

**AN ISSUE YOU MUST NOT MISS.**

# Popular Wireless

Every Thursday  
PRICE  
3d.

No. 290. Vol. XII.

INCORPORATING "WIRELESS"

December 24th, 1927.

## *Special Christmas Week*

### NUMBER

The Haunted "Ham"

The Radio Locksley Hall

THE "PROGRESSIVE" FOUR

The House on the Cliffs

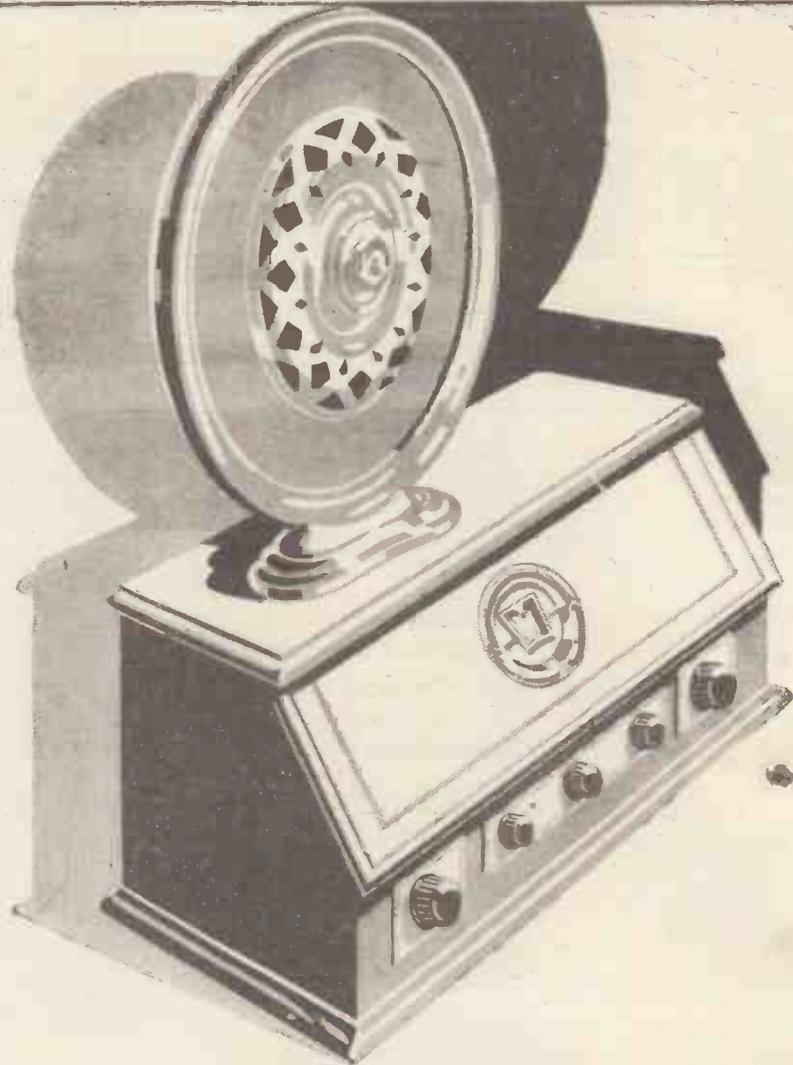
A One Act Broadcasting Comedy

"Chinks and Mikes"

etc., etc.



# MARCONIPHONE



Marconiphone productions are always "advance news"—the whole scientific resources of this immense organisation are ceaselessly working out something new, something better. That is why

## YOU GET MORE FROM MARCONIPHONE

The Marconiphone Model 51 (5-valve) receiver is a very finished article. It presents uncommonly acute sensitivity with tuning of utter simplicity and tone which is a marvel of realism. And it brings into being all the advantages of battery-less radio. With either A.C. or D.C. Mains it can be operated entirely from electric light supply. Publication No. 453B gives full particulars. Please send for it. If you haven't electricity, Model 51 can, of course, be operated from the ordinary battery-accumulator installation.

*The Marconiphone Company, Limited.*

Model 51 Receiver only with long or short wave coils, including royalty - - - - - **£27:2:6**

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**THE NEW RADIO SIMPLICITY. NO BATTERIES NO ACCUMULATORS**



**A great little condenser!**

**T**HE Dubilier fixed condenser with its di-electric of best India Ruby Mica, is hermetically sealed into its bakelite case to render it absolutely immune from the effects of damp or dust.

Before being sealed, however, the condenser element is subjected to enormous pressure, immersed in boiling wax, and kept so rigidly cramped when assembled that the excluded air can never regain entry. Finally the excellent bakelite moulding acts as an extremely high resistance and prevents losses through current "creeping" across between the terminals.

Years of experience and specialised craftsmanship go to the making of this great little condenser; see that it figures prominently in every set you build.

All Dubilier Products are fully described in the catalogue shown here. In addition there is a lot of information which you may find interesting. If your dealer has run out of copies we will forward you one free.



Dubilier Mica Condensers:  
Types 610 and 610 (vertical):  
0.0165 to 0.0009 mfd., 2/6  
0.001 to 0.006 mfd., 3/-  
0.007 to 0.009 mfd., 3/6  
0.01 mfd., 4/-  
0.015 mfd., 4/6



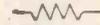
**DUBILIER  
DICTA**



No. 4.

Truly we progress in cycles. What must have been the first wireless set to be used on active service had an aerial consisting of paraffin tin cans propped up on bottles.

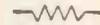
The mighty spans of aerial covering acres of ground and supported on masts over eight hundred feet high connote the peak of the curve, and we are already descending again via the modern directional aerial of increasingly diminutive proportions.



If this sort of thing spreads to receiver practice we may soon expect to be building the "Coherer five" or the "Maggie Super eight."



When the small a cumulator was sold mostly for running trembler coils on cars, perhaps it was legitimate to rate it at double its actual capacity. Now, when we want an accumulator for valve lighting, we are careful to see that the capacity is rated in terms of continuous, not intermittent, discharge.

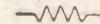


There is another little matter in which it will pay you to exercise a spot of circumspection.

It concerns the practice of referring to Mansbridge Condensers in terms of their "test" voltages.



You may be perfectly safe in working a Paper Condenser at half its stated test voltage; on the other hand you may find that it deteriorates rapidly at considerably less than this figure. It all depends upon what is meant by the word "test."



But after all, "test" voltages are things that mainly concern the manufacturer.

What you are interested in is the maximum voltage at which your Mansbridge will work in safety to itself and to your set or battery eliminator.

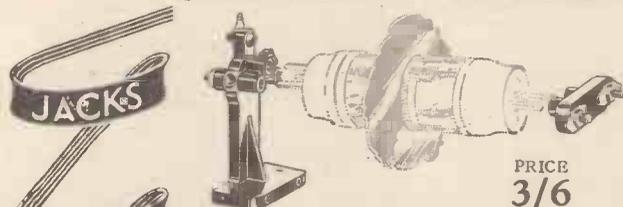


Turn to the Mansbridge Condenser section of our catalogue (pp. 9 to 12) and you will find that for your convenience all condensers are referred to in terms of their safe working voltages.





### SCREENED-VALVE HOLDER



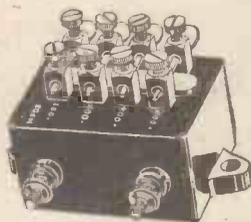
PRICE  
3/6

Conveniently made in two pieces, enabling the valve to be inserted or extracted at will. Fitted with Terminals and Soldering Tags. GENUINE BAKELITE.

### MULTIPLE FIXED CONDENSERS

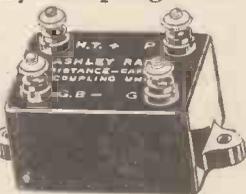
Although cheap enough to be incorporated permanently their main function is to determine the correct capacity of fixed condenser required in any specific circuit. Two ranges of capacity are made and capacities varying from .0001 to .0015 are obtainable in steps of .0001 and similar variations are to be obtained with the second unit the minimum capacity of which is .001. The acme of neatness and efficiency.

PRICE 5/6



### Resistance Capacity Coupling Unit. (A & B)

Made to suit the valves now marketed for R.C. circuits it is a first rate example of what can be accomplished by a careful study of up-to-date requirements in every direction. So far as can be determined it represents the best ideas in practice, the more remarkable in consideration of its compactness. The "A" unit suits all valves the impedance of which is less than 40,000 ohms and is recommended especially for the detector stage. For valves with an impedance value of over 40,000 ohms the "B" unit can be most effectively used.



PRICE  
5/6  
each.

If your dealer cannot supply, we send post free.

MULTIPLE FIXED CONDENSERS ETC.

ASHLEY WIRELESS TELEPHONE  
CO. (1925) LTD.,  
Finch Place, London Road,  
LIVERPOOL.

all  
**Guaranteed  
Components**

## Invaluable to EVERY Amateur and Constructor.

### The "POPULAR WIRELESS" BLUE PRINTS of TESTED CIRCUITS

The following is a list of the "P.W." 6d. Blue Prints for Constructors in stock, showing the different circuits available.

#### P.W. BLUE PRINT Number

1. DETECTOR VALVE WITH REACTION.
2. UNIDYNE DETECTOR VALVE WITH REACTION.
3. 1-VALVE L.F. AMPLIFIER.
4. CRYSTAL DETECTOR WITH L.F. AMPLIFIER.
5. H.F. (Tuned Anode) AND CRYSTAL, WITH REACTION.
6. H.F. AND CRYSTAL (Transformer Coupled, without Reaction).
7. 1-VALVE REFLEX WITH CRYSTAL DETECTOR (Tuned Anode).
8. 1-VALVE REFLEX AND CRYSTAL DETECTOR (Employing H.F. Transformer, without Reaction).
9. H.F. AND DETECTOR (Tuned Anode Coupling, with Reaction on Anode).
10. H.F. AND DETECTOR (Transformer Coupled, with Reaction).
11. DETECTOR AND L.F. (With Switch to Cut Out L.F. Valve).
12. DETECTOR AND L.F. UNIDYNE (With Switch to Cut Out L.F. Valve).
13. 2-VALVE REFLEX (Employing Valve Detector).
14. 2-VALVE L.F. AMPLIFIER (Transformer Coupled, with Switch to Cut Out Last Valve).
15. 2-VALVE L.F. AMPLIFIER (Transformer-Resistance Coupled, with Switch for Cutting Out Last Valve).
16. H.F. (Tuned Anode), CRYSTAL DETECTOR AND L.F. (With Switch for Last Valve).
17. CRYSTAL DETECTOR WITH TWO L.F. AMPLIFIERS (With Switching).
18. 1-VALVE REFLEX AND CRYSTAL DETECTOR, with 1-VALVE L.F. AMPLIFIER, Controlled by Switch.
19. H.F. DETECTOR AND L.F. (With Switch to Cut Out the Last Valve).
21. THE 2-VALVE LODGE "N."
22. "THE GUARANTEED REFLEX."
23. THE 1-VALVE "CHITOS."
24. THE "SPANSACE THREE." Three-Valve Receiver employing 1 Neutralised H.F. Valve, Detector with Non-Radiating Reaction Control, and 1 L.F. Valve.
25. 2-VALVE REINARTZ (Det. and L.F.).
26. A "STRAIGHT" 4-VALVER (H.F., Det., and 2 L.F. with Switching).
28. A "MODERN WIRELESS" 5-VALVER (H.F., Det., and 3 L.F.)
29. AN H.T. UNIT FOR DIRECT-CURRENT MAINS.
30. A REINARTZ ONE-VALVER.
31. A STANDARD TWO-VALVER (Detector and L.F.).
32. THE "CUBE SCREEN" THREE (H.F. Det. and L.F.).

### ALL "POPULAR WIRELESS" BLUE PRINTS—6d. EACH

All orders for these Blue Prints should be sent direct to the "Popular Wireless" Queries Department, Fleetway House, Farringdon Street, London. E.C.4. enclosing a stamped addressed envelope and a postal order for 6d. for each Blue Print ordered.

# What *this* mark means



Obtainable in six colours : Red, Yellow, Blue, Green, Black and White. Price 10d. per 10 ft. coil : 9d. per packet of four 2 ft. lengths (assorted colours)

This LEW trade mark guarantees coloured connecting wire to be the original GLAZITE.

When you buy wire bearing this label you take no risks. Hundreds of thousands of constructors have proved GLAZITE the way to quicker, simpler, more efficient and cheaper wiring. Glazite is flameproof, damp-proof and does not deteriorate in use.

Always be sure to see the LEW mark on the label. From all radio dealers.

THE LONDON ELECTRIC WIRE CO. & SMITHS LTD.  
Playhouse Yard, Golden Lane, London, E.C.1.

## GLAZITE

BRITISH MADE REGD

THE ORIGINAL COLOURED CONNECTING WIRE

Do not miss the January issue of  
**THE WIRELESS CONSTRUCTOR**

Special articles by PERCY W. HARRIS, M.I.R.E. (Editor), W. JAMES, and other famous radio writers make this number

**A SPLENDID SIXPENNYWORTH!**

Full constructional details are given of many first-class sets, including THE SHORT-WAVE THREE, A NEUTRALISED H.F. UNIT, etc., etc.

NOW ON SALE.

JANUARY NUMBER

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**ON YOUR COSSOR  
"MELODY MAKER"**

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**Build it yourself  
and save money  
AS SIMPLE AS  
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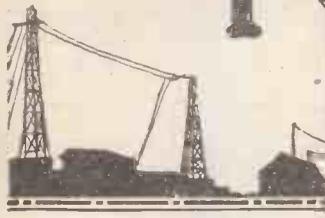
**R**ADIOFONICA Italiana! Radio Paris qui parle! London calling! Round the dial we go—eliminating distance by the turn of a wrist. The wonderful Cossor "Melody Maker" is the key to the music of six countries. A gay dance tune from Italy—a haunting tango from Spain—a song from Holland—a German opera . . . all and more brought to your home by a Set you can build yourself.

You need know nothing at all about Radio to be able to build the "Melody Maker." Thousands who know less than you do have already built it. The full-size plan is as easy to follow as A. B. C. *Soldering is eliminated.* Just follow the instructions and, in an evening, you'll build a Set that gives better performance than many factory-built Sets costing twice the price. Take the first step now. Ask your Dealer for the full-size plan "How to build the Cossor "Melody Maker"" or send a P.C. to A.C. Cossor, Ltd., Highbury Grove, London, N. 5.

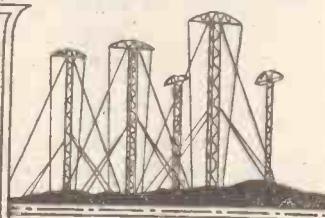
**Backed by the world-wide  
reputation of**

**Cossor Valves**

# Popular Wireless



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## RADIO NOTES AND NEWS.

### A Happy Christmas—"Ariel" Looks Back—Really Fireside Radio—Expanding Loud Speakers—That Chamber Music.

#### From Us to You.

ON Christmas Eve "P.W." sends this message to all its readers, to all who will be its readers, and to all lovers of radio: A happy Christmas and a prosperous New Year.

#### "Ariel's" Postscript.

YES, and may you be immune from oscillation, Morse, dyspepsia, run-down batteries, run-up bills, and Chamber Music. May the Pudding come out of its cloth sleek and whole, and the Turkey have eight legs. While I devour my miserable crust, I will think on you all with kindness. Friends, critics, and correspondents; Knights, Baronets, Peers; "Every Purpose Two"-ites, "Simmonds"-onians, Short-Wave Sheiks—mind you all have a Stout Old Time!

#### The Christmas Fare.

SOME of the Christmas items don't look too unbearable. I have marked down Mabel Constanduros' coming show from 2 LO as a "cert." Christmas Day being also Sunday, the attempt to provide special items results rather in a super-Sunday programme than in a Sunday-Christmas display, but Boxing Day looks promising. On December 23rd (to hark back a little), 5 GB will relay a Dickens Dream Phantasy from the "Brum" studio. Ought to be good!

#### "Ariel" Looks Back.

I HAVE special sympathy at this season for the professional wireless man. for his job takes him all over the world willy-nilly. The job has to be done, whatever the season. Just as he is gnawing at some fancy foreign grub and dreaming of turkey, stuffing, and sausage balls, lo! the aerial blows down or the nigger mechanic spills H<sub>2</sub>SO<sub>4</sub> on the dynamo! I have had some.

#### For Instance.

THERE was that Christmas Day I spent on the Red Sea, en route to China. Plenty of the right kind of things to eat and drink, but four stokers died of heat and one passenger shot himself, leaving us with his wife and two lovely babies to comfort. Then that Christmas in Shanghai, when the mail from Vladivos-

tok did *not* arrive and there was a little shooting in the French Concession, followed by a Chinese execution. And again, another joyous festival in Majorca, when I dined on half-raw pork sausages, washed down with priceless Lacrimæ Christi. Gentlemen, let us be glad that we are in England, with the right sort of folk and the old customs.

