to think, myself, as a child would think. The result is that I am thoroughly shocked at the sophisticated stuff you put out."

But how can a mummy or a daddy think as a child thinks? One who tries to think as a child usually ends up by just thinking simple. That gets us nowhere. Children don't think simple!

Other fond parents write in this style: "How SWEET of you to broadcast for the DEAR little kiddies. But why don't you tell more FAIRY stories? I'm SURE every teeny-weeny little one wants to hear tales like THAT."

(Continued on page 246.)



**4/6 READI-RAD  
HILO "HILO"**

**H.F. CHOKE**

A real "de-luxe" H.F. Choke specified time after time by the most famous designers of the British Technical Press. Used by all discriminating constructors. High inductance; extremely low self-capacity. Efficient over tuning range of 10 to 2,000 metres. Solid ebonite hand-turned former, on bakelite base, designed to take up minimum base-board space.

Price 4/6.

## BUILD THROUGHOUT WITH READI-RAD COMPONENTS

There is no need to pay fancy prices in order to obtain good components. Readi-Rad Components are low in price because the designers have concentrated on obtaining the highest efficiency with the utmost simplicity of construction. The fact that 7 out of 11 set-builders use Readi-Rad Components is proof of their high merit and their lasting reliability.

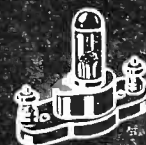
SEND NOW FOR ILLUSTRATED LISTS.

*Ready Radio*

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Telephone: HOP 5555 (Private Exchange) Telegrams: READIRAD, SEDIST.

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**READI-RAD 1/3  
FUSE**

An essential component in every receiver. Protects your valves from damage due to accidental wrong connections of battery leads. Rated to blow at 100 m/a. Bakelite moulded base of particularly small dimensions and neat design. Easily fitted on baseboard with accessible terminals.

Price: Holder 9d.

Bulb 6d.

Spare Bulbs, 6d. each.



On Sale TOMORROW!

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at the NEW PRICE

**6<sup>D</sup>.**

HERE is a magazine of the highest quality at a price within the reach of every purse—a magazine that everybody has been waiting for! The LONDON at 6d. is big; it is bright; it is full of attractive stories, articles and illustrations, all by authors and artists of world-wide reputation. If you want to make certain of the NEW LONDON you should order your copy at once. Here are some of the good things you will find in this issue:

## FREE Flower Painting

By H. Davis Richter, R.B.A., R.O.I.

Exactly like a real oil painting.

Splendid features from such well-known contributors as:

MICHAEL ARLEN, RITA WEIMAN,

GILBERT FRANKAU

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How I Decorated My House for £25

The Rise of Maurice Chevalier

The Care of Clothes

The Glory of Glass

On Sale  
Friday,  
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**6<sup>D</sup>.**

The  
New  
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# Varley — THE TALK OF OLYMPIA!



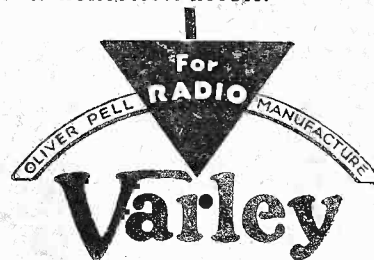
The sensation of the Radio Exhibition. Everywhere the Varley All-Electric Radio-Gramophone is being discussed. Never before has such perfection been attained. Clear treble and powerful bass, each note vibrant with life. Low organ notes that you *feel* rather than hear. Music with the freshness, the crispness, the vitality of the real thing. Varley All-Electric Radio-Gramophone (A.C. or D.C.).

Price 85 guineas.

Available on hire purchase terms.

Arrange for a demonstration.

Write for Section A of Varley Catalogue for full particulars of Varley All-Electric Radio-Gramophones and Receivers.



Advertisement of Oliver Pell Control Ltd., Kingsway House, 103, Kingsway, London, W.C.2. Telephone: Holborn 5303.

## MY IDEAL CHILDREN'S HOUR.

(Continued from page 244.)

But do they? Nowadays children seem to prefer Jules Verne to Hans Andersen. And—so we fervently hope and trust—they prefer funny things like Cissie the Cow to tales of Cissie the Silver Fairy.

### The "VICAR OF MIRTH."



Vivian Foster, the famous  
"Vicar of Mirth."

about them! Sort of "A. J. Alan-for-the-young" stuff!

**VIVIAN FOSTER** ("The Vicar of Mirth"): I would include an entire novelty—that of the broadcaster asking questions

in a humorous manner, and the listening kiddies answering as though he were actually in the room. It would be "playing at school."

It would lead to much fun, for anyone could reply, seriously or jokingly, raising a merry atmosphere around the loud speaker.

I think that the title ought to be "Mirth Minutes."

Each day a motto would reign, but in a funny way. "Make Hay while the sun shines" would be "Grasp opportunity—not nettles!" The "nettles" would for ever fix the "opportunity." And so on.

Every afternoon there would be a fight, with some mock subject chosen to get a knock-out—a bit of bad grammar, for example, or the mis-spelling of a word. Great fun!

### All Very Jolly!

Then would follow amusing questions on almost any subject under the sun. The children could write their answers on slips of paper, and in the following day's "Mirth Minutes" the correct answers would be given, and could be checked.

At home any kind-hearted uncle could be induced to offer a prize for the best results of so many "Mirth Minutes."

It would be all very jolly. Yes, I think so!

**LEONARD HENRY**: You know, I've never actually broadcast in a Children's Hour (for which I'm truly thankful), so you can take what I say with a grain of salt!

I guess the personality required of a radio "Uncle" must be really great. During my first week of radio I was asked to introduce newcomers to the microphone, and make them feel at home.

I have, therefore, a horrid fear that the B.B.C. Staff are not so simple as they look!

Besides, I'm not so sure that I get on well with the children. Only the other day I met a friend in the street with a chirpy youngster running round her.

"Well, Mrs. X," I said. "And I suppose (this is your little boy?)"

"Who the blazes did you think I was—her husband?" asked the very modern youngster.

And then, again, some of the Children's Hours do not introduce a feeling of Peace. One of the broadcasters, who has a little boy of his own, had to punish him one day.

"My boy," he said, "I understand that for no apparent reason you threw a stone at little Jimmy next door. Why did you do this?"

"Well," replied the boy logically, "afterwards—he hit me!"

(Continued on page 248.)

### "UNCLE LEONARD"



One of our most popular broadcast comedians—Leonard Henry.

### DUAL RANGE TUNER (W.G.2)

Single-Hole fitting Inductance covering Broadcast and Daven-try Bands. The short-wave section is single-layer wound and the long-wave portion section wound to avoid losses due to self-capacity in winding. Changing from long to short band is operated by a small knob on top of dial. Dimensions 3 1/2" deep x 3 1/2" x 3".

Price **15/-**

## FOR ALL CIRCUITS

IN

"POPULAR WIRELESS"

### An entirely new L.F. COUPLING UNIT

Something really new for your set—an addition which will make a remarkable difference to your reproduction.

Complete with Switch for Tone Control

**20/-**

### QUICK MAKE-&-BREAK SWITCHES

Supplied in Single and Double Pole Make-&-Break Change-over—with delayed action for indirectly heated valves.

Prices from **1/9 to 3/-**

OBTAINABLE in LEVER and ROTARY TYPES.

### TRANSFORMERS MAINS

An extensive range designed for use on all H.T. Supply Units.

Prices from

**25/-**

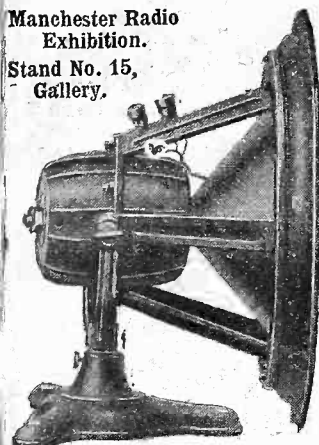
SPECIAL DESIGN FOR "ORGOLA" H.T. SUPPLY UNIT **30/-**

# WEARITE COMPONENTS

SEND FOR NEW ILLUSTRATED LIST.  
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# The SQUIRE SYLPHONE

Manchester Radio  
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Stand No. 15,  
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*THE* new Squire Moving Coil Speaker; it incorporates laterally supported diaphragm with free edge—increased concentrated field—no field leakage—no air-damping of moving coil—vibrationless moving coil—full efficiency over complete audio-frequency range and many other new scientific features.