#### Really Fireside Radio.

MY recent note about the need I felt for the means of working my set without stirring from the fire brings a note from another "hardy Norseman" like myself, namely H. A. S. (Surbiton). Fifteen feet from his receiver, he can sit in his old cane chair, get chilblains on his toes by roasting 'em, and at the same time switch on his set, control the volume, and, in addition, change from 2 LO to 5 GB. Good! Now, H. A. S., I want to tune the set without shifting. Guess I'll have to move the set—or the fireplace!

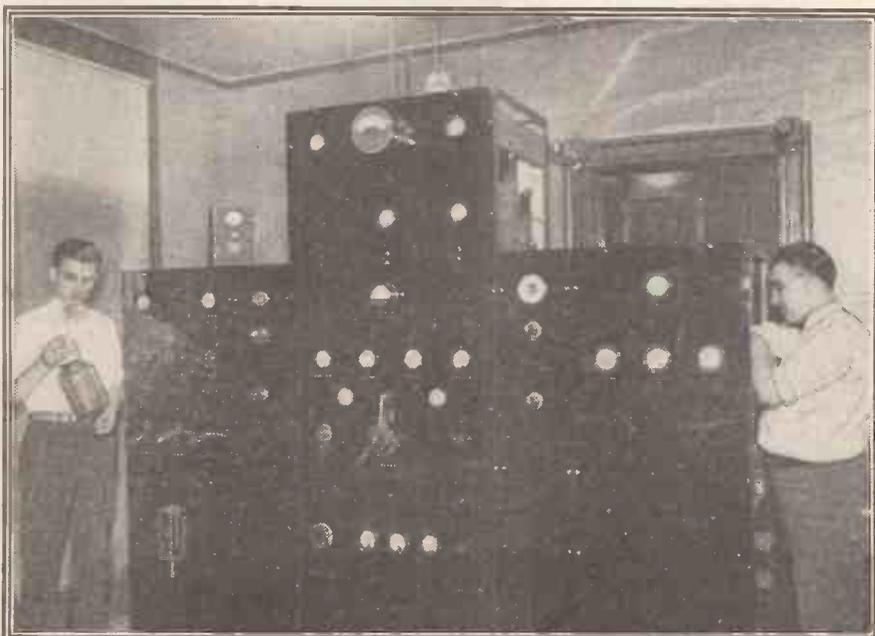
#### Familiarity Breeds Contempt.

THE terms used in wireless, once esoteric, are now household words, lisped by the baby and mimicked by the parrot. Radio sets are to be found in the most out-of-the-way places on earth, amongst cannibals, in Chinese huts and Indian wigwams. And yet—

#### Wireless Witchcraft.

ONLY seventeen years ago, when I tried to get a cook for a wireless station in a country not more than two days' journey from Charing Cross, I had the greatest difficulty in getting a native (European!) to live on the station, and then only got an orphan girl who, being disfigured by small-pox, considered herself immune from devilry and witchcraft of all kinds. But thereafter she was very unpopular amongst her countrywomen!

(Continued on next page.)



Practically every part of this 1 kw. broadcasting transmitter at the American station WODA was "hand made" by the staff engineers.

## NOTES AND NEWS.

(Continued from previous page.)

## Expanding Loud Speakers.

AN observant reader sends me a cutting from a newspaper wherein an advertiser offers a four-valve set, "with accumulative loud speaker." The advertisement ends, "Room wanted." I suppose the poor fellow lived in a Council-built house, and the loud speaker had accumulated so much that the garage was pushed into the next "Avenue."

## The Little Innocents.

I SEE that a Rotherham cadi, when inflicting fines on people for not having wireless licences said that the bench thought that it is not generally known that people must take out licences before they get their sets. I agree. It is not generally known. Nor is it correct to suppose that the licence must be procured before the set. But I believe that most folk know well enough that they must not own and work a receiver unless they are licensed to do so, and that 999 out of every thousand fines inflicted for non-licensed sets are jolly well deserved.

## Radio in Japan.

SHORT-WAVE enthusiasts may remember that some time ago I promised to write to Japan for authentic and up-to-date information about short-wave broadcasting there. My correspondent dashes our hopes by replying as follows: "There is no short-wave broadcasting in Japan, nor is any such service contemplated, even experimentally." He has, however, given me such a complete picture of Japanese broadcasting that, with the Editor's permission, I shall shortly give readers the benefit of it in a special article.

## That Chamber Music.

D. E. O. (Cambridge), whose kind wishes are reciprocated, has noticed my faint aversion to Torture-Chamber Music, and tells me that some people like it. I know! Some people like tom-tom music, and poison, and snakes. He goes on to say that he violently objects to a certain well-known dance band and the voice of a certain announcer at 2 L.O. Well, D. E. O., I am with you there; but some people like them, you know. D. E. O. buys "P.W." because—*inter alia*—he does not agree with all of my opinions, and thus finds food for debate. My dear fellow, if I wrote truisms and platitudes, I should not write for "P.W." It's alive!

## What's in a Name?

THERE'S a bit of a row on in the Esperanto world about the right word for valve. Some call it "lampo," others "valvo," "klapo," and "relajo." Well, if they will accept me as an arbitrator, I plump for "Bonzo."

## Still They Come.

INVENTORS of wireless continue to appear. The most recent attempt to twist the facts was made by the Russian Soviet who produced Popoff as the first to send a message by wireless. This attempt was squashed. I now read in the periodical called "International Language" a letter from Mr. F. Ullver, of Czech-Slovakia, in which he claims to have

done wireless transmission in 1895. In order to show the need for an international lingo, I will give an extract from his letter.

## Discovery of Wireless.

MR. ULLVER writes: "I have read, that radio apparatus was invented by Russian prof. Popov. To that occasion it is my obligation to say, that by my study time in teacher-institute to 1895 I and my colleague Brunclik have mutually ourselves understanding, each from one stead equipped with one battery. Rumkorf apparatus and a spool of wire drawer. . . . It was examined in Russia by wartime in the City Kazan." So that's that. Quite conclusive.

## SHORT WAVES.

Instructions on how to perform conjuring tricks are now broadcast. We can imagine the bleak silence that will ensue when an optimistic Aberdeen child attempts to borrow a shilling to perform a trick.—"London Opinion."

## SELECTIVITY.

A: Can you cut out interference with your radio set?  
B: Can I? Why, when I put the ear-phones on I can't hear a word my wife says!

Complaints have been received, we understand, of a loud speaker playing continuously outside a London cemetery while funerals are in progress.

Maybe it's only one of the fans trying to disprove his neighbour's theory that his loud speaker is enough to awaken the dead.

Never give your neighbour the smallest of crystal sets, because later on he will be borrowing your loud speaker.

Bell: Have you had a radio long?  
Bull: I've had one so long, I remember when we used candles instead of bulbs.

"Everything," says a writer, "will soon be done by wireless."

Cats are now eagerly awaiting the advent of the wireless canary cage.—"Sunday Pictorial."

Radio terms illustrated. An effective lead in: Policeman escorting burglar to cell.

## EPITAPH FOR A DX HOUND.

Here lies interred, Josephus Byrd,  
Who passed, from joy, away;  
The station call that he last heard  
Was 7 B Y—Bombay.—"Radio News."

## Interest in 5 S W.

I AM getting a lot of letters about 5 S W, the experimental short-wave station of the B.B.C. at Chelmsford. First of all, to answer many of you simultaneously, 5 S W works at present on 24 metres, from 12.30 to 1.30 p.m. and 7 p.m. to midnight, daily, except Saturdays and Sundays. L. F. (High Holborn), W. F. B. (Pontypool), and W. S. (Tredgar) refer to the re-broadcast of 5 S W by 2 X A F. This long-distance reception of a station on this side is very interesting, and reminds me that on some of the beam stations they have received and recorded their own signals after the latter had been round the world.

## Skip Distance.

DUE, no doubt, to "skip distance" effect, 5 S W is not generally well heard here. E. T. (Gloucester) has compared it with American stations, and found it wanting. R. W. S. (Little Wakering), who is a Valve Baronet, and user of the Simmonds 10-metres set, found little difference between 5 S W and 2 X A F. By the way, R. W. S. may look for a "P.W." Peerage, for on his 0-v-2 he

logs 150 stations, 29 of them being in the U.S.A.

## The Ruling Passion.

THIEVES recently got into Ongar school, dismantled an eight-valve set, and collared the parts. Then they went to the laboratory and gleaned more parts from another set. "P.W." feels slightly guilty about this, because it certainly does encourage its readers to "collect" and assemble radio components. My opinion, however, is that a local set broke down, probably in the transformers, and the devotees, having promised to give a demonstration, took the only possible course open to them, and borrowed a few odds and ends. Amongst gentlemen, this is nothing. Quite understood!

## A Few Appreciations.

THE "P.W." "All-Wave," 0-v-1, in the hands of W. S. (Tredgar), brings in 2 F C at R4, and works as well without an aerial as with one. Many U.S.A. stations on loud speaker. A Valve Baronet of the blackest ebonite! W. E. G. (Gt. Grimsby) clings to our "Every Purpose Two," which likewise gets 2 F C. The two-valver shown in our free blue print No. 31 has given B. J. (Rushden) all the loud-speaker results he wants, round Britain and Europe, besides some U.S.A. stations and 2 F C. Money's worth, eh?

## Reinartz and Simmonds.

N. W. H. (Cosham), an eighteen-year-old worker, gets 2 F C as well as his uncle does, on a Reinartz 0-v-1. Stick it, lad! Some of the planets may be inhabited. J. E. M. (Ivor Heath) wants to know whether there is a better short-wave set than the "Simmonds," because if there is he is ready to debate the point. There are many imitators, dear sir, but there is something about a "P.W." set that leaves 'em stiff.

## Proof Positive.

RECEPTION of 3 L O (on the "P.W." Every Purpose Two") by W. J. S. (Exeter) has received confirmation from that station in the shapes of a nice letter, souvenir programme, and photograph of the main studio. Any owners of five-valvers who may have been inclined to doubt the *bona fide* of some of our Valve Barts, may now rest assured that, ladies and gentlemen, there is absolutely no deception. You provide the apparatus: we bring the rabbit from the hat.

## International Prefixes.

G. H. J. (Ceylon), who runs Radio 7 V X, complains that Ceylon has not been allotted a prefix, and asks us to place the matter before the authorities. I understand that the prefixes were suggested by the International Amateur Radio Union; hence G. H. J. should write to Mr. K. B. Warner, Secretary, I. A. R. U., Hartford, Conn., U.S.A., expressing his views and suggesting suitable letters for Cingalese call-signs. Application should then be made through the local Governor.

## Change of Wave-length.

THE wave-length of 422 metres formerly used by Cracow is to be allotted to Katowitz, a new station of 10 kw. Cracow is now working on a wave-length of 500 metres.



# Radio and Christmas

Special programmes will be "on the air" for Christmas, but are you sure of getting your share? If not, read this timely and "solemn" warning.  
By P. R. BIRD.

ONLY a few days to Christmas! Only a matter of hours, and the finest festival of all will be in full swing!

Already a host of problems has arisen. Has the mince been minced for the mince-pies? What Bird of Paradise shall we have for dinner—turkey, goose, chicken, duck, or haddock? After the fatted calf has been killed, shall we ask the butcher for a joint, for a leg, for a rib, or for a knuckle?

These, and a thousand other queries clamour at Christmas-time. And amidst all the excitement, flurry, scurry, and bustle, a still small voice says, in the ghost of a whisper, "What about the wireless?"

This, my brother radio-listeners, is the voice of Conscience. And woe betide the man, woman, child, or oscillator, who ignores the call!

### The Breakdown.

You can, of course, harden your heart against the whisper, and stifle the pin-pricks of Conscience—but if so, be sure that pin will find you out! The Hour of Retribution will catch you bending! Right in the middle of the party the accumulator will run down, or the loud speaker will loud-speak no more. Then the music will be changed to lamentation, and there will be a great silence in the rooms of your father's residence. Then a great storm will arise, and the people will gather themselves together. Around you, and you only, will the people gather—and, well, you'll know it!

And the young maidens will weep, and will not be comforted (despite the untiring efforts of the opposite sex). There shall be a gnashing of teeth, and a wailing of a wail. All the joy and jazz will give place to lamentations, and the dancers will be desolate.

The old men will gather themselves together and say, "Who did this thing?" And the old women will be there—and will not be silent (you can bet).

### Every Eye on You!

And the head of the house will rise up in his place. And all eyes shall be turned upon him. And his voice shall ring out like a clarion call, and he shall say, "George, my boy, whassamatter with the wireless?" And then every eye will be turned upon you!

The floor, it will not open and swallow you up. The ceiling, it will not come down and create a diversion. There shall be no escape. No evasion or equivocation.

In that hour every ear shall be open to hear your voice. All the young men and maidens will listen. The old men will listen also, and also the wives of the old men, they will listen, too.

And the young children will be there (confound them), and they will listen. (But what can you say?)

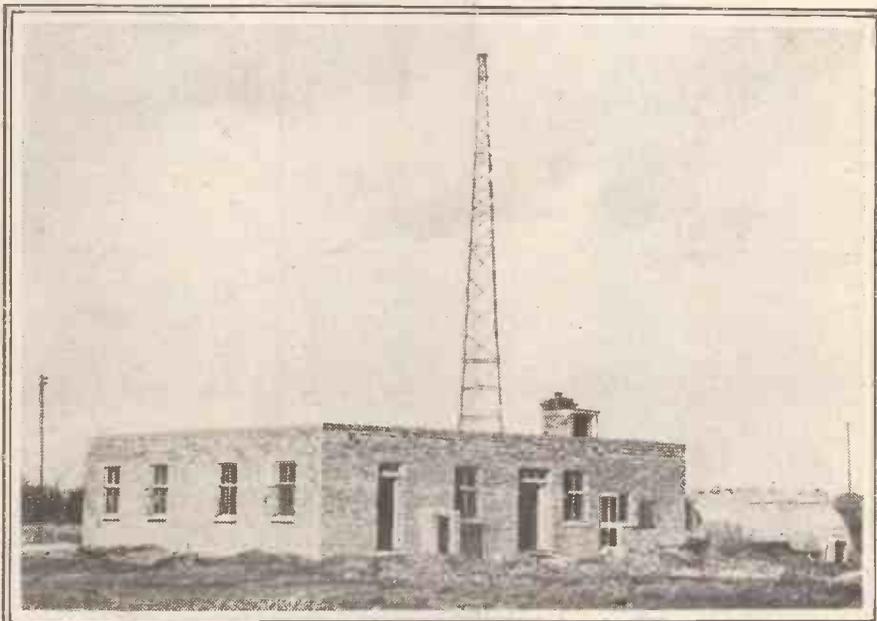
In the forefront of them that are against you will be Your Young Brother. Right in the front will he take his stand. And when all the people listen, he will listen. He, too, will hear nothing. But he will miss nothing!

you, and there you will kick yourself. Good and hard will you kick yourself, in the silence of that night.

And in the hour before the dawn you will see the error of your ways. And you will take a sheet of paper—a sheet of pure white paper, whiter than the driven snow—and on it you will write words of wisdom. And these are the words of wisdom that you will write:

### MEMO. FOR HAPPY CHRISTMAS (WIRELESS).

1. Is the accumulator properly charged?
2. If doubtful, arrange for spare accumulator, or some emergency supply.
3. Check up H.T. battery voltages. Renew if necessary.



The Air Ministry's new wireless station at Mitcham, Surrey, which, as this photograph shows, is now nearing completion.

And, when the silence can no longer be endured, he will grin. Your Young Brother will grin like anything. At you!

Bert, his bosom pal, also will grin. Bert will snigger and grin. Your Young Brother and Bert his pal will snigger and grin together. And all the people will join together and do likewise.

But you, and you only, will not grin. You will sneak off to an upper chamber in that house, and shut the door behind

4. Don't forget to switch set off, in excitement of Christmas Eve.
5. Glance over aerial and earth connections.
6. See that loud-speaker plugs, flex, etc., are in good order.
7. "Turf out" old grid-bias battery and renew, if voltage down.
8. Get that new valve in, if funds allow. (N.B.—"It's better to be sure than sorry.")

# The Haunted "Ham"

The story of a series of sinister events in an empty house.  
By HIGHAM BURLAC.

EVERYTHING in this story is true, and far from being supernatural is very natural indeed, especially the horror. I should have welcomed a genuine ghost, because you can understand a ghost; better still, you can see the blighter. It is the unseen and mysterious that makes your scalp tighten and your heart "knock."

It was late on Christmas evening. I and my small family—a "bob" and a brace of threepenny-bits—had been round at a "do" with the Parker lot, and had wound up very comfortably, the youngsters at nine and the oldsters at eleven-thirty. A dryish party; nothing but slight local "draughts" occasionally when Parker and I slipped out of the room on little errands of our own devising—to fetch another pair of 'phones or a new battery and so on—and met, strangely, by the pantry. Oh, really a most proper evening, with Ring o' Roses, Musical Chairs from 2 L O and a radio revue.

## I Go Home Alone.

My wife, etc., etc., were to sleep under the Parker roof. Right bang under it, too, as I noticed when I put young George to bed. When my head hit the dormer I felt like a chick must when it takes the first bump at the eggshell. Parker gave me the choice of the sofa and the bath, but as we had had late summer holidays the memory of the bed at Quaystown still rankled—on



"Then the mat began to slide, me with it"

my hip-bones—so I decided to go home. This, I said, would be mighty convenient, as I particularly wanted to sit up for Yokohama Radio.

It was pitch-dark outside, and very quiet. As I walked I started to whistle, but it sounded—well, like whistling in church, so I shut off. I noticed that a black cat ran across my path, and that a dog was howling a sort of death-watch in the butcher's yard. Also I tripped over a

grating and, in addition, stepped off the pavement before I was aware I had reached the kerbstone. I nearly snapped my tongue off and the incident joggled my nerves.

I reached my house. If you have not noticed how much darker, how sinister a house looks late at night when you know it is empty, just make an observation on the next convenient occasion. It looks as



"... how sinister a house looks at night when you know it is empty"

though it hides some gruesome secret within its black walls; a corpse, say, with a gibbering maniac beside it, seated on the ruins of the furniture.

Overcoming some such childish fancy I pushed boldly at the front garden gate. It was immovable! Then I noticed a faint rush of perspiration, a mere clamminess. I felt for the handle, but the darned thing had disappeared! Beyond a joke—what? Feeling in need of relaxation I tottered away, leaned my forehead against a nice cold lamp-post, and tried to size it up.

## Things Begin to Happen.

Well, of course, I found the handle on the right-hand side of the gate, whereas I had tried to open the left.

As soon as I set foot on the mat just inside the front-door, I began to perspire freely. Added to the smell of the Christmas pudding which had been boiled in the morning, one of the most clinging odours known to householders (though not in the same class as that of boiled cabbage), there appeared to me to be a new smell abroad which boded me ill. Then the mat began to slide, me with it, and we brought up against the hall-stand, which shook down two walking-sticks. These sounded through the echoing house like thunder, and I fancied I heard a scuffle upstairs. Now

that smell was due to a new kind of floor-polish which caused the mat and I to glissade. So natural! Myes!

I had left a new valve in the dining-room and I thought I would grab it and go straight upstairs to my wireless room; I should need my overcoat, anyway. I got the valve and began to march upstairs, singing a snatch of song, and I was halfway up the first flight when my hat was dashed from my head. I turned in a flash, my heart beating wildly and my blood apparently frozen, but the staircase was empty save for myself.

Leaving the hat to look after itself I galloped, panic-stricken, up to my room, entered it and shut and locked the door. In pulling my hand sharply away I somehow pulled out the key, which slipped off into the darkness. Almost simultaneously I dropped the valve; I could have sworn that it was snatched away from me.

"Good lor!" I muttered, "that's a goner!" And I listened for the crash. But there was no crash! Either some unseen agency had taken the valve, or else the thing had vanished into a bottomless pit. I stepped widely over the spot and reached the other side of the "pit" in safety.

## The Vanishing Valve.

It required some courage to switch on the light, for I had no particular desire to stretch out my hand and have it, perchance, clasped icily by the intruder (if any). However, I did it. And there was my valve lying on the spongy rubber mat used by our maid when scrubbing floors.

I walked over to the valve, thinking to recover it, but as I bent to pick it up the light went out. I sprang back like a dog when it meets a snake. Sensation was piled on sensation and my nerves had by this time become as sensitive as a super-het. Before I had time to lick my dry lips the light came on again. But the valve had disappeared.

I looked under the table, just like a maiden lady looks under the bed for the fatal burglar—and there were the valve and the key side by side. I suppose I had jumped on the rubber mat and given the valve a spring off.

I was very successful with Yokohama Radio, and heard an appropriate talk on "hari-kari," which completed my happiness as you may imagine.

Next morning I found that the barometer which hung on the wall of the staircase had somehow or other let fall its hinged glass cover, which had knocked off my hat.



"I was half-way up the first flight of stairs when my hat was dashed from my head."



THIS week we arrive at the fourth stage, and nearly, but not quite, complete our task. If all has gone well you should now be in possession of a three-valve outfit that is really giving three-valve results. If it should happen that you are not quite convinced that your set is 100 per cent efficient, please do not tackle this fourth stage until you are perfectly satisfied with the present condition of the receiver. Slight faults in respect of lack of sensitivity can be "blanketed" by additional amplification it is true, but minute imperfections

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This article describes the addition of the final stage. The set is now an efficient four-valver suitable for long-distance loud-speaker work.

By G. V. DOWDING, Grad.I.E.E.  
(Technical Editor.)

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**THE EXTRA COMPONENTS YOU WILL REQUIRE.**

- 1 Low-frequency choke or an anode resistance of 250,000 ohms resistance (see text).
  - 1 Grid leak and holder (2 megohms) (Mullard, Lissen, Dubilier, etc.).
  - 1 Valve holder.
  - 1 .01 mfd. mica fixed condenser (Mullard, Clarke Bros., Lissen, Dubilier, etc.).
- Terminals, wire, etc. See article before buying new components.

in reproduction will be magnified enormously. Your ideal, and the one I trust you will achieve, must be optimum sensitivity together with faultless reproduction.

The last stage is another low-frequency

amplifier, and with this really powerful loud-speaker results should be obtainable from quite a number of stations. I have chosen the choke-coupled method for this ultimate amplifier, although constructors who prefer resistance-capacity coupling can have this. The only alteration is the replacement of the low-frequency choke for a 250,000-ohm wire-wound resistance.

**The Choke Coupling.**

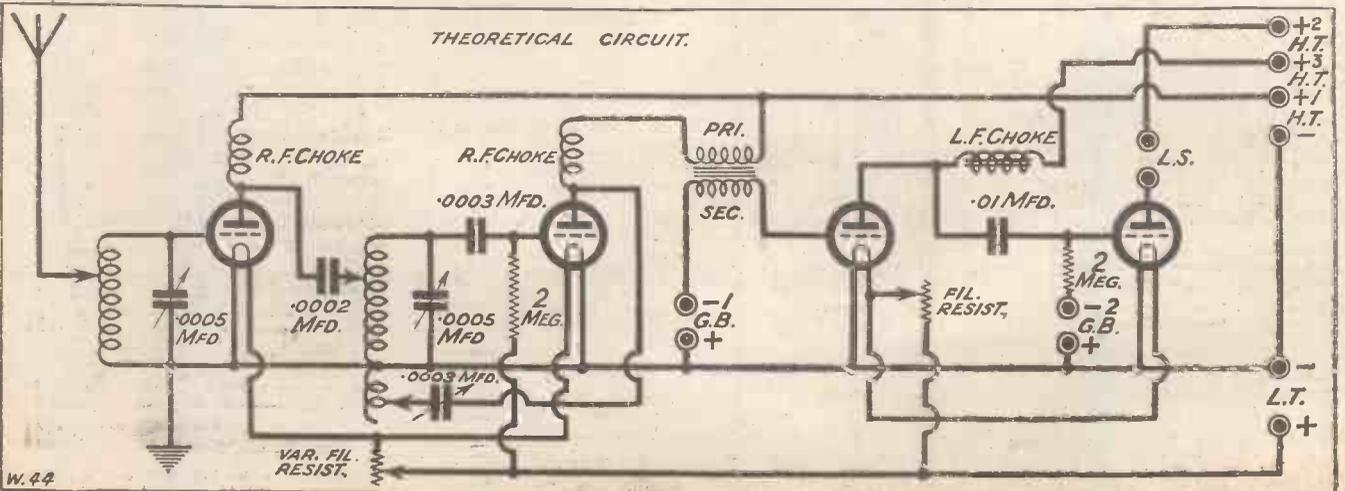
Now refer to the theoretical diagram, and I will give you a brief description of how our choke coupling operates. Instead of the plate of the third valve being connected to the loud-speaker terminals as it was formerly, it is now joined to one side of a low-frequency choke. A low-frequency choke is, as its name suggests, something which tends to prevent the passage of low-frequency currents such as

are present in the anode circuit of a low-frequency valve, and which operate loud speakers and telephone receivers.

So instead of flowing round the H.T. battery-L.T. circuit through the choke, the low-frequency impulses from the third valve are diverted through the .01 mfd. fixed condenser on to the grid of the fourth valve. They are then handed over to the loud speaker in a considerably magnified form. Now, much of the purity of the reproduction will depend upon the careful selection of the values of the choke, .01 fixed condenser, and grid leak. From a purely constructional point of view the addition of this last stage will present no difficulties whatever, more especially after your experience with all the preceding stages, but if your results are to be really good I must impress upon you the importance of adhering to the stipulated values of components, and the necessity of selecting them with care.

The fixed condenser must have a capacity of .01 mfd.—no more and no less. And it must be of a really first-class make, preferably one that has mica plates, such as

(Continued on next page.)



\*-----\*  
 \* "PROGRESSIVE" FOUR. \*  
 \* (Continued from previous page.) \*  
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the large capacity Dubilier Mica Condenser. The grid leak, too, must be above reproach both in respect of correctness of value and in reliability. Do not purchase one of doubtful origin. A grid leak made by one of the first-class firms in the country is an inexpensive item.

**A "Key" Component.**

Finally, the low-frequency choke is a real "key" component, and if it is "dud," then the remaining part of the set could be superb without rendering the final results passable. The main requirements of an efficient low-frequency choke are that it should be able to handle a fair amount of steady current without reaching a point which is known as saturation, and that it should possess a pretty high inductance.

If it can handle up to 5 or 6 milliamps of anode current (H.T. which flows in the anode circuit of the third valve), and has an inductance of at least 50 henries, then there cannot be much wrong with it.

Do not buy an unbranded low-frequency choke, and one that does not carry the guarantee of the name of a leading British manufacturer. There are plenty of good

low-frequency chokes to choose from, including such stalwarts as the Marconi-phone, R.I. and Varley, Pye, Ediswan, etc., etc. Somebody may tell you that an old low-frequency transformer can be used as a low-frequency choke in some way or another. And so it can—but not in the "Progressive!" Here you must  
 (Continued on next page.)

\*-----\*  
 \* WIRING INSTRUCTIONS. \*  
 \*-----\*

Remove lead number (9) from 'phone terminal and join it to one terminal of low-frequency choke.

Now proceed with the new leads.

Join 'phone terminal now disconnected to the plate terminal of the fourth (new) valve holder (36).

Join one filament terminal of new valve holder to one filament terminal of third valve holder (37).

Join other filament terminal of new valve holder to other filament terminal of the third valve holder (38).

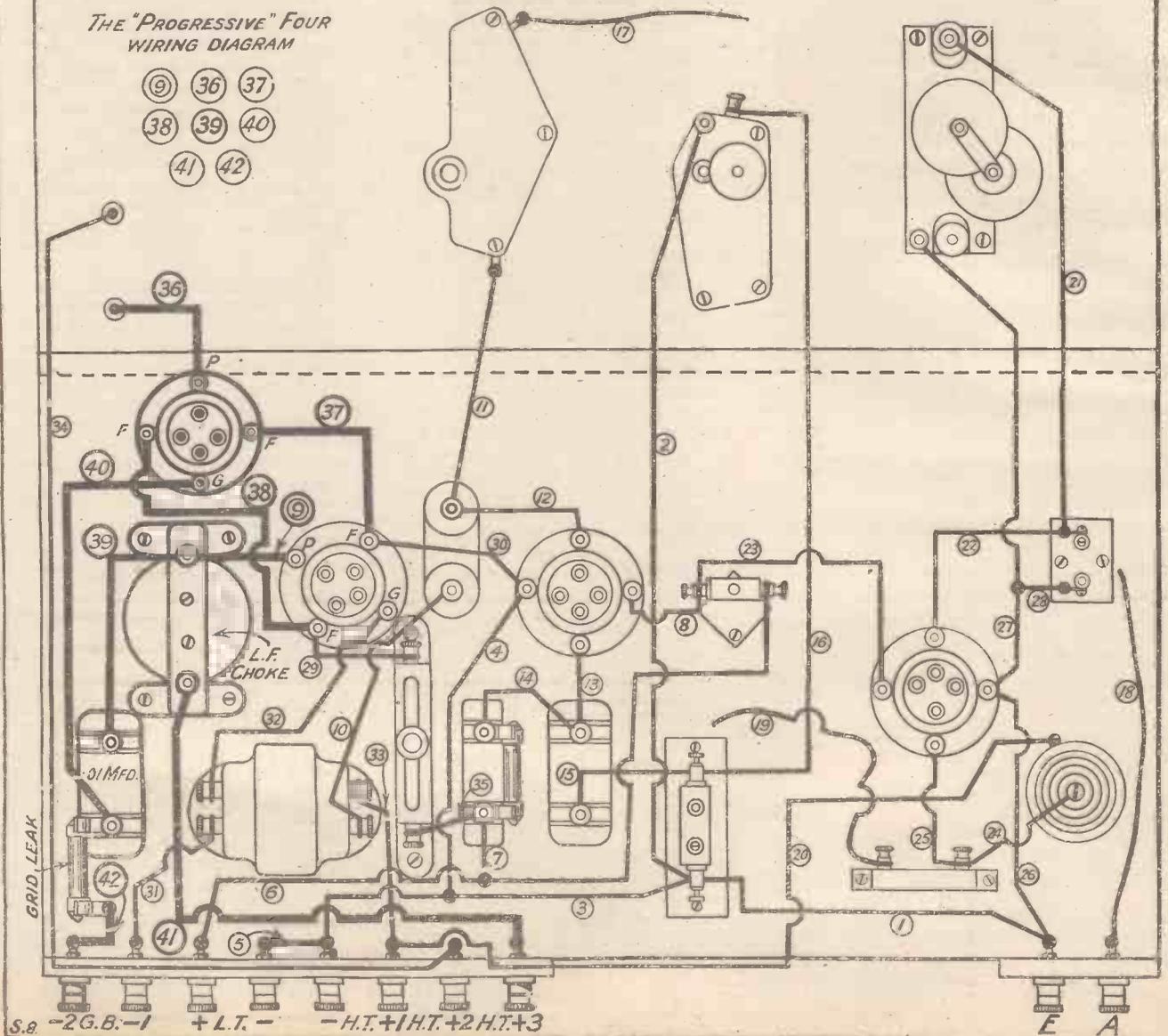
Join terminal of low-frequency choke, which is also connected by lead number 9, to one terminal of the .01 mfd. fixed condenser (39).

Join grid terminal of new valve holder to remaining terminal of .01 mfd. fixed condenser (40). (This terminal of the .01 mfd. fixed condenser holds a grid leak clip.)

Join remaining terminal of low-frequency choke to the H.T. +3 terminal (41).

Join grid leak to G.B. -2 terminal (42). There are 7 new leads.

THE "PROGRESSIVE" FOUR  
 WIRING DIAGRAM



**"PROGRESSIVE" FOUR.**

(Continued from previous page.)

place yourself above compromises and wangles and see that the best you can afford of everything is used.

Well, the only remaining items required are another valve holder and two more terminals, and then you can start the constructional work of the week. You

this is soldered to a small piece of wire, which in its turn is fastened to the new grid-bias terminal. If you are going to adopt the same scheme I should advise you to get it all fixed before you finally screw the condenser down on to the base-board.

Now, I do not think I need say much more about mounting the components or even the wiring, but there is just one little point I must bring to your notice. In

cannot quite dig out the sense of this last paragraph by ignoring it you will not be missing anything vital.

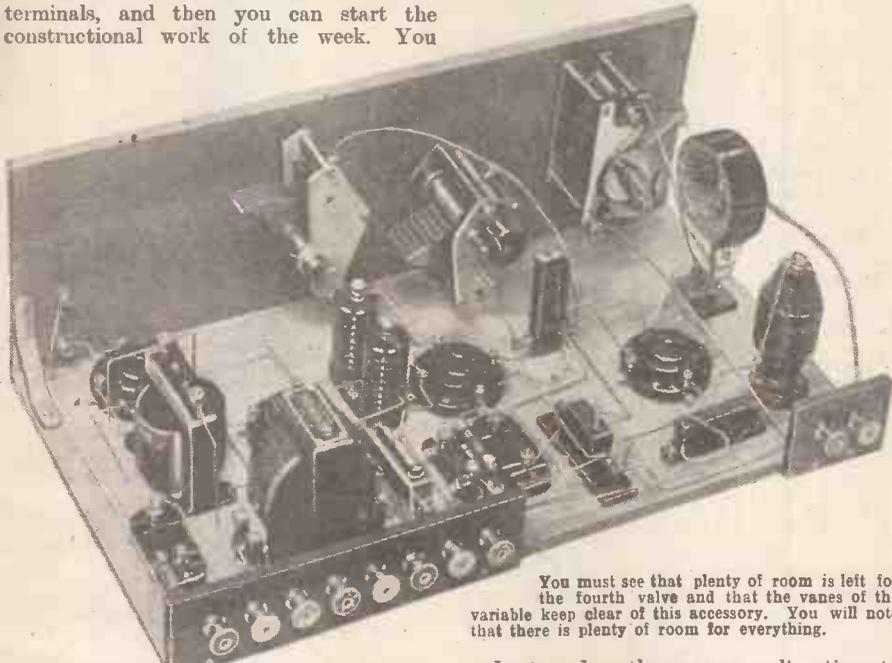
As before, I am showing all the new components and wiring in thicker lines on the wiring diagram than all the existing gear and its wires. This, together with the numbers and the wiring instructions, should prevent you from going wrong. But do not forget to cross out those numbers in the top left-hand corner of the diagram as you connect up the appropriate leads.