The maximum advance in quality of reproduction has been made in this speaker.

Ask your dealer to  
let you hear one.

FREDERICK SQUIRE, LTD.,

LESWIN PLACE, STOKE NEWINGTON, N.16  
TELEPHONE: CLISSOLD 0334. M.C.6

## YOU CAN BUILD THIS H.T. ELIMINATOR in less than 2 HOURS

WITH a screwdriver and a pair of pliers this efficient Stal H.T. Eliminator can be built in less than two hours and at a saving of over 40%. There is no soldering, no dirt, no mess—you can build it in the drawing room. The Stal kit of parts comes to you complete (except for the rectifying valve) with full and explicit instructions and illustrations which make the building so easy you can't go wrong.

Why then bother about all-electric sets, few of which are yet fully efficient, when you can make your present tried and trusted set into an all-electric by using this economical Eliminator for your H.T. and by fixing a Stal Charger (costing only 17/6) to your accumulator for a constant L.T. supply?

Write for full particulars.



**NOTE.** If you do not wish to build up the Stal Eliminator yourself, your dealer will be glad to do it for a small charge and you will still make a very substantial saving.

### A.C. H.T. JUNIOR KIT.

Output, 140 volts, 20 m/a, 1 variable tapping.

Plus 9/6 for Triotron G.N.14 rectifying valve. **42/-**

**Senior Kit,** output 175 volts, 40/50 m/a, 3 variable tapings. 60/- plus 12/- for Triotron G.A.24 rectifying valve.

## INSPIRED LEADERSHIP!

**PRESCIENCE**  
**EPITOMISED INGENUITY**  
**PERFECT BALANCE**  
**EXQUISITE CRAFTSMANSHIP**

**PRECISION**  
**METICULOUS ACCURACY**  
**EXCEPTIONAL MERIT**  
**THE QUINTESSENCE OF EFFICIENCY**

**FOR ALL CONDENSERS**

**VERNIER DIAL**  
Easy reading. Smooth action. Metallic continuity. No crackle.

Cap. 00015

**MID LOS LINE CONDENSER**  
The lightest, lowest loss & most efficient Condenser extant.  
Capacities:  
0005  
00035  
00025  
00015

**HIGH VOLTAGE CONDENSER**  
Higher test, lower loss, great longevity. Caps. mid. 2 1/2 1/3 1/4 1/5 1/6

Bakelite cased 600 volt test mains Condenser.

Prices 3/- 2/2 2/- 1/9 1/6

**MICA CONDENSER**  
Loc. v.o.t. test. Bakelite and Mica.

Caps.	Prices
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0002	7d.
0003	8d.
0005	10d.
001	
002	

**COMPRESSION TYPE CONDENSER**  
A great little variable compression type condenser.

F 0001 } 1/6  
J 0003 }  
G 001 }  
H 002 } 2/3

**DRUM DIAL CONDENSER**  
A truly phenomenal illuminated drum dial with trimmer control.

Drum dial, 8/6 with one Condenser, 13/- with two, 12/6

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**CATALOGUE FREE. GERRARD 1863. GOLDEN SQ. PICCADILLY CIRCUS, LONDON.**

7 of our 35 Lines

C.H.S.



## MY IDEAL CHILDREN'S HOUR

(Continued from page 246).

**REV. B. G. BOURCHIER, M.A.:** The Children's Hour does not always last an hour. It has nothing like the great listening audience possessed by the normal evening programmes. Yet it is one of the most important B.B.C. features.

It brings new life into the limited life of a child, and it teaches the coming generation to appreciate the marvel of radio, and the power of the microphone.

### "MOST IMPORTANT"



The Rev. B. G. Bouchier, M.A., considers the Children's Hour a most important feature of the programmes.

My candid opinion is that the Hour should not be given over entirely to merriment. Educational items should be subtly introduced. Opportunities should be seized during the Hour to educate even when not appearing to do so.

There is a feeling that if kiddies are not treated in the "old-fashioned" way—that is, with plenty of Grimm, Lewis Carroll and

so on, they will become sophisticated. Some parent listeners to the Hour deplore

the frequent broadcasting of mystery yarns with fairly technical details, high-class orchestral selections, and modern poetry. They say that such things are above the heads of children, and if they aren't, then they ought to be!

Do they forget that the world is growing older? *What suited us as children won't suit our children, either in school or on the wireless.* A modern child who talks about television is no more sophisticated than was a child of our day who talked about the telephone.

**DE GROOT:** Music should be the keynote of the Children's Hour. The ages of the children who listen-in during this feature range, I should think, from four or five to fourteen or fifteen.

There is only one short period each day available; it must be after school and before going to bed.

So, you see, it is almost impossible to find items which will appeal at the same time to children of all ages.

Stories and fairy tales won't do. They are puzzling to the toddlers, and are scoffed at by the elder children.

The only thing which has a universal appeal is music.

## MUST HAVE MUSIC



"Music is the only thing with a universal appeal to all ages," says De Groot, the famous violinist.

**MAURICE COLE:** Really I have no suggestions as to how the Children's Hour should be run. I have merely gone to the studio and listened (or otherwise!) to the rest of the programme, and played my items!

In the early days I was called "Uncle Maurice," and I announced the titles of my pieces. But since the B.B.C. became a Corporation this has not been allowed!

**MISS GRACIE FIELDS:** As a kiddie I used to hate doubtless well-meaning folk who spoke of "girlie" instead of girl, and "houseie" instead of house.

Therefore my Hour wouldn't have in it any of that bosh which brings down the level of intellect.

Children do like listening to other children and envying their position at the microphone.

Therefore the idea of having simple competitions and allowing the successful kiddies to broadcast is an excellent one, though I don't believe it has been done for a long time.

Verb sap!

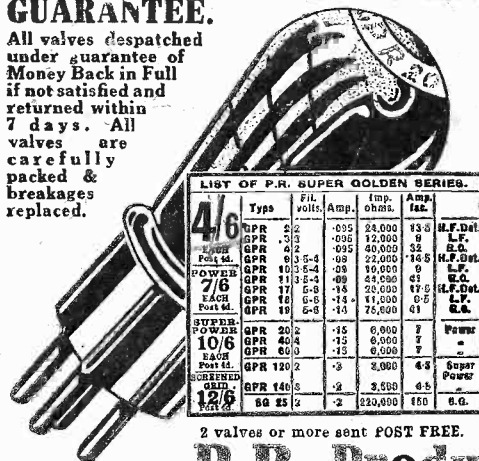
### "UNCLE" MAURICE



Maurice Cole, the celebrated pianist, has no suggestions to improve the B.B.C. Children's Hour.

## GUARANTEE.

All valves despatched under guarantee of Money Back in Full if not satisfied and returned within 7 days. All valves are carefully packed & breakages replaced.



2 valves or more sent POST FREE.

**P.R. Products** (Dept. P.) P.R. HOUSE, 14, NEWGATE STREET, LONDON, E.C.4 (Opposite G.P.O. Tube Station.)

# THE GOLDEN P.R. VALVE

## SUPREME IN TONE, SELECTIVITY AND MIGHTY VOLUME

Don't run away with the idea that because a valve is expensive it must be good. There is just as much scientific thought—just as much careful workmanship in the Golden P.R. Valve as there is in the highest-priced valve of any make, and it is covered with a written guarantee of life and efficiency. Until you have tried a Golden P.R. you do not know what you have missed in tone, selectivity and mighty volume; and you save a fine sum, too.

## THE LOWEST PRICED RELIABLE BRITISH VALVE ON THE MARKET

Send for one to-day or ask your dealer—you will be astonished at the excellent results. That is because we keep up-to-date, constantly improving the emission and strengthening the filament. Remember, that you can get 2 Golden P.R. Valves for the price of one standard British valve. Why waste money?

## The Best, Most Economical and the CHEAPEST.

Matched Valves 1/- extra per set.

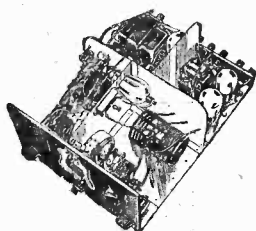
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One-knob control—Illuminated dial—Gramophone pick-up—Automatic grid bias—Simple selectivity adjustment. No soldering—A screw-driver and pliers is all you require—Panels and screens drilled. Full size **£9-10-0**

This highly efficient all-mains Receiver is unique in many respects. Simple to build—simple to operate—it has truly remarkable selectivity, sensitivity and purity of reproduction.