There are still one or two little things I am going to ask you to do before I write "finis" to this series, and these I am going to leave over until next week. Therefore, if you notice the omission, so far, of a few of what you yourself consider rather vital pieces of gear, please have a little patience. Everything of real importance to the operation of the four valves is now arranged for, and before we come to embellishments I want you to get the set to work to your own full satisfaction.

**The New Battery Adjustments.**

In this last valve holder an L.F. valve of the power type is essential, and even a super-power valve could usefully be used. As much as 15 volts grid bias may be needed, although it is possible that good results will obtain with much less than that. The grid bias needed depends upon the valve and H.T. used, and I must refer you to the remarks I made last week on the subject. Of course, the same grid-bias battery can be employed for both of the low-frequency valves. The only addition required is another flexible lead and wander plug, which should be connected to the G.B.—2 terminal. The other grid-bias connections remain exactly the same as before. This also applies to the H.T. In this case, too, another flexible lead and wander plug are connected to the new H.T. + terminal, and the plug plugged into the existing H.T. battery, the other connections standing as before.

(Continued on next page.)



You must see that plenty of room is left for the fourth valve and that the vanes of the variable keep clear of this accessory. You will note that there is plenty of room for everything.

will find that there is only just about enough room for the new components, although it will not be necessary to do any "crowding." The valve holder is placed well back on the baseboard, and you must see that even when a large valve is used that this will clear the vanes of the variable condenser.

I have had a special photograph taken to show clearly the disposition of these new parts, and from this you will easily be able to obtain guidance for the disposal of your own individual new components.

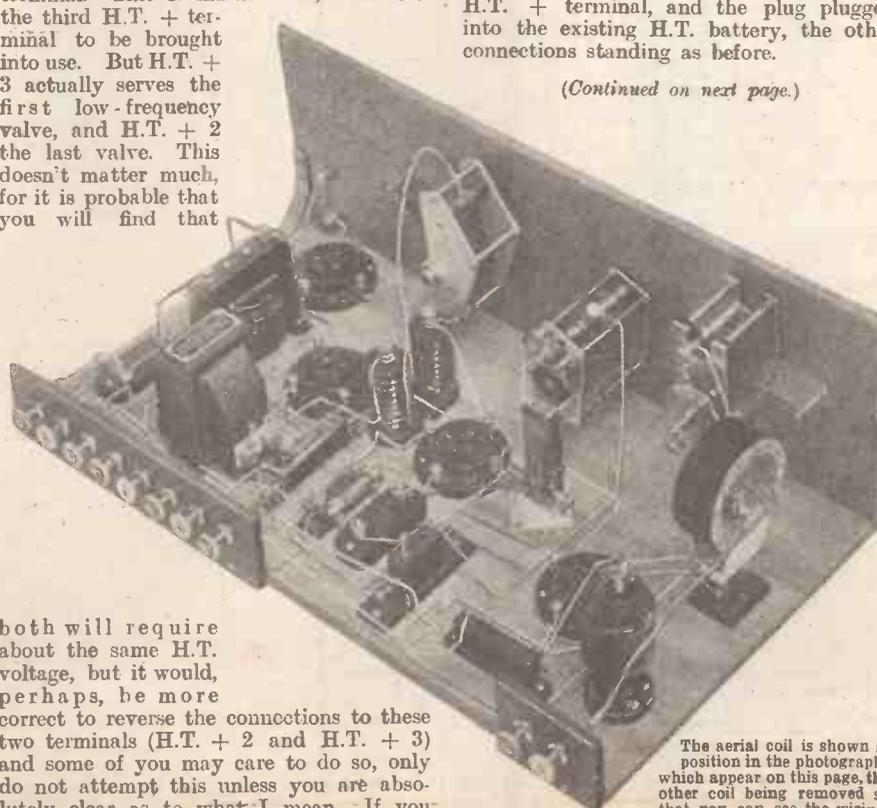
**One Lead Alteration.**

You have only to alter one of the old leads and I think that it may be better if you disconnect it right away. Lead No. 9 is the one in question. This should be disconnected from the lower loud-speaker ('phone) terminal. Its other end need not be disconnected, and the lead can be left sticking straight up in the air until it can be reconnected to the new point—a terminal of the low-frequency choke. Of course, the lead can be removed entirely if you prefer this and an entirely new one snipped off and connected up in due course. No. 9 lead still retains its old number, but in the diagram it is enclosed within a double ring instead of in a single ring in order to remind you that something happens to it.

Have you noticed the manner in which I have disposed of the grid leak? It is held in two of Messrs. Dubilier's grid leak clips, and one of these is fastened under one of the terminal screws of the .01 mfd. fixed condenser. The other clip is fixed by means of a small nut and screw to an ordinary soldering tag of small size, and

order to reduce the necessary alterations to the existing wiring to the lowest possible number, I have shown the low-frequency choke connected to the new H.T. + terminal. This is marked "3," for it is the third H.T. + terminal to be brought into use. But H.T. + 3 actually serves the first low-frequency valve, and H.T. + 2 the last valve. This doesn't matter much, for it is probable that you will find that

both will require about the same H.T. voltage, but it would, perhaps, be more correct to reverse the connections to these two terminals (H.T. + 2 and H.T. + 3) and some of you may care to do so, only do not attempt this unless you are absolutely clear as to what I mean. If you



The aerial coil is shown in position in the photographs which appear on this page, the other coil being removed so that you can see the wiring.

“PROGRESSIVE” FOUR.

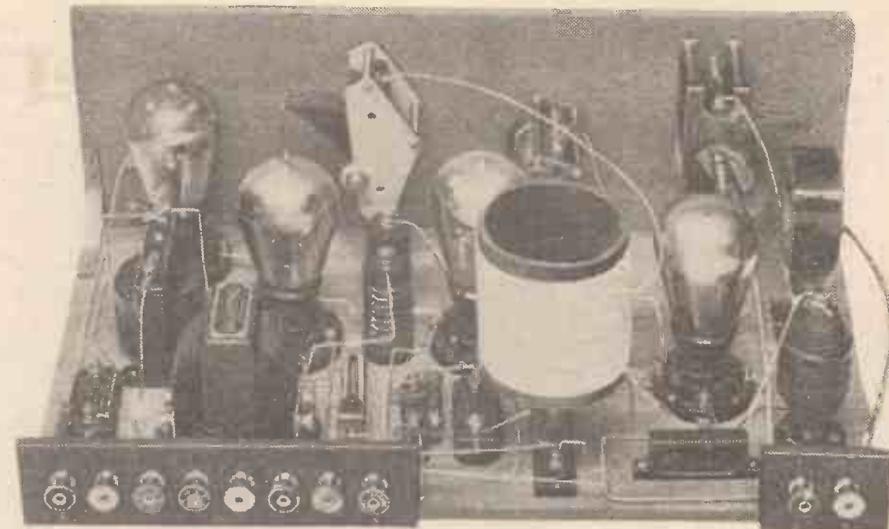
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Let me just refresh your memories in respect of H.T.'s, valves and etc., at the same time as I run over the requirements of this last stage of low-frequency amplification. In the present high-frequency position a high-frequency valve of the medium impedance type should be used, such as the P.M.1, D.E.3H.F., etc. As a detector a general-purpose valve of the “H.F. Det.” type will be found to give good results, and of these among 2-volters are the D.E.2., Cossor Point One, and so on. A power valve should be used in the first low-frequency position. Among 2-volt power valves we have the P.V.2, D.E.P.215, Stentor 2, and so on. There are several 4-volt power valves, and quite a number in the 6-volt class.

The Last Stage.

A super-power valve can be used with advantage in the last stage, although here an ordinary power valve will function very well, unless the volume is particularly great and a pretty large speaker in use.

The H.T. + 1 terminal should be taken to a tapping on the H.T. battery somewhere around 60 volts, while anything between 99 and 120 will be needed for H.T.'s + 1 and 2. These and the grid-bias voltages you must adjust yourself until you are satisfied that the sensitivity and tone of the set are all that can be desired.



Here is the completed set with valves and coils in position. The terminals, reading from left to right, are: G.B.-2, G.B.-1, L.T. +, L.T.-, H.T.-, H.T.+1, H.T.+2, H.T.+3, and on the small strip E and A.

WHY VALVES BECOME PARALYSED.

PROBABLY the majority of dull-emitter valves at the present time still employ the so-called thoriated tungsten filament. There are, of course, an increasing number of valves now on the market with special filaments of other materials than tungsten. But as the thoriated tungsten and the oxide-coated filaments were the original dull-emitters, these still hold the field.

The electronic emission from the thoriated tungsten filament depends upon the presence of a very thin layer of thorium molecules or atoms on the surface of the filament. It should be noted that, unlike the oxide-coated filament used in many valves, the thoriated tungsten filament is not merely coated, but is permeated throughout its entire mass with thorium or thorium oxide.

During the normal operation of such a filament the thorium on the surface, which has a very high electronic emissive power, is continually “evaporated.” If there were no more thorium to take its place, the thin thorium coating on the surface would soon be lost, and the electronic emissivity of the

filament would gradually fall to that of an ordinary unthoriated tungsten filament. The effect of the proper temperature, however, is to “boil” fresh thorium out of the mass, converting the thoria into thorium and continually replenishing the very necessary and delicate thorium coating on the surface.

Every experimenter knows that it is very important not to raise the temperature of a thoriated tungsten filament very much above the rated temperature. If this is done the thorium is driven completely away from the surface, and the emission falls. By a kind of “juggling” with the filament temperatures afterwards it is possible to “boil out” more of the thoria, converting this into thorium, and so to put back the filament into more or less its original condition. So much for the use of too high a temperature.

Insufficient L.T.

What is not so commonly known, however, is that the operation of the thoriated filament at too low a temperature is also very bad for the filament. In this case the “boiling out” of the thorium becomes abnormally retarded, and there is insufficient thorium produced at the surface for the proper electronic operation of the valve.

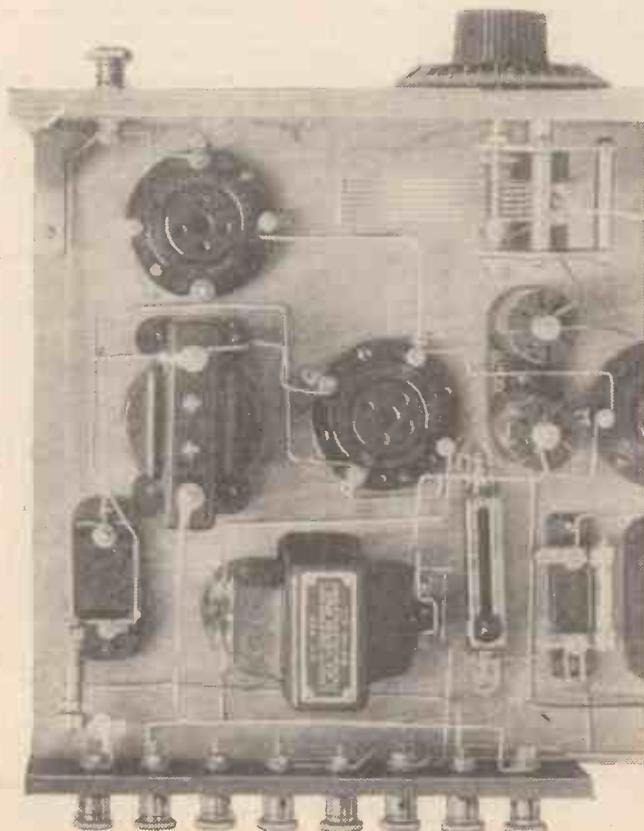
Hence it is very important that a thoriated tungsten filament valve should be operated strictly at its rated filament voltage. This may be done, either by means of individual rheostats (using an accurate voltmeter occasionally), or perhaps more simply by means of the so-called self-adjusting or automatic rheostats.

DISCOVERY DATES.

Marconi invented the aerial in 1896, and was granted a patent for it in 1897.

Dr. Fleming, of London, invented the valve detector in 1904, and it was not until four years later that the grid was introduced by Dr. Lee de Forest.

Reaction was discovered about the year 1913.



This photograph clearly shows the L.F. stages of the receiver, including the choke-capacity coupled one, the addition of which forms the subject of the accompanying article.

# The House on the Cliffs



THE SCENE, as the title suggests, takes place at a lonely house on the cliffs, ten miles from anywhere.

(In the oak-panelled room, JAMES FRENESHAM, grey-haired and very worried-looking, is busily writing. There are two other characters. One of them is Mr. Murgatroyd, in charge of the police-station at the village of Fairbanks, whose inhabitants are so narrow-



"You called, sir?"

minded that they think the famous film star took his name and makes all his films in their honour. MR. MURGATROYD is of the opinion that one day he will be one of the Big Four. Unfortunately no one shares that opinion with him. The other is MARTHA, the house-keeper. There is also ROBBINS, a policeman.)

(The scene opens with JAMES FRENESHAM muttering angrily to himself, and throwing his pen on the table with a gesture of dismay.)

FRENESHAM: Terrible! Terrible! (His heavy sigh can be heard, and he starts to pace the room.) To think that twenty-four hours ago I was the happiest man alive. Now I'm not even alive! Confound women, they wreck a man's happiness with as much thought as—as—. Good lord, why, even words fail me! I must be going mad! Yes, that's what's wrong with me. It's this continual loneliness, the never ceasing howling of the wind, the monotonous beating of the raindrops on the windows that is driving me mad, and then—oh, but it's impossible! I can't

A short, breezy little sketch that has been specially written for broadcasting. The author has produced several revues for the B.B.C. and is well known as a producer on the legitimate stage.

By OSCAR M. SHERIDAN.

have gone as far as all that to have—  
Hello! Who can that be?

(He stops in his stride as he hears the moaning of the wind and, in the distance, the slam of a door.)

Who's there? There's nobody, of course. My nerves are all on edge. What a fool I was to ever come here. I might even be murdered and nobody would be any the wiser, that is, of course, excepting Martha. Martha, ha! she might even do it herself. I've always been suspicious of her. She doesn't drink, which is always a bad sign in a cook.

(Again the moaning of the wind. Again the slam of a door.)

I had better see who is there? (He goes to door and opens it.) Who is that? Martha! Martha! Are you there? Heavens, what a holiday! Living in a gale-swept house with a deaf cook, and a rotten one at that. Bah, I'm getting foolish in my old age! I must be sensible and be ready to face the consequences. At any moment now my search may be ended, and I shall capture the elusive thing they call—what's its name? Why, I've even forgotten that. M'm! I think a drink will do me good. I'll ring the bell. With a bit of luck she'll hear me. (He rings a loud bell.)

(There is a knock at the door. Enter MARTHA.)

MARTHA: You called, sir?

FRENESHAM: No, Martha, I rang.

MARTHA: What's that? You heard a bang? It must have been the door of the gar-ridge.

FRENESHAM: I didn't say I heard a bang, Martha, although I did.

MARTHA: Then why didn't you?

FRENESHAM: I said I rang, I didn't call!

MARTHA: I wasn't in the hall.

FRENESHAM: I never said you were. (He shouts at her, going close to her.) Whisky, Martha!

MARTHA: Not on your life.

FRENESHAM: Why not?

MARTHA: I'm not going to let you kiss me. So there, Mr. Frensham!

(Exit and bangs door.)

FRENESHAM: A lunatic asylum—I knew it! (He opens door.)—Martha, come back!

MARTHA: Well, what is it this time?

FRENESHAM: I want a drink. (Puts finger in cheek and produces popping noise.)

MARTHA: Well, why didn't you say so first time?

(Effects of getting drink.)

FRENESHAM: Ah, that's better.

MARTHA: I posted it, sir.

FRENESHAM (with sarcasm): Good-morning!

MARTHA: Not yet, sir, you see 'e's got galloping presumption, but he ain't dead yet.

FRENESHAM: While there's life there's hope.

MARTHA: That's an idea, sir, we've tried everything but soap.

FRENESHAM (gently): You know, Martha, you really must go to bed. It's very late.

MARTHA (laughs coyly): Fancy you calling me Kate. You know it's Martha. Well, I suppose you people must have your joke. Good-night, sir!

FRENESHAM (shouts with all his force for fear of being misunderstood): GOOD-NIGHT!

MARTHA: All right, I'm not deaf.

(Bangs door as she exits.)

FRENESHAM: Well, that's over! Now I'll be able to think things over quietly. First there was the murder. Then the inquest at which Mona gave false evidence. Why did Mona do that, I wonder? Is it because she was afraid that her lover



"He says it's a murder."

would know? Um! Most probably. It's a pity, though, because that would have helped in clearing matters a great deal, her failing to give true evidence, I mean.

(Continued on nex' page.)

## THE HOUSE ON THE CLIFFS.

(Continued from previous page.)