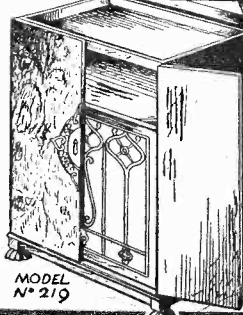
It is not only selective enough to entirely separate the twin stations when these are but 5 miles away, but will bring in at moving coil strength all the principle European stations.

Write for particulars. From your dealer or direct from

**THE WHOLESALE WIRELESS CO.,** 103, Farringdon Road, LONDON, E.C.1. Phone: Clerkenwell 5312.

## 12 Guinea WIRELESS CABINET for £3

JUST ASSEMBLE IT YOURSELF THE "OSBORN" WAY THAT'S ALL



No. 219 A Radio or Radio Gramophone Cabinet. 3' 9" high, 2' 2" wide, and 1' 6" deep. The battery and loud speaker compartments are at the bottom and are partitioned off. Size of the baffle behind the fret is 24" x 24". Metal fabric for the fret front is included. Opening at the top and back. This cabinet will take a panel 2 ft. x 9 ins. or smaller.

Ready to Assemble: Mahogany 70/- Walnut 80/-

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STAND Nos. 166 & 167. NORTH LONDON EXHIBITION, ALEXANDRA PALACE, Oct. 15th-26th.

## THE SET DEPENDS UPON THE TRANSFORMER



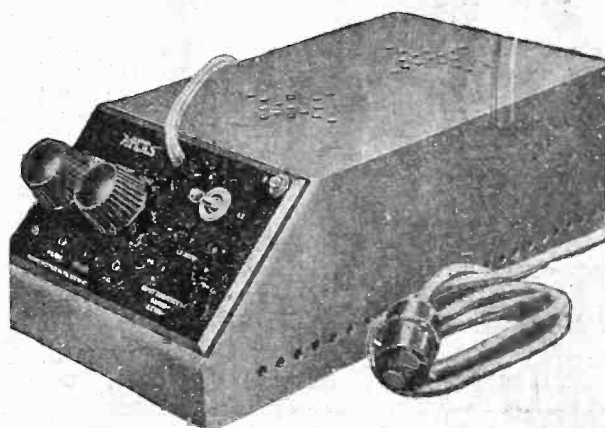
A marvel of production in L.F. Transformer design. The quality of material and workmanship guarantees results which might be envied by transformers costing three times as much.

Ratio 3½ to 1, Price 6/6. 7-1 Ratio model, 12/6.  
From all dealers of repute or direct from the manufacturers.

# BRITISH GENERAL

British General Manufacturing Co., Ltd.,  
BROCKLEY WORKS, LONDON, S.E.4

## THIS AMAZING ALL-MAINS UNIT ECLIPSES EVERY OTHER . . .



## MAKE ANY SET ALL-MAINS —PORTABLE OR STANDARD

### PRICE

**£6-0-0**

### CASH

or 10/- down and the balance in 7 monthly instalments of 15/6 each and one of 14/6.

Experts agree that this combined Eliminator and Trickle Charger is the most outstanding Mains Unit of all time. It is as simple to use and as compact as an H.T. Battery and every bit as safe.

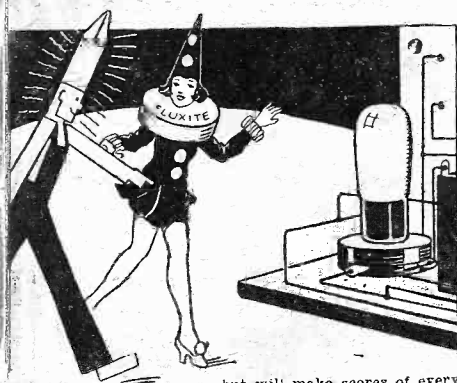
It is especially suitable for providing the conveniences and economy of All-Mains Radio with such sets as the Mullard "Orgola" the Osram "Music Magnet" and the Cossor "Melody Maker."

ASK YOUR DEALER OR WRITE TO MAKERS FOR FOLDER No. 55.

There are two variable tappings of 0/100 and 0/120 volts respectively, and one fixed of 150 volts. Output 25 m/A at 150 volts—the highest of any unit designed for portables. The Trickle Charger caters for 2-, 4- and 6-volt L.T. Accumulators, incorporates the Westinghouse Metal Rectifier and is guaranteed for 12 months.

## "CLARKE'S" ATLAS MAINS UNITS

H. CLARKE & CO. (M/CR), LTD., OLD TRAFFORD, MANCHESTER



"We're Fluxite and Solder—  
The reliable pair,  
Famous for Soldering,  
Known everywhere!  
If you're fixing up

Wireless  
There's no need to fret,  
Let US join the  
connections—  
Then Perfection you'll  
get!

See that Fluxite and Solder are always by you—in the house, workshop, garage—anywhere where simple, speedy soldering is needed. They cost so little

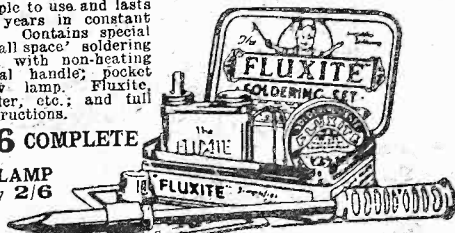
but will make scores of everyday articles last years longer! For Pots, Pans, Silver and Brassware; RADIO: odd jobs in the garage—there's always something useful for Fluxite and Solder to do.

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Simple to use and lasts for years in constant use. Contains special 'small space' soldering iron with non-heating metal handle; pocket blow lamp; Fluxite Solder, etc.; and full instructions.

**7/6 COMPLETE**

or LAMP only 2/6



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All Hardware and Ironmongery Stores sell Fluxite, in tins, 8d. 1/4 and 2/8

ALL MECHANICS WILL HAVE

# FLUXITE

—IT SIMPLIFIES ALL SOLDERING

## THE NEW "P.W." COIL.

(Continued from page 242.)

put 25 turns in first slot, miss over the second slot, leaving it empty for the reaction winding, and continue in third slot, and so on up to the top.

Now the reaction coil. The direction of this is vital. The starting end is to be joined to the lower end of the large winding, and it is then to carry on as though it were a continuation of the latter. Imagine that

## NEXT WEEK.

## Another GREAT GIFT Number

ORDER YOUR COPY NOW

Price 3d. as usual.

the large coil had finished at the bottom, then carry on the reaction winding as though it were the same winding having another section added in a continuing direction.

The outer former is  $2\frac{1}{2}$  in. long and 3 in. in diameter, and is of Pirtoid or other good material. Low-wave secondary has 48 turns of No. 24 D.S.C., in the same direction as the long-wave secondary. Supported above the lower end of this on eight or nine ebonite spacers (about  $\frac{3}{16}$  in.  $\times$   $\frac{1}{4}$  in.  $\times$   $\frac{3}{4}$  in.) is the primary, containing 12 turns of the same wire in the same direction.

Important: Lower edge of primary to come over lower edge of low-wave secondary, which in turn is to come over lowest slot in low-wave former.

## Connecting Up the Windings.

Next, the connections: Top ends of both secondaries go together to "G." Top end of primary to "A," lower end to "S<sub>1</sub>." Lower end of low-wave secondary to "S<sub>2</sub>." Lower end of long-wave secondary and start of reaction to "S<sub>3</sub>." Finish of reaction to "R."

Method of Assembly: Six lin. brass screws passed outwards through both formers. Positioning can be done with nuts or ebonite washers (cut from small tubing) between formers. Double nuts on outer ends to serve as terminals, preferably with soldering tags. All to be placed round lower edge of formers, in positions shown.

Mounting in sets: Small brass brackets attached at the bottom, or a wooden cross-piece fitted inside ribbed former. Screws downwards through cross-piece into base-board of set.

## RADIOTORIAL.

All Editorial communications to be addressed to the Editor, POPULAR WIRELESS, Tallis House, Tallis Street, London, E.C. 4.

The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All inquiries concerning advertising rates, etc., to be addressed to the Sole Agents, Messrs. John H. Lile, Ltd., 4, Ludgate Circus, London, E.C. 4.

The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

## QUESTIONS AND ANSWERS.

## SWITCHING OFF H.T.

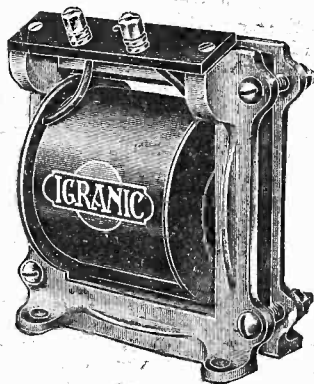
Arising out of a query from a Devonshire correspondent, which was answered in "P.W." No. 432, September 13th issue, a number of letters have been received dealing with the switching off of H.T. with an ordinary make-and-break switch, in such a way that the possibility of danger from an H.T. short across the filament is prevented.

The reply in "P.W." named above stated: "With the ordinary on-off switch no matter how you connect the L.T. leads it is impossible definitely to break both circuits. (Apart from the fact that when the L.T. circuit is broken

(Continued on page 252.)

# NEW IGRANIC Components

## IGRANIC CHOKES



IGRANIC CHOKE

The new range of Chokes includes the following sizes:—

**TYPE C. 15.** Has a constant inductance of 20 henries with polarising currents up to 15 milliamps. D.C. Resistance 1,000 ohms.

**TYPE C. 30.** Has a constant inductance of 20 henries with polarising currents up to 30 milliamps. D.C. Resistance 500 ohms. Specially suitable for use as a Smoothing Choke in H.T. Supply Units.

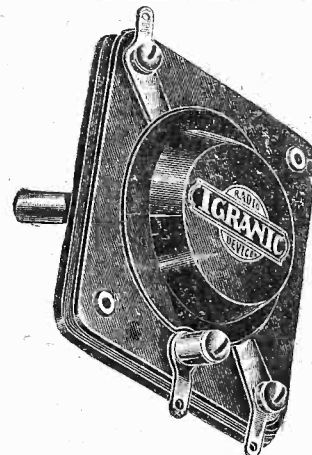
**TYPE C. 60.** Has a constant inductance of 20 henries with polarising currents up to 60 milliamps. D.C. Resistance 340 ohms.

**TYPE C. 150.** Has a constant inductance of 20 henries with polarising currents up to 150 milliamps. Resistance 20 ohms.

Write for a copy of our new Catalogue to Dept. R. 162.



IGRANIC CHOKE	
TYPE C. 15.	PRICE 10/6
" C. 30.	" 15/6
" C. 60.	" 21/-
" C. 150.	" 45/-



IGRANIC DIFFERENTIAL CONDENSER

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CONDENSER

CAPACITY .00115 mfd. ON EACH SIDE

PRICE . . . 3/9





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good item  
on any  
programme

*Player's  
please*

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Tobacco that Counts

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To get the best out of that "P.W." set of yours you should make a special point of reading MODERN WIRELESS every month. Among its exclusive features is:—

## THE WORLD'S PROGRAMMES

which tells all about those foreigners—how, when and where to hear them. Another special "M.W." series is entitled—

## RECENT RECORD RELEASES

and this recognises a selection of current gramophone records chosen by experts as being particularly suitable for home pick-up reproduction.

## MODERN WIRELESS

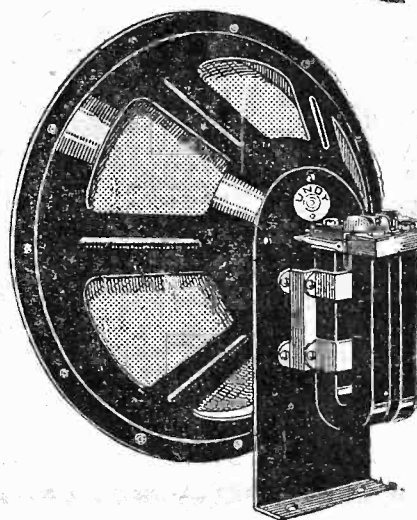
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IN LOUD SPEAKER UNITS

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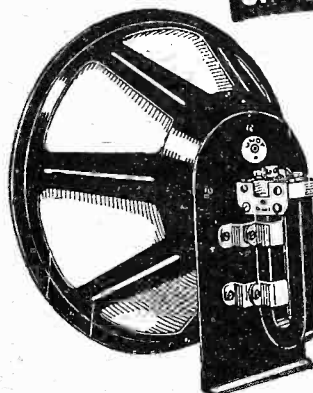


Undy 8 pole Dynamic now on top of all modern loud speakers by marvellous new design, the speaker for the smallest set and the great amplifier, known the world over in a few weeks since introduction.

# UNDY 4 POLE

8 pole's younger brother!

A New Marvellous Design  
of the famous Undy-Laboratory



35%  
INCLUDING  
CHASSIS

18%  
UNIT ONLY

The Undy 4 pole, the new ingenious design by the inventor of the Undy 8 pole. This loud speaker will give full satisfaction on the ordinary small set or amplifier—its extreme sensitivity, amazing volume and perfect reproduction is unbeaten by any moving-coil speaker.

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OBTAINABLE FROM YOUR WIRELESS SHOP  
Ask for Demonstration!

# The Easy Way TO PERFECT RADIO

Offer you Every Known Radio Receiver or Component on

## EASY TERMS WITH SERVICE AFTER SALES

The following list is merely representative, and we ask you to fill in the coupon below or send us a list of your requirements.

SEND 1931 EMPIRE MELODY MAKER KIT. 10/- 1931 Model, S.G., Detector and Power.	Balance in 11 month-ly payments of	12/6
ONLY Cash £6:17:6		
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Important Note: All above Kit prices include valves and cabinet.

### THIS WEEK'S SPECIAL! THE ADAPTARAM.

SEND The instrument which con- verts your existing radio 39/6 receiver into a modern radio ONLY gramophone. Garrard gramophone motor, B.T.H.	Balance in 11 month-ly payments of	20/-
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Pick-up and tone arm, and Frost Volume Control included. Takes any set up to a panel size 21" x 8", or baseboard depth 16". Cash price £11:19:6

SEND EXIDE 120 volt WH. 8/6 Type Accumulator in ONLY Crates.	Balance in 11 month-ly payments of	8/6
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SEND REGENTINE W.5 Combined H.T. Eliminator and Trickle Charger, 1 S.G.	Balance in 11 month-ly payments of	10/9
10/9 1 Variable and one fixed ONLY tapping for H.T., L.T., charging for 2, 4 and 6 volts. For A.C. Mains.	Balance in 11 month-ly payments of	10/9
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SEND EKCO 3F.20 H.T. Eliminator, 20m/A. 7/4 Tappings for S.G. 60 volts, and 120/150 volts. For A.C. ONLY Mains.	Balance in 11 month-ly payments of	7/9
Cash price £3:19:6		
SEND CHELSTON D.12 LOUD 9/2 SPEAKER. An en- tirely new model in oak. ONLY Cash price £5:0:0	Balance in 11 month-ly payments of	9/2

SEND ULTRA MODEL U.99 LOUD SPEAKER. Incorporating 14" x 14" 8/3 Double Linen Diaphragm Air ONLY Chrome Chassis, in oak or mahogany cabinet.	Balance in 11 month-ly payments of	8/3
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SEND FARRAND INDUCTOR SPEAKER for perfect reproduction. 6/5 Unit and Chassis complete, ready mounted.	Balance in 11 month-ly payments of	6/5
ONLY Cash price £3:10:0		
SEND EPOCH Permanent Mag- 8/3 net Speaker, Type B-4.	Balance in 11 month-ly payments of	8/3
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PLEASE SEND ME Your famous Easy Way Catalogue by return of post.

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P.W. 11/10/30.

## RADIOTORIAL QUESTIONS AND ANSWERS.

(Continued from page 250.)

the cessation of the filament current automatically cuts off the high tension.) If you require to break the actual lead from the high-tension battery as well as that from the low-tension battery, you require THREE contacts. . . etc."

This statement has been widely doubted and several readers have sent in diagrams showing exactly how ordinary on-off switches have been arranged in their own sets.

In all the diagrams submitted the same effect occurs. The H.T.+ of the battery is left connected to the H.T.+ on the set and to the plate wiring, etc., H.T.— is left connected to the H.T.— terminal and to the L.T.—, and the switch is so placed that it breaks the contact between these two points and the earth, filaments, etc.

It is then supposed that the filaments are in this way protected when the switch is "off," but a little consideration will show that this is not the case.