And then on top of the awful tragedy comes the death of Mona. It is two hours since she was found by Martha. I wonder. After all, it would take them two hours to get here. They've only got a pony and trap, or perhaps a horse, at Fairbanks, and that fool of a Murgatroyd would never suspect. If he did I could be away from here in say ten minutes at the utmost, after doing the rest and getting rid of the body. If the body were found that would spoil everything. Mona is full of vanity. The mere fact of her disappearance would keep her in the public eye for a bit, and that might console her over her untimely end. I'm sorry, Mona, but it had to be done. How coldly one can review the sordid details of a murder after it's been done! Ugh! it makes me shiver, even I to whom murders are a common occurrence. This makes the seventeenth, and slowly but surely the net is drawing tighter and tighter. If I carry on in this way much longer, there will be no escaping. Well, here goes. (He picks up the telephone.) Hallo, is that the Exchange? My name is Jasper Bevan and I want Fairbanks 10. How long will I have to wait? It's direct, isn't it? Oh, hello, is that Fairbanks Police Station? I want to speak to Sergeant Murgatroyd. My name's Bevan.

(ROBINS, the POLICEMAN at Fairbanks police station answers the 'phone.)

ROBINS: Who is that? Well, Mr. Bevan, h's h't very important, because I'm afraid that Mr. Murgatroyd is extremely busy reviewing the facts of some missing jools.

(Mr. MURGATROYD is busy reading a paper, but nods approvingly at his assistant.)

MURGATROYD: That's the stuff. It's aducive to the nonentity of crime, that's my motter.

FRENSHAM: You may tell him it's not very important. It's only a murder.

ROBINS: A what?

FRENSHAM: Murder. MURDER. M.U.R.-D.E.R.! You surely know what they are. They have them in every country where the police system is perfect.

ROBINS (turning to Mr. M.): He says it's murder, sir!

MURGATROYD: No! at last, my chance has come! Give me that 'phone. Fetch that gun out of the drawer and give me those cuffs—no, the silver ones, you fool. This is a special occasion. Hello, this is Sergeant Murgatroyd speaking,

FRENSHAM: Oh, yes.

MURGATROYD (interrupting): Sergeant Joseph Murgatroyd, to be correct.

FRENSHAM: Of course.

MURGATROYD (interrupting again): Sergeant Murgatroyd in charge of Fairbanks Police Station.

FRENSHAM: I know all that, sergeant.

MURGATROYD: And anything you say will be taken down in evidence—no, that's wrong. Wot's this 'ere mudrer? Wot h's the name of the injured, and wot is your name? Let's be systematic about it. Give your or 'is or 'ers first, accord-

ing to alphabetical order. Wot's the first name?

FRENSHAM: Bevan.

MURGATROYD: Is that the murdered man's or the present speaker's?

FRENSHAM: I'm Mr. Bevan.

MURGATROYD: Ah yes, of course. Now perhaps you'd give me a few details about the murder. Was the person alive when it was committed?

FRENSHAM: Yes.

MURGATROYD: Was it a 'e or a 'er, and wot was the name?

FRENSHAM: It was a 'er, I mean a she, and her name was Mona Lawrence. She was beautiful, and when found was attired from head to foot in scarlet with a dagger in her heart.

MURGATROYD: 'Orrible!

FRENSHAM: I beg your pardon?

MURGATROYD: I was commenting.

FRENSHAM: Oh yes, of course. Now will you please listen without interrupting?

MURGATROYD: Certainly, in anything I does not clearly understand I shall submit you to cross-examination.

FRENSHAM: I agree. The body was lying prone on the floor of the oak-panelled study of the House on the Cliffs.

MURGATROYD: Not the 'aunted 'ouse!

FRENSHAM: The very one, sergeant.

MURGATROYD: Um, that makes the case clearer.



"Was it an 'e or an 'er, and wot was the name?"

FRENSHAM: I'm glad you think so. To proceed. The body was in front of the fire and in the grate were signs that she had been burning her letters. She had not committed suicide. It is obvious by the dagger in her heart, which is an ornamental dagger, by the way, with an Italian coat of arms on the hilt, that she was murdered. Possibly the crime took place because of political reasons. It is well known that Mona Lawrence, by her beauty and cold-heartedness had been the cause of many a vendetta in the streets of Florence where she was born.

MURGATROYD: Excuse me, sir, I'm taking all this down. I 'ope you will sign it,

because this bringing Italy into it makes it rather fantarstic, I think you calls it.

FRENSHAM (testily): Of course. To proceed, there is no possible entrance down the chimney, the windows were barred and shuttered, there are no secret panels, no holes in the ceiling, and the floor boards do not come up. All the doors are locked, being locked from the inside. The important question, then, is how did the murderer get in?

MURGATROYD: I'm afraid I can't tell you.

FRENSHAM: What? Do you mean you don't know?

MURGATROYD: Well, it might have been a skeleton key.

FRENSHAM: No, it isn't.

MURGATROYD (suspiciously): How do you know?

FRENSHAM: Why, I wrote it!

MURGATROYD: Wrote what?

FRENSHAM: Why, my latest novel—"The Murder of the Purple Lady," and I can't finish it. You see, I've got her murdered and everything, and now I don't know how it was done? Can't you help me, sergeant?

## ITEMS OF INTEREST

In an overcharged accumulator the positive plates instead of being brown are much too dark—at times almost black.

Telephones or similar sensitive apparatus should not be stood near a newly-charged accumulator, as the gassing from the latter is liable to cause considerable damage.

Very sharp tuning on the high-frequency side of the set is not altogether advantageous, as it has the effect of cutting off the side bands, i.e. suppressing or greatly reducing some of the audible frequencies, which are necessary to give the full tone of musical reproduction.

Where ringing noises are troublesome it is a good plan to rest the set upon rubber sponges or some similar resilient shock absorber.

One of the commonest causes of backlash and unsatisfactory reaction control is the use of an incorrect H.T. voltage.

The B.B.C. is experimenting with spaced aerials in an effort to solve the problems of fading.

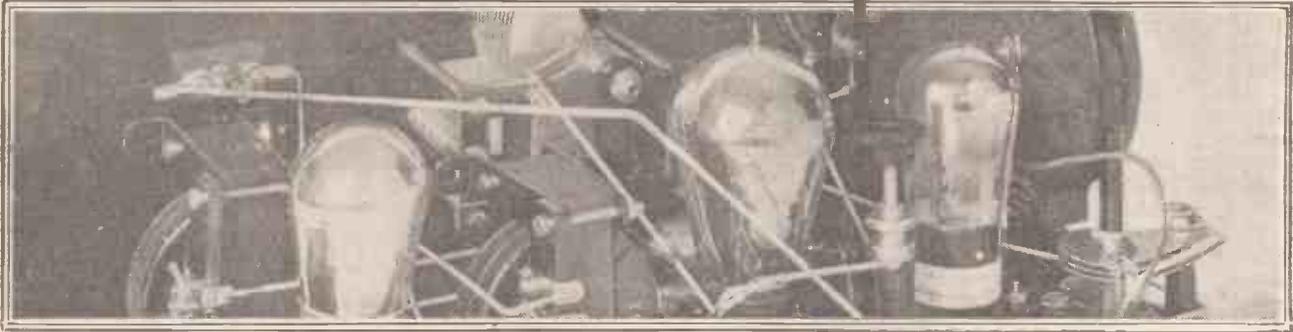
A hole which has been made in the wrong place on a panel can be filled in with Chatterton's Compound or "Glitterwax." The latter is a toy modelling substance, obtainable in penny sticks at almost any toy shop.

Instead of an L.F. transformer an anode resistance should be used for coupling, in the plate circuit of an anode-bend detector.

The level of the acid in an accumulator should never fall below the top of the plates.

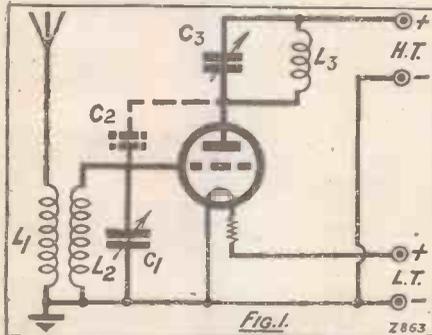
Before attempting to drill a hole in ebonite its position should be centre-punched, or otherwise the drill will tend to wander from the proper position.

# The ABC of H.F. Amplification



IN the last article in this series I explained just why it is that the simple form of H.F. amplifying circuit tends to oscillate, and showed how this difficulty grew more acute as valves became more efficient, circuits more selective, and so on. We also saw how this tendency to oscillate

\*-----\*  
 Continuing our Series for the Beginner, this article deals with  
**NEUTRALISING (Part 1).**  
 By G. P. KENDALL, B.Sc.  
 \*-----\*



can be controlled in various simple ways, commonly called "losser" methods, which, although having the desired effect of damping out self-oscillation, are not very efficient from the point of view of obtaining the maximum amplification and selectivity from a given circuit. Altogether, losser methods have now largely been abandoned for long-distance receivers, and are only occasionally used for controlling the volume on a strong local station, for which purpose they have certain special advantages with which we are not concerned here.

It now remains to discuss the more modern method of stabilising which is usually called neutralising (sometimes neutrodyning), and this is, unfortunately, far too large a subject to deal with at all thoroughly in a simple article. Actually, it could not be done properly if I were allotted the whole of this issue of "P.W.", and hence we must content ourselves with a very brief survey indeed of some of the more important forms of the neutralised circuit.

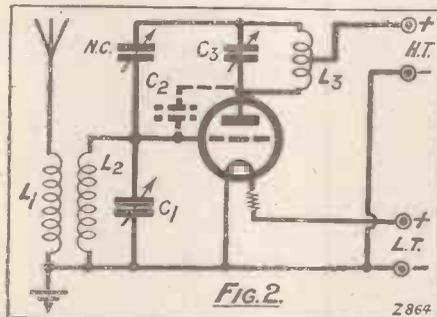
### Valve Capacity.

Let us look first at Fig. 1, where we see a high-frequency amplifying valve with a tuned-anode circuit, and one of the more modern selective aerial-coupling arrangements. Here  $L_1$  is the semi-tuned aerial coil, with the fully-tuned secondary circuit composed of the coil  $L_2$  and the variable condenser  $C_1$ . The plate to grid capacity of the valve, which is one of the main factors causing it to oscillate, is represented by the dotted condenser  $C_2$ ,

while  $L_3$  and  $C_3$  compose the tuned anode. This circuit will, in all probability, oscillate violently when the anode and grid circuits are tuned to a suitable wave-length, for the reason that the plate-to-grid capacity of the valve feeds back sufficient energy to maintain a state of continuous oscillation.

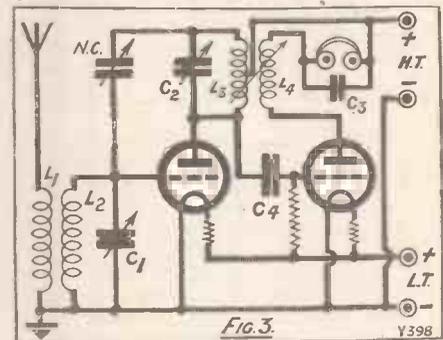
### Simple Principles.

Now the elementary principle of the neutrodync circuit is quite easy to comprehend, provided we are content with a general understanding of the main idea. What we must do is to find some means



of feeding back energy from the plate to the grid circuit which shall be opposite in direction, so to speak, to that which is fed back by the plate-to-grid capacity. What we want is sometimes called "a

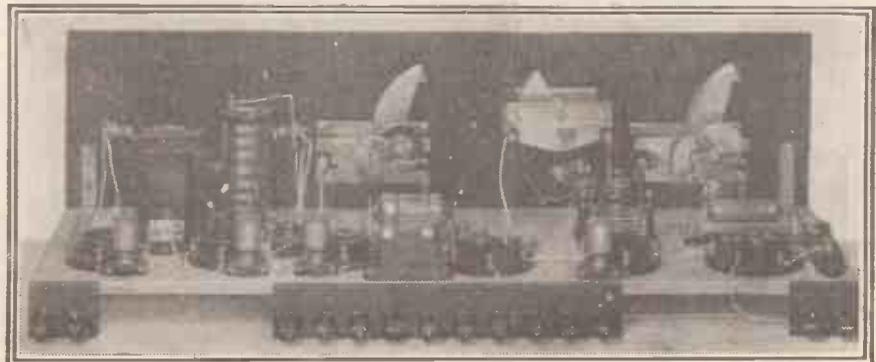
negative reaction effect," and it could be done after a fashion by coupling the coil  $L_3$  to the grid coil  $L_2$  in the opposite direction to that which would be required to produce positive reaction. This method



of obtaining negative reaction could be used to stabilise valves, and indeed has been used, but it is not very satisfactory in practice, because a suitable adjustment will not "stay put" over any appreciable tuning range, and requires manipulation constantly during tuning.

What we want is some arrangement which will feed energy back to the grid from the plate circuit, and which shall be opposite in its effect to that which is fed by the plate-to-grid capacity, and which shall at all times be exactly equal to that which is fed back through the valve. Evidently what we want is to find some point in the anode circuit which is, at any given moment, at opposite potential to the anode, and connect between this point and the grid a small condenser which can be adjusted until we find that we are feeding back just the right amount of energy.

(Continued on next page.)



This receiver utilises the well-known "split secondary" circuit.

# THE A B C OF H.F. AMPLIFICATION.

(Continued from previous page.)

If we remember that in any free tuned circuit the two ends are at opposite potentials at a given moment when oscillations are flowing therein, we shall soon see where to look for the correct point on the anode circuit. Obviously, if one end is connected to the anode, the other will be the point from which to take our negative feed-back, provided that we arrange for this opposite end to be free to assume an opposite potential at any given moment. What is meant here is that this end shall

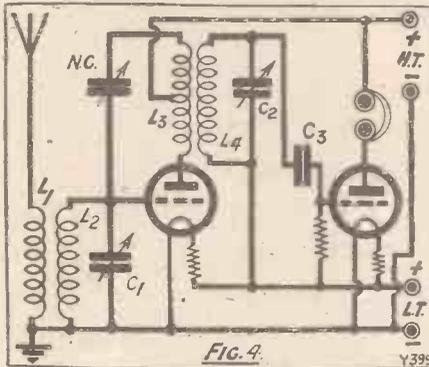


FIG. 4.

not be connected to the H.T. battery, since this is very much the same as earth, which, of course, would be always at zero potential. This point is, perhaps, rather difficult to follow, but if you think it over you will see that if we connect the centre of the coil to H.T. positive we shall achieve the desired effect, leaving the farther end free to assume an opposite potential to that of the anode end at any instant.

Thus, when the anode end is positive, the opposite end is negative, speaking in terms of H.F. potential, so that we can get our desired feed-back on to the grid circuit by means of a small variable condenser,

commonly called a neutrodyne condenser, connected between the two desired points. If we make the capacity of the neutrodyne condenser somewhere about equal to the plate-to-grid capacity of the valve, we shall find that with a little adjustment we can so arrange matters that the feed-back inside the valve will be perfectly neutralised, and the circuit will become quite stable.

This ideal state of affairs is not very easy to realise in practice, since there are certain little difficulties concerned with the use of this circuit (commonly called the split-tuned anode), and these are not very easy to overcome in practice. Consequently, it has never achieved any wide popularity, various other forms having been found rather easier to apply in practice.

Before passing on to the next type of circuit, the reader may be interested to glance at Fig. 3, which shows a practical form of the neutralised split-anode circuit, with reaction upon the anode circuit of the detector valve, this combination being one capable of giving quite good results as far as sensitivity is concerned. Its main drawback is that, unless special precautions are taken, the neutralising adjustment does not hold very constant over the tuning range.

A very much more popular neutralising arrangement is that which is commonly

called the split primary, in which a tuned H.F. transformer is used as a coupling between the valves, a comparative small primary winding being used with a large secondary which is tuned with a variable

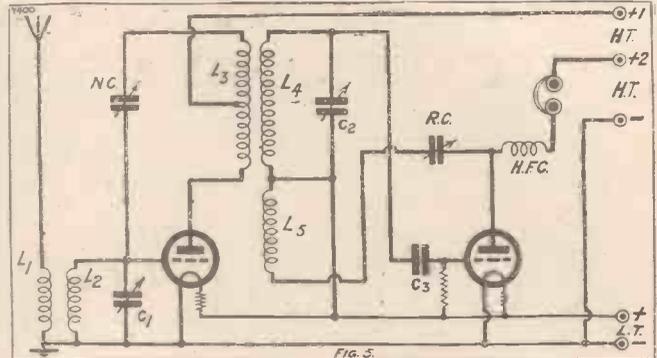


FIG. 5.

condenser. The method of neutralising will be understood quite easily if you compare Fig. 4, which is a simple form of split-primary circuit, with Fig. 2, for you will see that the anode circuit of the valve in Fig. 4 contains a coil which is provided with a centre tap very much as in Fig. 2, one end of the coil going to the anode and the other round to the neutralising condenser, while the centre tap is connected to H.T. positive.