Why not? Because an L.T. battery of very low resistance remains connected to the L.T. terminals in practically all cases, the other side of this battery being connected to the L.T.+ terminal and to the filaments. The

### HOW IS THE SET GOING NOW?

Perhaps some mysterious noise has appeared, and is spoiling your radio reception?—Or one of the batteries seems to run down much faster than formerly?—Or you want a Blue Print?

Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers an unrivalled service.

Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do. On receipt of this, an Application Form will be sent to you free and post free immediately. This application will place you under no obligation whatever, but having the form, you will know exactly what information we require to have before us in order to solve your problems.

**LONDON READERS PLEASE NOTE:** Inquiries should NOT be made by phone or in person at Fleetway House or Tallis House.

switch in fact is bridged or "paralleled" by this battery in series with the filaments, and consequently it offers not the slightest protection against an H.T. short, unless the L.T. battery is disconnected from the set, which in the ordinary way is never done!

To break the actual lead from the high-tension battery negative, as well as that from the low-tension battery, requires a three-contact switch of the type to which three wires may be joined, all of which are disconnected from each other when switched off, and all joined together when the switch is on.

With this kind of switch the H.T.— wire is taken to one terminal and the remaining two terminals are joined to the two sides of the filament circuit in the ordinary way. When the switch is "open" L.T. is really disconnected from both sides of the filament, and these are disconnected from each other. When closed both the circuits are completed ready for reception.

### THE "STAR-TURN SELECTOR" FOUR.

F. L. (Birchington-on-Sea), "OLYMPIA," and OTHERS.— "What are the windings, etc., for the Selector coil in the 'Star-Turn' Four? (Described in 'M.W.' last July.)"

(Continued on next page.)

Popular Wireless, October 11th, 1930.

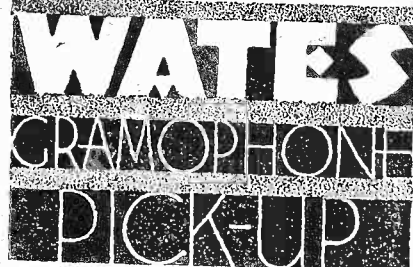


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The reason why the Wates Pick Up reproduces all those subtle gradations of sound with perfect balance and uniformity of tone at any volume strength, is found in the scientifically correct combination of weight, balance and needle tracking.

A unique adjustment is provided by the two screws securing the needle holder, and a half turn is sufficient to defect by ear the best position.

Ask your dealer to demonstrate side-by-side with any other—we are content if you select by test—your choice will always be a Wates.



PICK-UP 21/- WATES  
ONLY PICK-UP ARM 7/6  
STANDARD BATTERY CO., LTD.  
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**AGENTS WANTED** to sell Wireless goods, all makes in sets, components and accessories. Cash or Easy terms. Liberal commission. **NEW AUTO SUPPLY CO., 241, Park Rd., ASTON, Birmingham.**

## ALL MANUFACTURERS' GOODS

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All goods guaranteed. Send a note of your requirements TO-DAY and pay the postman.

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40, Stockwell Street,  
GLASGOW.



RADIOTORIAL  
QUESTIONS AND ANSWERS  
(Continued from previous page.)

Full details for the "Star Turn" coils were given in the May issue of "Modern Wireless" for those who prefer to make their own coils. The "Selector" coil for the aerial circuit is very easy to wind, especially for the man who has had previous experience in this class of work.

The former is a piece of insulated tubing 3 in. in diameter and 3½ in. long, and into each end of this you should fit a wooden cross-piece with a hole in the centre through which you can pass the long spindle of the stud switch to be mounted later, upon one end of the tube. One of these end cross-pieces will provide a means of mounting to the panel.

Two wood screws pass through holes in the panel into it, and hold the unit firmly in place. The other cross-piece is to provide a means of attaching the stud switch to the end of the tube.

This switch has eighteen studs and can be made up of odd parts on a piece of ebonite about 3½ in. to 4 in. diameter. The contact arm is operated by a spindle which passes through the centre of the coil and goes through the panel, and has a knob on the end and preferably a pointer to indicate the position of the arm.

The tube carries three terminals, A, B and C, in the positions shown on the wiring diagram. The winding consists of a single layer of 84 turns of No. 24 D.C.C. wire, which is started by connection to terminal C.

Start at the end nearest the panel, put on 20 turns and take out a tapping to No. 1 switch stud, put on

TECHNICAL  
TWISTERS

No. 30.—THE L.T. SUPPLY.

CAN YOU FILL IN THE MISSING LETTERS?

As your L.T. battery will need frequent . . . . . it is advisable to duplicate it, if possible. In other words, have . . . batteries, one in . . . and one on . . . . .

Apart from the voltage, you must consider the amount of . . . . . it can supply, which is popularly called its . . . . .

An L.T. B.'s capacity is reckoned in . . . . .-hours, and if you know how much . . . . . current your set takes, you can easily calculate how often you must re-charge.

Dividing the battery's actual ampere-hour capacity by . . . gives the maximum current in amps. that it can safely supply.

Last week's missing words (in order) were :

Ignition ; Actual. More. Voltage, Doubled. Voltage, Doubled.

four more, tap out to No. 2 switch stud, four more turns and tap to No. 3 stud, and so on till you come to No. 17 stud, at which the winding ends.

Stud No. 18 is blank except that it is wired to terminal B. Make one other connection, i.e. a wire from terminal A to the arm of the switch, and the coil is complete.

CUTTING OUT FIRST VALVE OF  
"MAGIC" FOUR.

R. H. H. (Liverpool).—"I have built your 1930 'Magic' Four and I wish to thank you for this wonderful set. It is most selective and the volume is good.

"One might term it a 'man's set.' The only snag (I beg your pardon!) is the big consumption of H.T. to the small-pocket-money-holder like myself. I wonder if you, in the near future, will be giving the builders of this set a tip how to fix a switch to cut out the

(Continued on next page.)



HERE IS YOUR OPPORTUNITY—MAKE WIRELESS  
BATTERIES—IT IS A PAYING PROPOSITION!

Whether you are a Wireless Enthusiast or not, you know what an enormous demand there is for Wireless Batteries—a demand which is ever increasing by leaps and bounds. If you are a Wireless Enthusiast you know also that you and millions of others are constantly on the look out for BETTER Batteries.

You Can  
Do This :

Here is a way in which YOU can meet the demand for BETTER Batteries, and Profit Financially—make them yourself in your Spare Time by means of our Patented Method and Formula! By making your own batteries you can SAVE money—by supplying your friends and others you can MAKE money; and you may make up to £300 a year per Licence!

ANYBODY CAN DO IT! It has probably never crossed your mind before. You have thought of batteries as "Technical" things—always regarded them as something "mysterious."

The exact opposite is the case. Study the pictures on the left and you will see how really simple it is. You will need no expensive "plant" or machinery—only a few simple tools and hand presses. You need have no special accommodation—a start can be made upon your present kitchen table. The children can help you.

WE WILL TELL YOU HOW You may know nothing about Wireless or Electricity—it doesn't matter in the slightest. We will tell you how to do it—FREE. After receiving our instructions you can start right away to manufacture! And the work is intensely interesting as well as easy; more fascinating than making your own Wireless Set! The saving is huge—an

average worker can complete a 60-volt H.T. Battery in 2 hours at a cost of 2/3 approximately! Compare this with Shop Prices!

MAKE YOUR FRIENDS' WIRELESS  
BATTERIES—AND MAKE MONEY!

Consider what this means to you. Not only can you SAVE money on your own batteries, and get BETTER results, but directly your friends know of them they will want some, too! Thus, you can begin to build up a Profitable Spare-Time Business and reap a Golden Harvest from the Wireless and Electrical Market. Many men are already making comfortable EXTRA incomes in this Pleasant, Easy Way. There's MONEY in it—big money if you are energetic and anxious to get out of the rut! What could you do with £300 a year?

PROFITS GUARANTEED

Your market is unrestricted—it can never become overcrowded—you sell where you like and when you like. If necessary we will purchase sufficient of your output to guarantee you a Weekly Profit providing it reaches the required standard of efficiency which is easily attainable. We will continue your training FREE until you reach that standard—that's fair, isn't it? Don't hesitate—if you have never seen a battery before you can MAKE Money this way. Let us explain this GILT-EDGED HONEST PROPOSITION fully. Write AT ONCE! Make Your SPARE Hours GOLDEN Hours!