### A Popular Device.

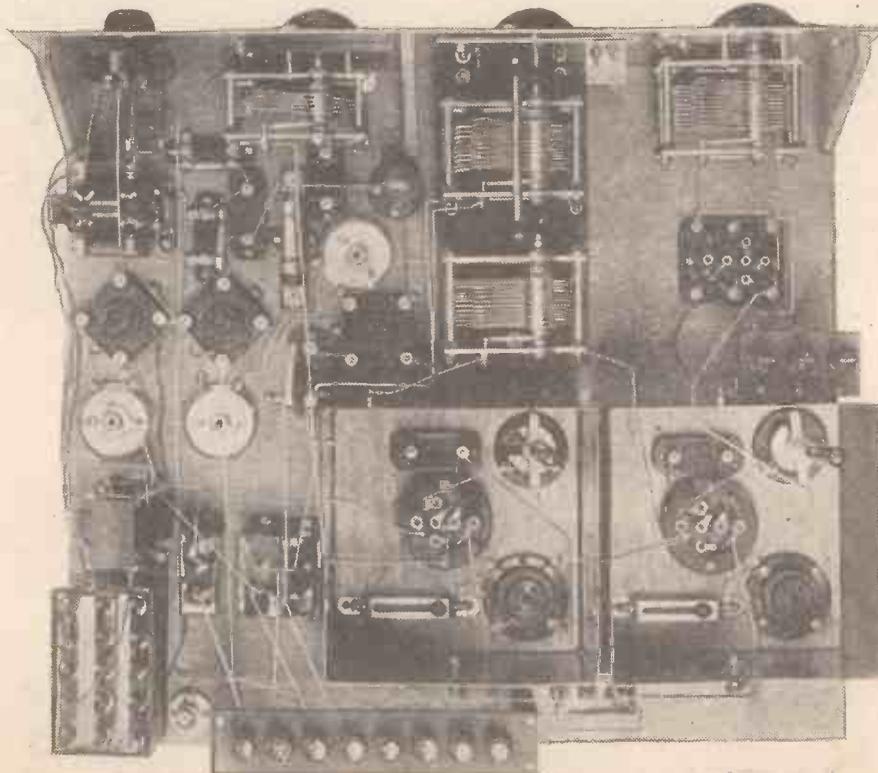
As a rule, this winding is referred to as the primary and neutralising winding, the two portions being regarded as separate windings. The functioning of this circuit, however, can be regarded as being very similar to that of the split-tuned anode, since the effect of the currents flowing in the primary portion of the winding is to generate currents in the neutralising winding which can be used to produce a feed-back on the grid of the valve which will be opposite in its effect to that which takes place through the plate to grid capacity of the valve itself.

Thus adjustment of the neutralising condenser can again be made to secure stability, and with a carefully-designed transformer a very useful degree of constancy can be obtained in the adjustment of the neutralising condenser, and in practice one setting can be made to serve for the whole of the tuning range of the set. It may not be quite perfect over the whole range, but for general purposes quite good effects can be obtained.

### A Practical Circuit.

In Fig. 5 you will find a practical form of a split-primary circuit, with the usual aerial-coupling scheme, consisting of the semi-tuned coil L1, a tuned secondary circuit L2, and a variable condenser, and then the transformer unit with the primary and neutralising windings L3, tuned secondary winding L4, and also a reaction winding L5.

This latter, it will be noticed, is of the Reinartz type, which is usual in circuits of this nature, the actual reaction effects being adjusted by means of the variable condenser R.C. An H.F. choke is, of course, customary in the anode circuit of the detector valve, and this also is shown in Fig. 5. This is a very widely used circuit, and it may be remembered it was used for the series of "Cube Screen" receivers which have been described during the last few months in POPULAR WIRELESS.



The baseboard of the "M.W. Five," a powerful and popular receiver employing a split-primary circuit.

# WHAT HAPPENED TO THE LISSEN BATTERY DURING 18 DAYS & 18 NIGHTS UNDER CONTINUOUS DISCHARGE

A LISSEN new process Battery was taken from stock on 23rd January, 1927. It was standard in every way with the LISSEN Battery you can buy at any Radio dealers.

It was put on test a day later and was discharged through a resistance of 150 ohms per cell, giving a discharge rate of 10 milliamperes.

The Battery discharged continuously under these conditions for 18 days and 18 nights, and at the end of that time the LISSEN Battery actually read 36 volts.

This is one of the most drastic tests any Battery could be put to, because it never had a chance to recuperate, which ordinary use provides.

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No Battery so stubbornly resists volt drop and has so low an internal resistance as the result of use.

This is due to the new process and chemical combination—employed only by LISSEN because only LISSEN knows the secret.

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**NAVY CUT CIGARETTES**

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N.C.C.264.

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# The Radio "Locksley Hall"



(Editor's Note : If one may judge by this recently discovered fragment, it would appear as if the prophetic faculty Tennyson shows in the published version of his famous poem "Locksley Hall" extended not only to human flight, but to Broadcasting. With his amazing prevision he even catches glimpses both of the humour and the beneficence of a system of radio stations which is destined to make the British Empire, not a far-sundered congress of dominions, but just one big, happy, and united family.)



All who dip into the future see a time quite close at hand,  
When the world shall sit and listen to the same percussive band ;  
When the latest fox-trot trembles to the far Antipodes,  
And the Charleston, and Black Bottom ride the gales of all the seas.  
You shall hear the Weather Forecast, when your own is very vile,  
Of those heaven-reflecting places where the skies for ever smile ;  
And, when you are sitting gasping in the grip of heat and drought,  
You shall catch upon the ether news of frost and waterspout ;  
Thus may Cape Town, cool by proxy, bask upon the Polar ice,  
And our foggy London borrow Fiji's solar paradise !

Sitting on the beach at Brisbane you shall hear the pleasant chime  
Of Big Ben, 'mid London's traffic, giving Earth her Greenwich Time ;

Pioneers of range and prairie, wanderers of the scrub and bush,  
May be linked to English woodlands by the nightingale and thrush ;

Atmospherics quite abolished, Perth shall chat with Ottawa,  
Much as village politicians, simply-wise, lay down the law :

Saying : "Canada is calling for more men to till her land."  
Saying : "West Australia's people would not make a crowded Strand."

Saying : "Million miles of Empire waiting for the sower's seed,  
Waiting to produce the foodstuffs Britain's crowded cities need."

Why should men stand idly waiting in a hopeless, workless queue,  
When there are ten million acres battenning the kangaroo ?

When the Empire is united by a viewless radio ring,  
When we hear each other's laughter, hear each other talk and sing,

We shall be one happy fam'ly, sitting round the Christmas fire,  
Harkening to Christmas Carols, sung by Santa Claus's Choir.

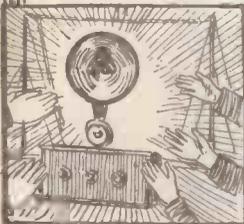
We shall know each other better, shall not feel so far away,  
Friends and neighbours, happy-hearted, swopping gifts on Christmas Day ;

Thus may Wireless be an Angel heralding goodwill and peace,  
And the war-drum's throb shall silence, and the shout of battle cease ;

Why should not the British Empire, blended to one perfect whole,  
Bring the prophesied Millennium from circumference to pole ?

For, when men are truly brothers, language will not matter much,  
Since I hold that Love's coherent, though it talk in Double Dutch !

A. B. COOPER.



# WHAT IS "LOUD SPEAKER STRENGTH"



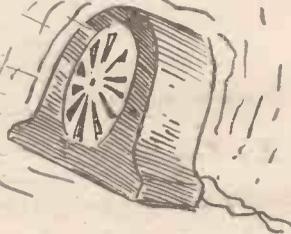
-DOES IT COUNT IF YOU HAVE TO STOP THE CLOCK - HOLD YOUR BREATH AND PUT YOUR HEAD INSIDE THE SPEAKER?



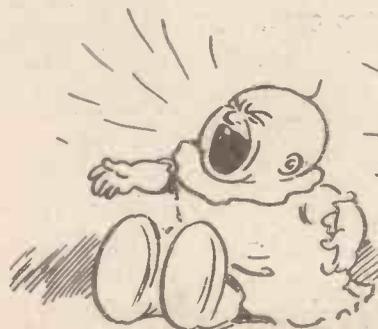
AND WHAT ABOUT INVOKING THE ASSISTANCE OF A STETHOSCOPE? THEN ONE HEARS OF AMAZING PERFORMANCES OF



"BABY" MODELS - PERHAPS THE TERM "LOUD SPEAKER STRENGTH" APPLIES - ALTHOUGH IT MIGHT BE NECESSARY TO USE TWINS IN THE WAY SHOWN.



THEN AGAIN - SOME ENTHUSIASTS' IDEA OF LOUD SPEAKER STRENGTH IS WHEN THE 'SIGNALS' EMITTED SHAKE THE HOUSE TO ITS FOUNDATIONS.



-AND EXCEED IN VOLUME ANY OF THESE!

EDW. SHAW



**F**OR the last time, T'mala, *what did you do with those bonds?*"

The voice of the Chinese villain of the piece appears to come from some point on the stage, yet just where it originates is a puzzle not likely to be solved by a lay audience.

Wireless enthusiasts hearing it during one of the thrilling episodes of "The Silent House," at the Comedy Theatre, will probably be apt to suspect a whole battery of loud speakers concealed in nooks and crannies all over the stage, and it will very likely be something of a surprise to them to

Two people are alone trapped in an Oriental "Chamber of Horrors"—when suddenly a mysterious voice speaks to them—apparently from nowhere! Such is one of the many surprise situations provided for the audience at the Comedy Theatre (where "The Silent House" is drawing thousands of people) by the "P.W." Technical Staff.

It was quite evident that any ordinary horn type of loud speaker was barred, and further that the amplifier must be specially designed to take good care of those lower frequencies of which we hear so much nowadays.

Furthermore, the amplifier must be capable of being brought into use by entirely non-technical operators, must require no adjustment before use, and must be one hundred per cent reliable.

**The R.C. Amplifier.**

Again, there must be no noticeable click from the loud speaker when it was turned on and off, and finally all the wiring must be carried beneath the floor. Fortunately, this latter point could be left in the hands of the theatre electrician, but the difficulties remaining were sufficiently formidable.

Finally, after much anxious debating of ways and means, an amplifier containing three stages of resistance coupling was built and tried out with a special loud speaker, success resulting after certain troubles had been eliminated.

*(Continued on next page.)*



Mr. Franklin Dyall as the villain of the piece.

learn that only *one* is used, and that the elusive nature of the sound is simply obtained by taking advantage of the acoustic characteristics of the stage and auditorium.

**The First "Snag."**

Just how it is done has not previously been divulged, but it can now be disclosed that the whole scheme was worked out and installed by the POPULAR WIRELESS Technical Staff, and some details of the interesting problems encountered can be given, without going too deeply into technicalities.

Now, when the general requirements were first explained to the technical staff it did not sound a very difficult matter. It appeared that what was needed was a microphone and amplifier installation in a small room behind the stage, and a line connecting this to a loud speaker concealed somewhere amongst the stage scenery. But further

details put rather a different complexion on the affair.

The first technical snag appeared when it was learned that the Chinese villain was to be played by Mr. Franklin Dyall, whose voice is a deep one, of a character to which the average loud speaker and amplifier would not take at all kindly.

The serious aspect of this difficulty was that it was absolutely essential that the audience should recognise the voice immediately, and therefore the reproduction *must* be reasonably natural, mere intelligibility being useless.



Switching on the amplifier and "mike" circuits. The "mike" is in the box on the right, comfortably packed to avoid extraneous pick-up.

## "CHINKS & MIKES."

(Continued from previous page.)

To obtain stability, however, it was found that a connection to earth was essential, the absence of such an "anchor" resulting in howling or ticking noises. This was not a particularly welcome discovery, since it was expected that there would probably be some difficulty in getting a good earth at the theatre, a fear which was later to prove only too well founded.

The microphone was obviously a very vital factor in getting realistic reproduction, and we were fortunate enough to be able to secure the use of an instrument of the type which is largely used for broadcasting. A good deal of time and ingenuity was then devoted to making a very completely shock-proof mounting for this, with a view to excluding all extraneous noise as far as possible, a very necessary proceeding when so high a degree of amplification is being attempted.

### The Gear is Transported.

At last the preliminary tests were completed and it was considered safe to transfer the apparatus to the theatre and try it out at a rehearsal. The gear was piled into a taxi (which it completely filled) and then on arrival at the theatre there followed that lengthy procession along passages and up and down flights of steps which seems to be the inevitable consequence of an excursion into the mysterious regions technically known as "behind." The unlucky individual who had to carry the Ford starter battery which constituted the "juice" supply seemed to decide at about this time that the affair was not quite so amusing as he had anticipated!

For the first tests the amplifier was arranged on the floor in the wings with all its attendant gadgets laid out around it, and the loud speaker was placed in the centre of the stage.

While one of the "P.W." technical people was connecting up the gear another went in search of a good "earth," and very quickly learned that the prospect was very bleak indeed. There were no water pipes to be got at anywhere near the right spot, the radiator system was fed with steam, and the only hope seemed to be a gas pipe.

### Searching for an "Earth."

It was evidently going to be a choice of the lesser evil, and the first test was to connect to one of the radiators. The outfit was switched on, and the loud speaker promptly gave a spirited imitation of a particularly able-bodied motor bicycle without a silencer.

Obviously, that "earth" was not good enough, so a gas pipe was tried. More "motor-biking." Then both earths were put on together, but the uproar was as bad as ever.

Next, the main gas pipe was located where it left the meter, and a connection made to the "ground" side of this. Result, same motor-bike still going strong.

It did not seem likely that all these different earths could be so bad as to provoke such virulent trouble, and the amplifier was naturally suspected of "taxi-sickness," but no sign of any broken connections or other fault could be found, and

the technical people were observed to be muttering "nice little amplifier, what can be the matter with it?" (Well, something like that, anyway!)

Presently it occurred to someone to try earthing the microphone circuit as well as the amplifier, although this had not been necessary in the previous successful tests. It was done, and the amplifier was immediately restored to good behaviour.

### Quite Satisfactory.

A very little testing then showed that Mr. Dyall's voice could be heard quite clearly and recognisably even at the back of the theatre, and the gear was transferred to the appointed spot in a small underground chamber to one side of the stage,



The innocent-looking rose-bowl loud speaker which causes such consternation on the stage in Act 2. Mr. Dyall as Dr. Chan Fu, the westernised Chinaman and villain of the piece.

whose main function appeared to be to hold the gigantic gas meter which supplies the theatre.

After fitting everything up here it only remained to find out by trial just what distance should separate the speaker and the "mike," how loudly he should talk, and so on.

This occupied some time, but the final result was sufficiently good to repay in full for all the trials and tribulations which had been passed through, and when the rose-bowl loud speaker had been given a seat on a table on the stage the sense of illusion produced was quite startling.

## A TUNING IMPROVISATION.

HAVE you ever experienced that annoying business of not being quite able to tune in a very promising-sounding station. You vary the dials of your receiver, passing various stations, and just at the maximum reading a very healthy signal is beginning to be heard. Hurriedly you change your coils only to find that that promising station has vanished amid a dozen others somewhere around the centre of the dial.

In this connection, here is a fact worth remembering. It is that a variable condenser with any other kind of dielectric except that of air will have an increased capacity. For instance, if the vanes of a .0005 mfd. variable condenser were separated by ordinary notepaper instead of air the capacity would be increased to about .001 mfd.

Therefore if that station of promise just begins to come in when all the vanes of your variable condenser are interleaved, go on tuning up by gently inserting thin pieces of paper between the vanes of the condenser, but see that the paper is clean and dry. There may be serious objections to this unorthodox practice, but the writer does not know them, and he has employed this cunning scheme several times to wheedle in stations which he might otherwise have lost altogether.

## RADIO REMINDERS.

THE use of insufficient grid bias means that the high-tension battery will run down much sooner than necessary.

When a soldering iron has been filed clean, for tinning, the flux and solder should be applied *quickly*. It is important to avoid exposure to the air.

A screened aerial causes flat tuning, but a .0001 mfd. condenser in series with it will sharpen up reception considerably.

A thin coating of petroleum jelly or vaseline will keep accumulator terminals in good condition indefinitely.

Quite a good little neodyne condenser can be formed by twisting two pieces of insulated wire together. The capacity can be varied by varying the lengths, one wire being, of course, connected to grid and the other to plate.

Very unpleasant distortion can be caused in your set by a neighbour whose set is left gently oscillating. (Similarly, if your set oscillates it will cause a neighbour's programme to be spoilt.)

There is a right and wrong way of connecting 'phones or loud speaker to a valve set. Be sure that the lead which is marked red or with a plus mark is connected towards H.T. plus.



## CAN BE BUILT WITH LISSEN PARTS

*Congratulations to Messrs. Cossor on an excellent set.*

IT has been definitely proved that LISSEN parts can be used for this Set with eminently satisfactory results, as well as for every other type of Circuit which may be popular at a given time, and which requires Standard parts of recognised quality.

LISSEN parts are guaranteed to give satisfaction every time they are used. Test the LISSEN TRANSFORMER against any other, and if you are then willing to part with your LISSEN, and return it within seven days of purchase, your money will be willingly refunded.