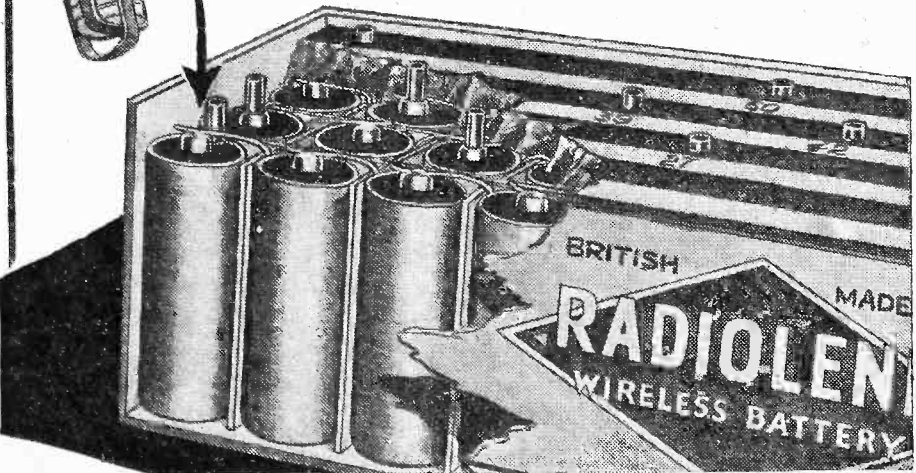
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Print your name and address boldly in capital letters on a plain sheet of paper and pin this coupon to it.  
"Popular Wireless," 11/10/30.





# NEW CLIX LINES



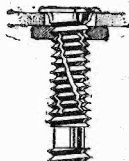
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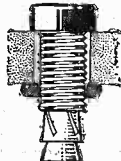
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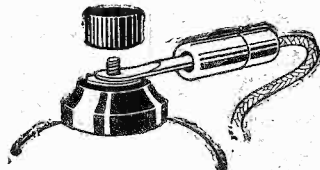
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## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from previous page.)

first valve. I am sure it would be a boon to many readers besides myself."

To cut out the first valve in this way, when the set is used for local station work, it will be necessary to cut off its filament supply and to transfer the aerial from its normal position to the point where it will be feeding the detector valve grid circuit.

An easy way to break its filament circuit would be to put an on-off switch low down on the panel underneath the first condenser, and then break the positive filament wire that comes through a hole in the screen, taking the two sides to the two terminals on this switch. This will put the H.F. filament on or off as required and its H.T. supply lead (H.T.+2) need not be removed from the battery.

An easy way to transfer the aerial would be to fit a new terminal on the panel at the other side of the screen near the L.T. switch S. At present you have one of the taps on the Coil L<sub>2</sub> fitted with a flexible lead which goes to the top of the screened-grid valve. This flexible lead can be left, but coming from this point or from one of the other taps on L<sub>2</sub> you need a wire going to your new aerial terminal.

When the H.F. valve is in action the new lead and terminal are not active, and the circuit is exactly as before. But when you switch off the H.F. valve you will be able to bring the aerial to the new terminal, which is connected to L<sub>2</sub> and which will then act as a new aerial terminal with the H.F. valve cut out of circuit.

### Threshold Howl.

G. N.W. (Newcastle).—"Back in the summer I saw in the Short-Wave Notes by W. L. S. a means of curing threshold howl on short-wave sets. Intending to build a short-waver, I kept it by me for some time, but now I cannot find it, and a friend of mine has got a set which is perfect in every way, but he cannot stop it howling on the verge of oscillation!

"What are the usual things to do in such a case?"

The following are the "cures" recommended. It should be remembered that although only one of them may be sufficient, it is advisable to try them in conjunction with one another where possible, one peculiarity of threshold howl being that it occurs in different sets due to different causes.

- (a) Adjust the filament voltage of the detector valve, by means of a rheostat.
- (b) Change value of detector grid leak.
- (c) Connect a grid leak of 1 or 2 megohms across L.F. transformer secondary.
- (d) Change L.F. transformer, remembering that a cheap make will often be quite satisfactory in such a circuit!
- (e) Use filter output circuit for 'phones.
- (f) Connect condenser of .0005 mfd. across 'phones.
- (g) Connect H.F. choke in 'phone leads.
- (h) Use capacity control for aerial circuit instead of loose inductive coupling. (When using throttle control for reaction you must be careful to see that the capacity of the transformer primary is not so high that it passes H.F. and keeps the set in an oscillating condition when the reaction condenser is at zero. If the transformer has a condenser across it it will, of course, cause howling, and in such a case an H.F. choke is necessary between the plate side of the transformer and reaction coil.)

### BACK NUMBERS OF "P.W."

F. F. (Petersfield).—"Where can I get back numbers of 'P.W.'?"

Back numbers of POPULAR WIRELESS which are still in print can be obtained from the Amalgamated Press, Ltd., Back Number Department, Bear Alley, Farringdon Street, London, E.C.4, price 4d. per copy, post free.

### TESTING FOR DISTORTION.

"BIMBO" (Wolverhampton).—"My young brother's firm has recently gone west. I tell him it was all right till he joined it, and the consequence is that quite a lot of good electrical gear went cheap. Among the disposals were some milliammeters, and we got a good one measuring up to 30 milliamps.

"How should it be connected to check and prevent distortion?"

With a milliammeter of this kind you can keep a watch on quality by joining it in the lead from H.T.+ to the plate of the last valve. It will be marked + and -, so be sure to join it with its + terminal towards H.T. +, and its - terminal towards plate.

For permanent use as a checking instrument it is a good plan to join an on-off switch across it, or else

(Continued on next page.)

## RADIOTORIAL QUESTIONS AND ANSWERS.

(Continued from previous page.)

arrange for a plug and socket connection if it does not incorporate a switch of its own.

When the set is on, but no programme is coming through, if you switch the milliammeter in you will, of course, get a reading on the scale showing how many milliamps. are passing to the plate of the power valve. Moreover, the needle should remain steady, even when you are receiving a programme.

If it flickers or kicks when the loud musical passages come along, your set is distorting. Usually, if the needle kicks up—to a higher reading—your negative grid bias to the power valve is too high. If the needle kicks down—to a lower reading—the bias is too low.

If the needle cannot be steadied by adjustment of the grid bias to the power, and any preceding L.F. valves, you are probably "overloading," and trying to make your set hand out greater power than it is capable of giving.

A reduction of strength (by detuning, if you like) will clear up this trouble, but if greater power is required you must either increase your power-valve's ability to handle strong signals by increasing its

### WHAT DO YOU THINK ABOUT THIS?

A Purley reader of "P.W." decided that his "Magic" Three deserved a mains unit, and the dealer recommended a certain type because his own "Magic" Three worked perfectly with this.

On connecting this up there was a loud hum, "which must come from the unit, because the set never hums without it," argued the puzzled owner. So the dealer—a friendly chap—lent him his own mains unit, a tried and trusted one, but the result was the same.

The sets themselves were almost exactly alike, valves of same types, and both used balanced-armature cone speakers. Could you have said

#### WHAT WAS WRONG?

N.B.—There is no prize for answering this, but from time to time we shall give a radio problem (followed the next week by the answer) in the hope that readers will find them both interesting and instructive. (Look out for the solution to the above next week.)

The trouble with the S.G. valve voltage referred to last week was that the voltmeter was taking too much current, and thus giving misleading readings. The experimental settings of H.T. were right, but connection of the voltmeter made them appear lower.

H.T. + and grid bias (if the maker's recommendations permit) or else get a valve capable of handling that power without distortion.

#### RATTLING RESULTS.

D. M. J. (Glasgow).—"What is the cause of rattling in a loud speaker?"

It just depends on what you mean by "rattling." In the sense commonly given to this word, "rattling" means the disturbing and irritating vibrations due to a mechanical defect or a defect in adjustment, such as a screw which has worked loose, a diaphragm which is touching the magnets, or any other part of the mechanism which has become a little loose and which consequently responds to the variations of the loud speaker in a way in which it is not intended to do.