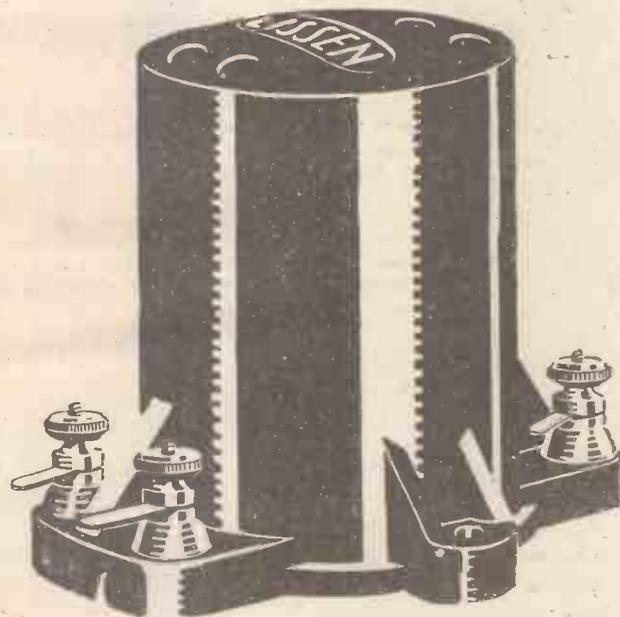
Use the other LISSEN parts as well, resistances, condensers, rheostats, valveholders, batteries, etc.

### Lissen Parts for the Cossor Melody Maker

- 1 Lissen L.F. Transformer (Price 3/6).
- 1 Lissen '001 Fixed Condenser (to be put across the primary of the L.F. Transformer) (Price 1/-).
- 1 Lissen Base-board Rheostat, 7 ohms (Price 1/6).
- 2 Lissen Key Switches or Lissen 2-way Switches (Price 1/6 each).
- 2 '0003 Lissen Mica Fixed Condensers (grid leak clips are included) (Price 1/- each).
- 1 '0001 Lissen Mica Fixed Condenser (Price 1/-).
- 1 '001 Lissen Mica Fixed Condenser (Price 1/-).
- 1 '002 Lissen Mica Fixed Condenser (Price 1/6).
- 1 Lissen Mansbridge type Condenser, 2 mfd. (Price 3/6).
- 1 Lissen Grid Leak, 3 meg. (Price 1/-) and 1 Lissen Combinator (Price 6d.).
- 1 Lissen Grid Leak, '25 meg. (Price 1/-).
- 1 Lissen Grid Leak, 4 meg. (Price 1/-) and 1 Lissen Combinator (Price 6d.).
- 3 Lissen Valve Holders (Price 1/- each).
- 1 Lissen 9-volt Grid Bias Battery (Price 1/6 each).

### Also use the Lissen H.T. Battery

All these Lissen parts for the Cossor Melody Maker are obtainable from 10,000 radio dealers throughout the country. Ask for Lissen parts in a way that shows you will take no other, and be sure of perfect results.



LISSEN GRID LEAK 1/-



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The windings of heavy gauge wire are sectional, giving a very low distributed capacity. The core is of “Stalloy”, while the case is “Bakelite.”



VARIABLE RESISTOR

5 ohms.  
or  
30 ohms.  
3/-

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L.F. Transformer Multi Ratio (Ratios 1.8, 3, 3.66, 4.5 and 6 to 1) .. £1.7.6

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# THE POSITION OF THE R.S.G.B.

REORGANISATION AND BIGGER MEMBERSHIP ESSENTIAL.

By THE EDITOR.

LAST week I suggested that the Radio Society of Great Britain, as at present organised, was not representative, in the full sense of the word, of the Radio amateur movement in this country.

Obviously, with a membership of under two thousand it cannot be; and without adequate membership it cannot "carry weight" when dealing with officialdom in matters relating to the welfare and prestige of British amateurs.

The R.S.G.B. is professedly an academic society, chiefly interested in maintaining its dignity and reputation as a "serious" body. Its traditions are undoubtedly excellent, but it is the very excellence of its traditions which now threatens to turn it into a hopelessly moribund society, without any great value except as a medium for circulating appeals for subscriptions and for organising, from time to time, technical lectures and meetings.

### Beyond Its Strength.

If the R.S.G.B. did not claim to be the representative body of the British amateur movement, and if it did not, from time to time, negotiate with the P.M.G. with a view to obtaining concessions for the benefit of amateurs, there would be no case against the society: it would then be a semi-scientific body existing purely for the technical benefit of transmitters.

But it does attempt feats beyond its strength, and its consequent failures do considerable harm to amateurs in this country. These failures are not due to carelessness, or lack of sincerity or hard work; they are due, almost entirely, to an inherent weakness in the society and the society's constitution—lack of strength as regards membership, due to the fact that such membership has not proved much of an attraction, and, in any case, is not easy to obtain.

### Experimental Reception.

The average amateur cannot join the R.S.G.B. unless he can satisfy the committee that he is a *bona fide* experimenter. That rule is all very well in its way, but *bona fide* experimenter in the eyes of the R.S.G.B. almost invariably means amateur transmitter, or a man who can show some years of intensive research work.

There are a few thousand transmitters in this country—but hundreds of thousands of amateurs who devote themselves to experimenting in methods of reception. These people should be encouraged to join the society, for their membership would strengthen it enormously, provide it with the necessary financial support, and, incidentally, a backing which would command attention and respect in official quarters.

The present conditions of membership are absurdly out of keeping with the times, and the society is not progressing as it should. Other societies have been formed which have absorbed much of the available material upon which the R.S.G.B. could have drawn, with advantage to itself and its members.

If it persists in its present ultra-conservative attitude, it is obvious that another and more virile society will have to be formed—a society for the amateur in the widest sense of the term.

There still exists a society for listeners,

## THIS YEAR'S SOLODYNE

Exclusive Constructional Details.

This Five-Valve Set gives results which would have necessitated at least ten valves two years ago.

With this set you will hear stations you have never heard before.

Full details of this magnificent Receiver will be found in

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"MODERN WIRELESS"

although its influence is weak and its powers waning through lack of initiative and proper organisation. In capable hands such an organisation could do much for the listener just as an organisation for the average

amateur could do an immense amount of good. This week, for example, considerably more than 100,000 people will buy and read this journal—and "P.W.," however it may follow the modern trend of journalism by avoiding a dull and stodgy appearance and contents, is not entirely meant for the raw novice in amateur radio.

"P.W." caters for that ever-growing band of amateur enthusiasts who, debarred by red tape restrictions, by time to spare, cash, and other considerations, from erecting transmitters, devotes itself to the experimental side of reception—and the R.S.G.B. council should realise that here they have a potential membership which, if they had the sense to see it, would provide them with the strength they so sadly need.

But the average amateur has no use for the R.S.G.B. so long as its present rules of constitution remain in force, and so long as it turns up its nose and affects an air of superior dignity which goes ill with its recent record of achievement on behalf of the amateur movement.

### The Reason Why.

At the time of writing, the R.S.G.B. council has decided against co-operation with "P.W." with a view to increasing the society's power and authority. The suggestions submitted to the society were, we understand rejected: the society is "satisfied with its position and rate of progress."

Well, if it is satisfied with under two thousand members—and the R.S.G.B. was formed in 1913—it is very easily satisfied indeed; but it must, if it has any regard for veracity, cease to call itself the National Amateur Organisation. That it cannot be when it but represents a fraction of the amateurs in this country.

Here is a list of the reasons put forward by the R.S.G.B. why You should join it:

1. BECAUSE is is THE National Amateur Organisation. It was founded in 1913.
- In 1923, when broadcasting was firmly established, the Society widened its scope to embrace the broadcast listener.
2. BECAUSE some of the most famous radio men in the country are members.
3. BECAUSE it is non-partisan and protects your interests by vigorously upholding your rights in all radio regulations.
4. BECAUSE it is the medium through which Amateurs can get together.
5. BECAUSE you will receive its Bulletin.
6. BECAUSE its distinctive emblem is recognised as the Badge of the leading national amateur organisation.

Paragraphs two and five are perfectly true.

Paragraph 1 is obviously ridiculous. The Wireless League, the Wireless Association, and the Radio Association have all "had the pick" of listeners; the R.S.G.B. may have a few, but they should have had so many that other Leagues and Societies need never have been formed.

Point 3 is sheer conceit: "vigorously upholding your rights in all radio regulations"! No comment is needed.

Point 4 has a very limited application in actual practice, and applies to about 1,000—if not less—of the amateurs in this country.

What is the R.S.G.B. going to do about it?

## BROADCAST NOTES

FROM OUR BROADCASTING CORRESPONDENTS.

"Ceremony of the Keys"—British and American Museums—Carols at Glasgow—Mr. Ponsonby on Diaries—Lady Hosie Again—The Story of Suez—Hogmanay—Manchester Reviews the Year—5 G B on New Year's Eve.

### "Ceremony of the Keys."

EVER since the "Ceremony of the Keys" was broadcast in December of 1926, the B.B.C. has received numerous applications from listeners that it might be heard again. Arrangements have, therefore, been made to repeat it on Monday, January 16th. As most listeners will remember, the ceremony has been observed every night for the last six hundred years.

The Head Warder makes a formal tour round the historic building when, amid the sharp challenge of the sentries and the traditional replies, the ceremony of locking the gates with the old keys is carried out. The broadcast provided one of the most realistic mind-pictures of the year, the tramp of the soldiers and officials of the Tower "coming over" with wonderful accuracy.

The ceremony finishes with the final dismissal of the guard and the sounding of the Last Post and the playing of the National Anthem. It takes place shortly before 10 p.m., and the broadcast will probably be preceded, as was the case last year, with a talk on the various historical ceremonies which are observed at the Tower of London.

### British and American Museums.

Sir Robert Witt, one of the original founders of the National Art Collections Fund, is visiting the London Studio at 9.15 p.m. on Tuesday, January 3rd, to give a talk in which he will draw comparisons between some of the great American museums and those of our own country.

Sir Robert has recently visited the United States, and his topic is of particular importance at the present moment by the fact that the Royal Commission, of which Sir Robert is a member, is considering various aspects associated with our national museums and galleries.

### Carols at Glasgow.

Glasgow's Saturday programme (Xmas Eve) has a distinct "carolly flavour." During the afternoon, "Good King Wenceslas" and other seasonable airs will be given by the Station Singers, to be followed in the evening by a recital from Robert Donat, of his own special arrangement of Dickens' immortal "Christmas Carol." There will also be a recital of unpublished carols by the choir of St. Ninian's Episcopal Church, Edinburgh, Dundee, and Aberdeen has also arranged for carol singing to take a prominent part in the earlier part of their Christmas Eve programmes.

### Mr. Ponsonby on Diaries.

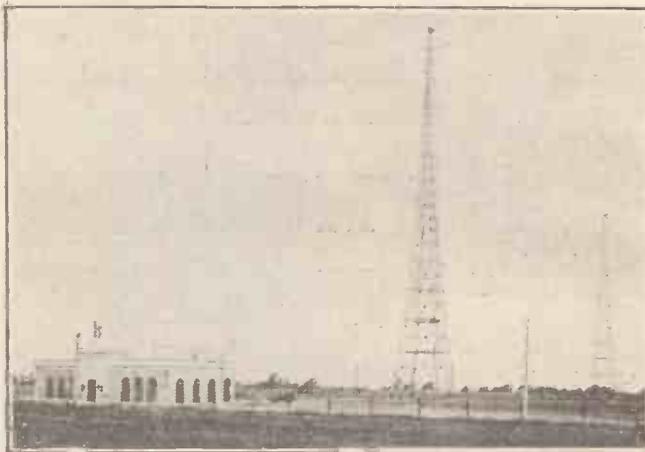
Mr. Arthur Ponsonby, M.P., for the Brightside Division of Sheffield, holds a strong opinion that we should all keep a diary in some form or other. Perhaps the publication of this statement from such a distinguished Parliamentarian, who was principal private secretary to the late Sir Henry Campbell-Bannerman, may go a

long way towards reducing the numbers of diaries for 1928 that are now stacked so high on the counters and shelves of stationers' shops, but there are many people who will profoundly disagree with Mr. Ponsonby's contention that it frequently happens that details, which to us seem of no importance, can be extremely interesting to succeeding generations.

Be that as it may, we must all acknowledge Mr. Ponsonby as an authority on diaries, because the search for and study of unusual specimens has long been one of his particular hobbies, in connection with which he has published more than one interesting book. Whatever may be our individual persuasions about diaries, Mr. Ponsonby's talk on "Keeping a Diary," which is to be broadcast from London and other stations at 9.15 p.m. on Wednesday, December 28th, is certain to be very fascinating.

### Lady Hosie Again.

Those who heard the recent talk by Lady Hosie on Chinese life will look forward to her next visit to the London Studio on



The high-speed wireless telegraph station recently built at Lima (Peru). The power of the valve transmitter is 15kw. and the call sign is O A Z.

Thursday, December 29th, when she will give a seasonable talk on Chinese festivities under the title of "Yün Yün and Nieh Nieh Welcome the New Year." Lady Hosie is the daughter of Professor Edward Soothill, Professor of Chinese at Oxford University, who was President of the Imperial University of Shansi Province from 1907 to 1911. Her husband is also prominently associated with Chinese commercial life, so that Lady Hosie has had unique opportunities of becoming acquainted with and understanding Chinese characteristics.

### The Story of Suez.

Mr. Halford Ross, who is telling the story of the Suez Canal, the construction of which was one of the world's finest feats of engineering, in a talk which London and other stations are broadcasting on

Tuesday, December 27th, is a much-travelled man. Since he left England some eighteen months ago to make observations of miners' phthisis and to organise preventive measures against mosquitoes and malaria in India he has twice crossed the equator, visited the Arctic Circle, and visited Japan, the Pacific Islands, Tibet, British Columbia and California. He has recorded the first part of his travels in a book, just published under the title of "By Devious Ways."

### Hogmanay.

Always on December 31st Scotsmen the world over turn their thoughts to the Homeland, and Scotsmen at home remember their clansmen scattered throughout the earth. It is Hogmanay—Scotland's own festival, when in every home from the Tweed to John o' Groats the old stories and songs of Scotland are told and sung, until the old year passes and "first-footers" go out to greet their friends in the New Year. All Scottish stations will relay a special Hogmanay programme which Aberdeen is arranging as an appropriate celebration of this important occasion. On the previous evening, Mr. Peter Malcolm, ex-Rector of Lockerbie Academy, who knows a lot more about Hogmanay than most people, will tell of the queer customs and traditions of the festival and their origin in a talk from the Glasgow studio.

### Manchester Reviews the Year.

Although it is impossible to perform in seventy-five minutes all that listeners might like to hear again of a whole year's programmes, the concert which the Manchester Station is giving on Tuesday, December 27th, of excerpts from some of the outstanding operatic, dramatic and musical transmissions given during 1927, will no doubt revive memories of many pleasant evenings. The concert will include items from "La Traviata" and "I Pagliacci," a one-act play, "Whose Door," by R. H. Blackmore, performed last April, the tone poem "Tiel Eulenspiegel," by Strauss, heard on January 23rd, and Brahms' "Academic Festival," which figured in a special programme on February 2nd.

### 5 G B on New Year's Eve.

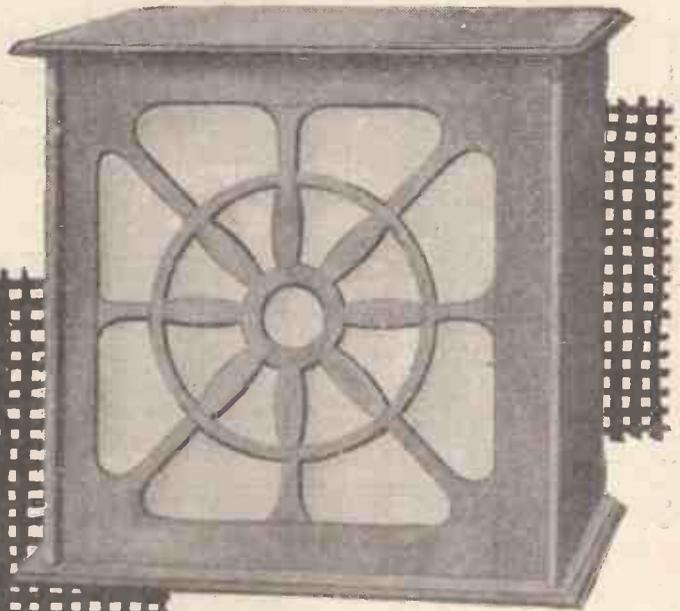
The New Year's Eve programme for the Daventry Experimental Station will consist of favourite orchestral tunes and items given by favourite radio artistes which have been heard by listeners during 1927. The artistes include Emilie Waldron (soprano), whose singing has been an attractive feature in the Birmingham programmes during the year, who will sing the Waltz Song from "Tom Jones," Dale Smith (baritone), some famous Sea Shanties; and Stainless Stephen (entertainer). Among the orchestral items will be the Overture to "Russlan and Ludmilla," and the Egyptian Ballet Suite.