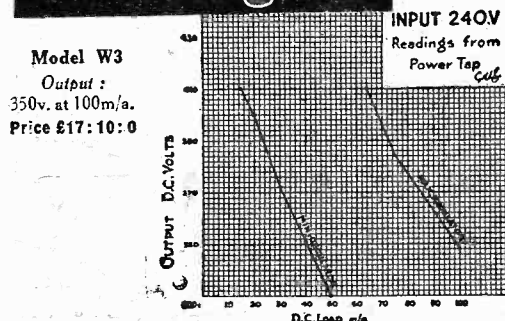
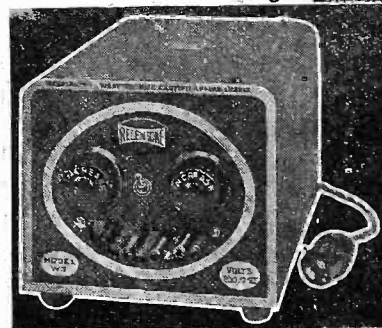
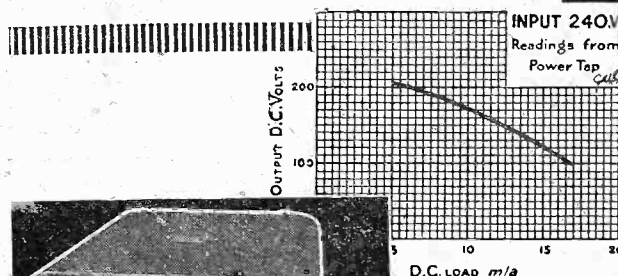
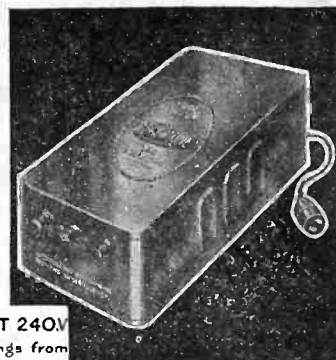
Such rattles are usually noticeable chiefly upon loud passages, and can usually be located if the instrument is carefully examined when working. Although it sometimes happens that such a rattle is not easy to trace, it is usually spotted at once by anyone with several years' experience of wireless, and usually it can be put right in a few moments.

Quite a different meaning is sometimes given to the word rattling, as some people use this to designate resonance on certain notes. True rattling is due to a mechanical defect, as explained above.

Resonance occurs not when something is loose but when one note, or one particular set of notes, gets amplified by the loud speaker to an extent altogether greater and out of proportion to the impulses which cause them. The natural acoustic

(Continued on next page.)

## A RANGE of MAINS UNITS for EVERY REQUIREMENT



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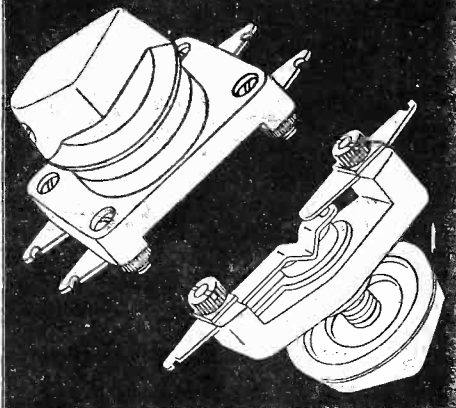


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## RADIOTORIAL QUESTIONS AND ANSWERS.

(Continued from previous page.)

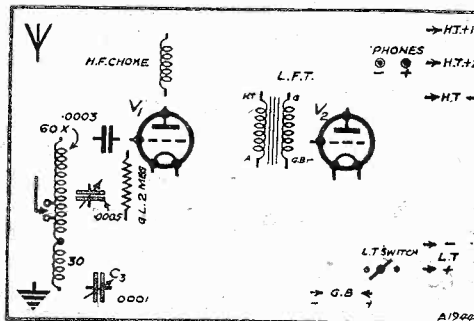
properties of some types of horn loud speakers did not permit proportional reproduction of the various frequencies in music, but accentuated and greatly over-produced those frequencies which corresponded with the natural frequency of vibration of the air column within the horn, or some other inherent frequency that came within the range of audibility.

The extra amplification was due to the fact that the note being reproduced and the reproducer itself were in resonance, i.e.—vibrating at exactly the same frequency, and thus it is that this class of loud speaker defect is more properly described as resonance than as rattling.

### GRID CONDENSER VALUE.

W. P. (Johannesburg, S. Africa).—"The instructions give the value of the grid condenser as .0003 mfd., but I have a .0002 in

## POPULAR "WIRELETS" No. 21



Here are the "components" for a simple 2-valve (detector and L.F. amplifier). Reaction is of the "Reinartz" type, controlled by the .0001 condenser  $C_0$ , and although 'phones are marked this type of set often works a small loudspeaker quite satisfactorily.

Can you "wire-up" this circuit? Look out next week for the answering diagram.

(It is regretted that the solution to Popular "Wirelet" No. 20 is held over till next week, owing to lack of space).

use, and the set seems perfect. Is it worth while getting the .0003 from the point of view of improved reception?

You probably would not hear the slightest difference in results however carefully you tried, so we do not think it worth while.

## FOR THE LISTENER.

(Continued from page 226.)

Berlin often has a wonderful Sunday night programme, if you can tear yourself away from Albert Sandler!

### German Talks.

But not, I think, Germany for talks; not even if you are learning German through the wireless lessons at home, and are seeking for bones to whet your milk teeth on! German talks are solid stuff than I can stomach.

I switch in, and out, when I am feeling very determined to be good; or as voluntary penance for my sins. For instance, "The Way to Musical Genius—the Discovery of the Musical Ego"; or "Literature, and the Spirit of Work"; or "The Bureaucratization of Modern Industry."

How thoroughly German these sound! That horrible word in the last title, beginning with a "B," which I defy anyone to pronounce after a single glass of the wine of the country! It is all frightfully thorough and deep and long-winded.

No, not Germany, I think, for talks!

(Continued on next page.)

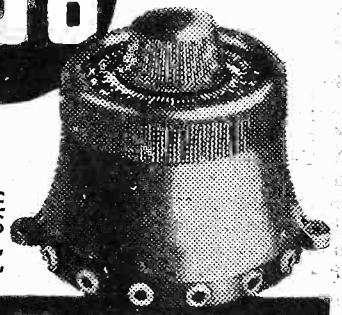
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FOR THE LISTENER.  
(Continued from previous page.)

Alice.  
Many listeners must have renewed an old pleasure, a fragrant memory like lavender hidden in a drawer, in the revival of "Through the Looking-Glass." It is a perennial flower. A work of unconscious genius. It is odd how many good things have come into the world by men who had no idea of how good they were! I wouldn't mind laying long odds that Lewis Carroll had no inkling of the fact that "Alice" would live for ever.  
It was a good idea to put the second performance earlier in the programme, so that the youngsters could enjoy it before they were sent to bed. The production was excellent, as Cecil Lewis's usually are; as if he loved it himself very much. He has a bright and ingenious mind.  
I forget who took the part of Alice in the original production. Was it Athene Seyler? But it fitted Jessie Tandy like a glove.  
Congratulations all round, and—encore!

Edges of the World.  
Geographically, this place, which I am now on the point of leaving, is not one of the edges of the world by any means; but the sight of a caveman or of a dinosaur could not have surprised me more than the sight, yesterday, of my neighbours catching a snake—to cook it and eat it!  
There was a hullabaloo outside, and I went to see. It was a lovely beast, about four feet long and dapple-grey.  
"Cattivo!" they shouted, and "velenoso!" as if to excuse before me the savagery with which they hacked off its head. I do not think that it was either "wicked" or "poisonous."  
I think it was a serviceable beast, and a farmer's friend against the field mice. But however wicked and poisonous they thought it to be when alive, it was evidently of quite another nature when dead; for, with their mouths watering, they carried it off in triumph to the pot, and the family dined that night off its white flesh! I have heard of pickled eels, but—snakes!

TECHNICAL  
NOTES.

By Dr. J. H. T. ROBERTS, F.Inst.P.

False "Fading."  
A READER described to me in a letter recently a curious effect which he had obtained with his receiver and which at first looked suspiciously like "fading," the only point being that the station which was being received at the time was only about 50 miles away, and a fairly powerful one at that.  
According to all the laws and theory of fading, it appeared to be impossible that this could be the real cause of the trouble in this particular case, although apparently the effect which he noticed had almost the exact characteristics of fading. It turned out eventually, after an examination of the receiver, that the effect was due to a defective contact in the grid-leak holder and when this was put right the trouble disappeared.  
(Continued on next page.)



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## TECHNICAL NOTES.

(Continued from previous page.)

### A Curious Receiver Effect.

I may say that I have heard of this kind of trouble several times before, particularly due to bad contact in a switch, such as the change-over switch from high to low wavelengths.

Of course, fading will almost invariably be experienced when receiving from the distant stations; and is at certain times of the year prevalent also even on medium distances; but if you get what appear to be fading effects on nearby or powerful stations, you may be fairly certain that the effect is spurious and is due to something in your receiver, probably something of the kind indicated above.

### Life of Power Valves.

I have, on more than one occasion, mentioned the importance of using correct grid-bias, particularly with a power or super-power valve. I suppose most experimenters know perfectly well that the higher the value of the grid bias (within the proper limits, of course) the smaller the high-tension current which passes in the anode circuit.

This not only results in an important saving in H.T. current, perhaps not very important when an H.T. mains unit is used, but certainly very important if a dry battery is employed, but also actually improves the quality of the reproduction, so that you are not saving H.T. current at the expense of reproduction, but are actually getting an advantage both ways.

### Grid-Battery Hint.

Quite apart from this, the use of the correct grid-bias also helps very materially in preserving the valve and lengthening its useful life. A high value of H.T. current means a correspondingly higher emission from the filament of the valve (since the H.T. current is, in fact, carried by the emission) and, as you know, if the emission is pushed beyond a certain point the emissivity of the filament may be seriously reduced, or the filament may actually be burned out.

### What Happens to the Grid!

A point which is not so often borne in mind, however, but which is extremely important, is this: Often when you wish to adjust the value of the grid bias, you may forgetfully leave the H.T. voltage on and simply pull out the plugs of the grid-bias battery and shift them to other positions.

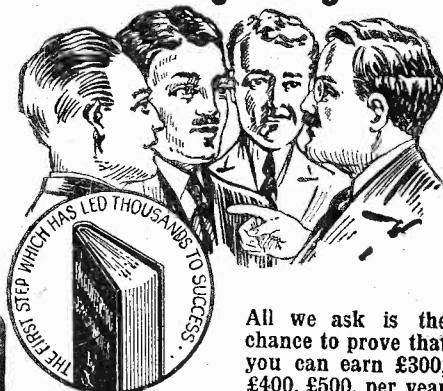
Every time you disconnect the grid-bias lead from the grid-bias battery, clearly the potential of the grid is left "up in the air," and although it is difficult to say off-hand what voltage the grid will assume, it is obvious that it will almost certainly assume a different voltage to that which was intended (otherwise there would be no purpose in having a grid-bias battery at all).

### Safety for Super-Power Valves.

Now with a power or super-power valve there is great danger, when the grid is disconnected from the grid-bias battery, of the H.T. current rapidly going up to a very high value, and this may have disastrous effects upon the valve. It is a good plan, therefore, when making adjustments, to be careful always to disconnect the H.T. voltage

(Continued on next page.)

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## TECHNICAL NOTES

(Continued from previous page.)

before making the adjustment, and only to have the valve actually working when the grid is connected to some point of the grid-bias battery.

I have known of cases where perfectly good and quite expensive power valves have been completely ruined by this bad practice of juggling about with the grid-bias connections whilst a high value of H.T. voltage is applied to the anodes.

This is one of those little points which may be very easily overlooked even by a careful experimenter, but as soon as you think for a moment of the conditions obtaining when the grid is disconnected you will realise the importance of the precautions which I have just indicated.

### Accumulator Life.

With most types of low-tension accumulator you will find that the screwed terminal pin which projects through the upper part of the celluloid container is locked in position by means of a flat locking nut: this is quite apart from the terminal knob by which the connecting wire is secured to the terminal. After the accumulator has been in use for some months you may sometimes find that a certain amount of corrosion has set in owing to the acid creeping up and attacking this locking nut, as well as the threaded pin.

If the locking nut has come loose (due to the operation of the terminal knob), you should take care to fix it back securely in position. If it is loose, not only is the tendency to creeping of the acid much increased, but also there is a danger, when the control knob is screwed hard down, of the lead plate beneath becoming wrenched.

Incidentally, it is a good plan, before screwing the locking nut home, to cover it with vaseline, as well as all the surrounding parts. Sometimes beginners in radio are averse to coating the terminals of the accumulator with vaseline, as they imagine that this, being an insulator, will prevent good contact from being obtained.

As a matter of fact, and curiously enough, the reverse is the case: the vaseline does not in any way prevent good contact, but, by its preserving action, keeps the terminals clean and free from corrosion, and thereby enables better contact to be obtained.

### Saving Money on L.T.

A very useful hint in connection with the prevention of corrosion in accumulators is to attach a flexible lead strip—say, three or four inches in length, slotted or drilled—to each of the terminals, and then to make connection to the remote or free end of the strip. Before fixing the lead strip under the terminal both the end of the strip and all adjacent parts of the terminal should be freely covered with vaseline.

When the terminal is then screwed up tight it does not need to be interfered with again, and all connections and disconnections are made at the opposite end of the strip. The strip itself, being of lead, will not be attacked by the acid, and the terminal, being well covered with vaseline and not being subsequently liable to disturbance, will also remain well protected. This very simple dodge may be

(Continued on next page.)

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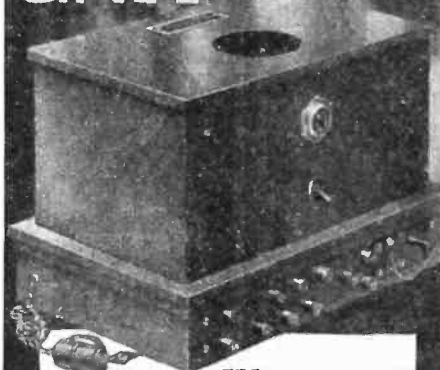
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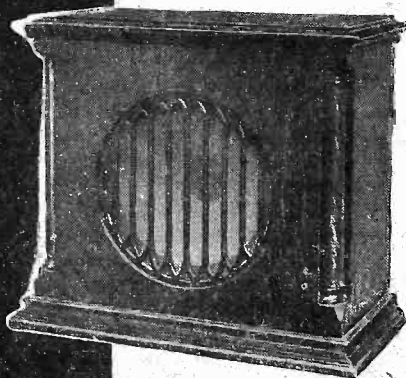
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## TECHNICAL NOTES.

(Continued from previous page.)

the means of adding at least another year of useful life to your accumulator, and is very well worth adopting.

### A.C. Valves.

I am often asked whether indirectly heated A.C. valves will act efficiently as detectors, and also whether, using an indirectly heated A.C. valve as a detector, a set will have as good a sensitivity range as with an ordinary type of valve.

As regards its sensitivity, it is simply a question of using the valve under proper conditions as to anode voltage and grid resistance, so that the characteristic curve is reasonably "straight-line" over the desired range. This is a matter which depends largely upon using a fairly high value of H.T. voltage, but not too high a value of grid leak.

### Pick-up Weights.

A question which confronts the listener who contemplates changing over from ordinary acoustic gramophone reproduction to electrical reproduction is whether the latter will have any bad effect upon the life of his records. In the early days of electrical gramophone pick-ups some of

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these were, unfortunately, made very heavy, and the armature very stiff, with the result that the reaction between the needle and the record was greater than with an ordinary soundbox.

### Does the Record Suffer?

As a matter of fact, there is really no reason why the reaction between the needle and the record should be so severe when using an electrical pick-up as when using an ordinary soundbox, because in the latter case, as you know, the whole of the sound is directly produced by the movement of the needle and associated stylus bar and diaphragm, whilst in the case of the electrical pick-up the actual reaction may be very small, and the effect may then be multiplied up to any desired extent by an appropriate amount of amplification.

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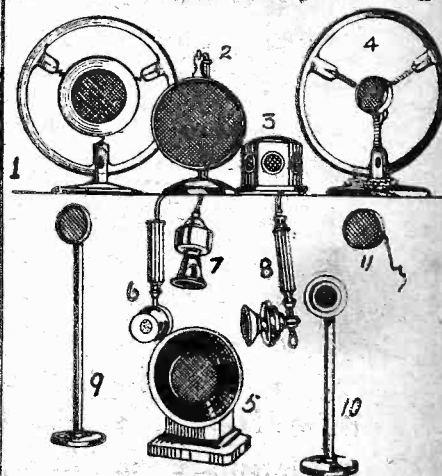
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