# THE STAR PARTS OF THE COSSOR MELODY MAKER

## THE ORMOND S.L.F. CONDENSER

The Variable condensers in the Cossor Melody Maker were selected with care to ensure sharp tuning, fine adjustment and exact capacities—and so the choice fell upon the Ormond S.L.F. Condenser. No other condenser must replace it in this circuit, for upon the delicate adjustment of the Ormond Slow Motion dials depends the razor-sharp tuning and extreme selectivity of the set.

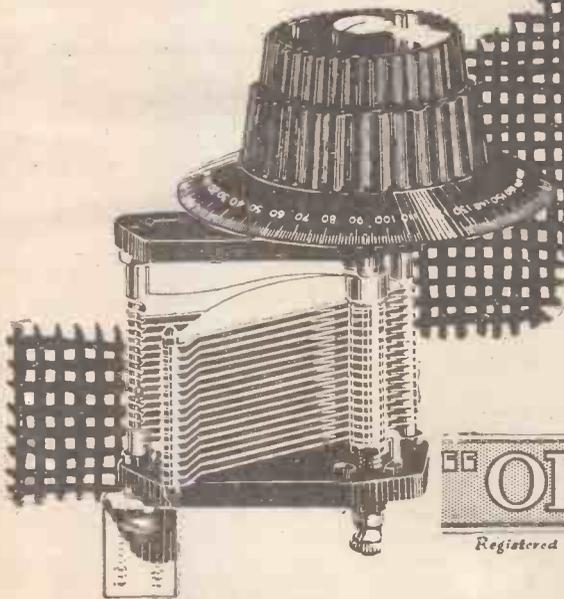
Insist upon the parts specified when building the Melody Maker—particularly insist upon the Ormond parts which give perfection.



## THE ORMOND "IDEAL"

## LOUD SPEAKER

is especially recommended for use with the Cossor Melody Maker—to it is due in no small part the ultimate perfection of the reproduction you secure with this new circuit. The Ormond "Ideal" was chosen from among the multitude of loud speakers by comparison—the test which you should apply. Ask your radio dealer to let you hear it. Price £3 : 3 : 0



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 Continental Agents: Messrs. Pettigrew & Merriman, Limited, "Phonos House," 2 and 4 Bucknall Street, New Oxford Street, London, England.

Wholesale Distributors for the "IDEAL" Loud Speaker only: F. A. Hughes & Co., Ltd., 204-206 Great Portland St., London, England.

For the  
Cossor Melody Maker



## REDFERN'S

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Set of Component Parts

Drilled Panel and Terminal Strip, Low Loss Coil Former, 3 Redfern Valve Holders.

The Set complete:—

With Ebonart Mahogany panel 25/6  
With Ebonart Black panel - - 23/6  
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Your Dealer can supply you

**REDFERN'S**  
RUBBER WORKS LTD.  
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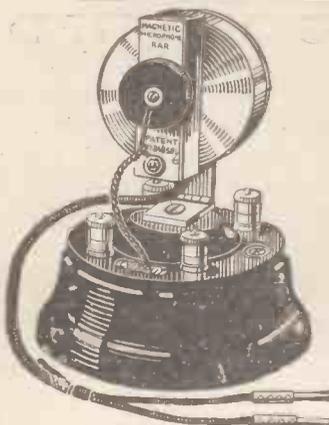
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## MICROPHONE BAR AMPLIFIER

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which operates a loud speaker direct from any crystal set up to six miles or more (according to strength of original reception) from main Broadcasting Stations; or makes weak reception loud and clear in headphones under any conditions. A great boon to deaf persons. May be used with small valve sets.

Works perfectly on one or two dry cells; no other accessories required.

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Mullard

## The Master Three

"The Master Three," the most wonderful Receiver in Radio, is fitted with two J.B., S.L.F. Condensers, '0005 mfd., 11/6, and '00035 mfd., 10/6. Are you joining the thousands who are constructing the amazing Receiver? You can build "The Master Three" in an hour! No soldering is necessary, the connecting wire being cut to length and looped ready for connecting, and, what is far more interesting to you, the complete supply of connecting wire is being given away to everyone who constructs "The Master Three."

Construct "The Master Three" yourself and spend hours of enjoyment and amusement listening to the many stations so accurately logged by the J.B. Condensers.

Delay means disappointment. Go to your dealer to-day and ask him for your J.B. Condensers.

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TECHNICAL NOTES

By Dr. J. H. T. ROBERTS, F.Inst.P.

# L.T. FROM THE MAINS.

ETHER DRIFT—NEW PHOTO-ELECTRIC CELLS—TELEVISION ABROAD—CATHODE RAY SYSTEM.

### L.T. From the Mains.

A NEW design of low-tension power supply unit has just been introduced on the American market which employs an entirely novel internal system. It provides 2 amps. at 6 volts for heating the filaments, and the running cost is claimed to be very low.

The circuit includes a rectifier and filter, and the unit is built into a compact case, the whole device weighing less than 15 pounds. It does not contain a storage battery of any kind and requires practically no attention.

For the rectifier an electrolytic cell is employed. The electrolyte is made by adding water to a powder which is already in the cell. In addition to the electrolytic rectifier there is a large capacity electrolytic condenser, as well as the choke coils. A curious feature about the device is that the electrolytic condenser employs the same electrolyte as is used in the rectifier. The condenser has two sets of plates submerged in the liquid and electrically is employed as two separate condensers. The electrical design is such that the outside plates of the filter condenser act also as the non-rectifying or neutral electrode of the electrolytic rectifier.

### Ether Drift.

The question of an ether drift between the earth and the ether has always been a subject for scientific controversy. Many experiments have been carried out, designed to have a direct bearing on this question, of which probably the best-known is the famous Michelson-Morley experiment tried many years ago in the United States. This experiment has been repeated with various modifications from time to time and the very greatest possible refinements have been introduced. Notwithstanding the extreme care and skill devoted to the repetitions of the experiment, however, it has yielded negative results so far as ether drift is concerned.

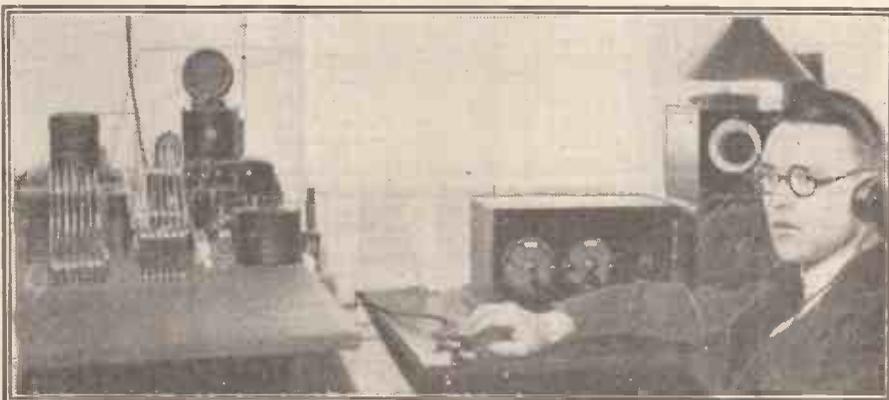
Recently, some important experiments have been carried out at the Mount Wilson Observatory by Professor Miller, as a result of which it is claimed that evidence of ether drift has been obtained. This, again, is disputed by other scientists who have given arguments to show that the drift observed by Miller is more likely to be due to local disturbances. Of course, any experiments designed to indicate ether drift in this way need to be carried out with the utmost possible accuracy, as the drift itself, if it exists at all, would in any case be exceedingly difficult to observe.

### New Photo-Electric Cells.

Some new photo-electric cells, which may be applied for a variety of laboratory experiments, have been introduced by the G.-M. Scientific Manufacturing Company (U.S.A.). Five tubes have been brought out up to the present, of which three are

described as photo-electric cells and two as neon glow-lamps.

An approach to the "electric eye" is found in the alkaline-hydride photo-electric cell. This device, which is extremely sensitive to light and to variations in intensity and colour of light, transforms optical variations into variations in electric current. Furthermore, the cell responds to these effects with extreme rapidity and with a high degree of precision. The current which passes through the cell, under proper conditions, is stated to be directly proportional to the intensity of the illumination, as well, of course, as to the area of the sensitive surface which is illuminated. The photo-electric cell may be looked upon as a variable resistor, the resistance of which is determined by the illumination which falls upon it.



A well-known American amateur, Robert Hart, of Hartsdale, N.Y., operating his short-wave transmitting station, U-2 CVJ.

This cell may be employed for a great variety of purposes for which at present it is only possible to use the human eye.

It is applicable to the transmission of photographs by wire or radio, the improved recording of sound on gramophone records, the reproduction of sound in talking movies, the transmission of moving pictures, the automatic operation of electro-magnetic relays, for the control of artificial illumination, operation of fire-alarms, inspection of materials according to colour, grading, and so on.

### Television Abroad.

It is not commonly known that experiments in television, or the sending of moving pictures by wireless, date quite a number of years back and are proceeding in various parts of the world. I have referred previously in these Notes to the work of the American Telephone and Telegraph Company, and of Dr. Alexander and Mr. C. F. Jenkins, in the United States, whilst the work of Monsieur Belin in France is also well-known.

A young Hungarian engineer, Denes von Mihaly, who is consulting engineer to the

A.E.G. (the General Electric Company of Germany), has progressed further than anyone else in the world, according to Mr. W. J. Brittain, a writer in the well-known United States journal, "Radio Broadcast." Mr. Brittain made a special journey to Europe in order to investigate the position of television development generally, and he went back to America full of enthusiasm for von Mihaly's work, and for the demonstration which was given.

Mr. Brittain says: "It was the writer's privilege to be present at a recent demonstration of Mihaly's apparatus. Results obtained were considerably better than those of the early demonstrations, and the images were clearer than those seen by the author on Baird's screen. On the picture of a 'televised' boy it was possible to see the collar, the wavy outline of the hair, the shape of the ear, the forehead, the eye, the nose and the mouth, the latter merging into shadow on the left side of the face."

### Light-Sensitive Cell.

One of the most important parts of von Mihaly's apparatus is the light-sensitive or photo-electric cell, which he has developed in his own laboratory, and which is a great secret. "Television sets for the home," he says, "will be sold in a few months for about twenty pounds."

Von Mihaly has been working for thirteen years on television. He gave his first demonstration on July 7th, 1919, when Hungarian ministers in the laboratory of the Telephon Fabrik, in Budapest, saw the representation of letters upon a screen transmitted from the young engineer's home laboratory in another part of the city.

### Cathode Ray System.

Messrs. Behn and Holweck are working actively upon their television system in Paris, using a special form of cathode ray oscillograph.

### Mihaly's Apparatus.

In regard to Mihaly's apparatus, an engineer has gone from America to Germany for the purpose of making a simplified version of von Mihaly's machine to be shown in Berlin and London as a preliminary to forming two television companies in those cities.

IF THERE IS ANYTHING IN THIS ISSUE OF "P.W." YOU DO NOT LIKE, PLEASE LET US KNOW ABOUT IT.



# Apparatus Tested

Traders and manufacturers are invited to submit wireless sets and components to the "P.W." Technical Department for test. All tests are carried out with strict impartiality in the "P.W." test-room, under the supervision of the Technical Editor, and the general reader is asked to note that this weekly article is also intended to provide a reliable and unbiased guide as to what to buy and what to avoid.—EDITOR.

## NEW EDISWAN R.C. "THREESOME."

WE were recently sent a set of components and valves for the construction and operation of the new Ediswan R.C. "Threesome." The R.C. "Threesome," as its name suggests, is a three-valve receiver and employs a grid leak rectifier followed by two resistance-capacity-coupled low-frequency stages. Magnetic reaction is obtained by the usual two-way coil holder scheme, and a single variable condenser carries out the tuning. The main components are this variable condenser, the two-way coil holder, and three R.C. coupling units. Each unit carries a valve holder and on two are grid leaks and anode resistances, and on the other a grid leak and grid condenser.

A great number of the connections are carried out automatically in a very ingenious manner. Each of the three so-called R.C. units has on one side three sockets and

on the other three plugs. Previous to screwing down on the baseboard the three units are all linked together by means of this simple plug and socket system, and thus a great portion of the wiring is accomplished before the real work of construction actually begins.

Messrs. Ediswan supply free a large blue print and an instruction booklet. Another vital item in the outfit is a combination multiple flexible battery lead. This terminates at the one end in a two-socket plug and two separate leads provided with ring terminals. At the other end of the cable are the various battery terminals, each of which is very clearly marked.

The assembly of this R.C. "Threesome" is simplicity itself, for after the three or four items have been mounted on the panel and baseboard there remains but five wiring connections, and as none of these connections needs to be soldered, we do not think

that it would be possible to devise a simpler method of receiver assembly.

The R.C. "Threesome" makes a fairly good local station loud-speaker set. As the makers state: "It is essentially a receiver for the reception of the local station and high-power station transmissions but, since reaction and leaky grid rectification are now incorporated, many additional stations at home and abroad are well within the receiver's range. Just how many home and foreign stations are received at good loud-speaker strength on each individual R.C. 'Threesome' depends upon the conditions under which the set ordinarily functions." The only real criticism that can be made against the receiver is that it is not particularly selective, but the addition of a very simple wave-trap would overcome this objection. The complete receiver can be built for a sum of fifty shillings or less.

## THREE HARLIE COMPONENTS.

Messrs. Harlie Bros. have produced a combined valve holder and filament rheostat. The anti-microphonic valve holder forms the upper part of the device, while on the side is a vertical control which enables the rheostat in the base to be adjusted. This latter in itself is of normal design, but the drive is through a smooth gearing, which gives a positive contact throughout the range of movement. This ingenious component is well made, and by its saving in wiring and space should appeal to the practical amateur. It is obtainable in resistances of 6, 15 and 30 ohms at 3s. 6d., a price which very favourably compares with the outlay necessitated

(Continued on page 900.)

## "The Silent House" ROSE BOWL LOUDSPEAKER



As used at the Comedy Theatre, and installed by the "P.W." Technical Staff.

You must read all about the mysterious voice. See "Chinks and Mikes," on pages 889 and 890 of this issue.

### THE "BECO" ROSE BOWL LOUDSPEAKER

is of Elegant Design. Highly Artistic Appearance. Gives Good Volume and Faithful Reproduction.

SIZE: Height 8 inches. Diameter 10½ inches.

YOUR LOCAL DEALER WILL DEMONSTRATE ONE TO YOU.

PRICES:

Oxy Silver or Antique Bronze £5:17:6  
Nickel Plate Finish - - - £5: 5:0

British Electrical Sales Org.,  
623, Australia House, Strand, London, W.C.2.

Adv. of British Electrical Manfg. Co., Hendon, N.W.9.



You'll wish you'd built the

L. & P.

3-20

EXPRESS

They're telling us

It's Better!

Ask your Wireless dealer for FREE COPY of circuit.

THERE IS NO SUBSTITUTE

# A 66-VOLT BATTERY is better than A 60-VOLT BATTERY

A 66 volt Battery will give you louder and better reception than a 60-volt Battery.

66 volts in a Battery instead of 60 volts will prolong the effective life of your Battery proportionately.

The LISSEN Battery, although marked 60 v., swings the volt-meter needle to well over 66 v. when you buy it—you can see this for yourself.

The LISSEN Battery is often 60 volts after you have had it in use for three months.

The higher voltage maintained in the LISSEN Battery by the new LISSEN process prevents valve distortion, and gives you clear, loud reception throughout the entire life of the Battery.

Buy a LISSEN Battery always—ask for it in a way that shows you will take no other.

60 v. (actually 66 v.) - price 7/11

100 v. (actually 108 v.) - price 12/11

9 v. - - - - - price 1/6

Obtainable at 10,000 Radio Dealers throughout the country.

**APPARATUS TESTED.**

(Continued from page 898.)

by the purchase of the separate items which it comprises.

Another new Harlie production is a slow-motion dial and indicator. This provides the now usual hairline scale indication with, additionally, two apertures in which can be written station names or call signs. It can be fitted to practically any variable, and has the useful reduction ration of 12 to 1. Another feature is that there is practically no metal used in its construction. It embodies a cog-wheel drive, but while this enables definite settings to be obtained, it cannot quite achieve the velvety smoothness of the friction-drive dial. Nevertheless, it is very well made, and perfectly satisfactory in operation, and at the price of 3s. 9d. appears to us to represent very good value for money.

The final Harlie item we have to review on this occasion is a seven-way battery connector. A neat seven-point socket is provided for panel mounting, and into this the plug at the one end of the multiple table can only be inserted in the one correct manner. At the other end of the cable the various leads are very plainly marked by means of metal tablets which are both numbered and carry indicative lettering. The cable is just over a yard long and is flexible and strong.

Such a cable is certainly just the thing to make more neat the average household set.

The accumulator leads seem to be taken out at just the right length, and the H.T. and grid-bias leads group in the manner which makes for neat and tidy connections. The price of this Harlie seven-way battery connector is 9s. 6d.

**CLIX RAINBOW TERMINALS.**

The latest production of Lectrolinx Ltd., Vauxhall Bridge Road, S.W.1, famous for their "Clix" products, is the Clix Rainbow Terminal. This is an ingenious combination terminal which will take any sort of connection, and which is supplied with a coloured identity ring. The terminal itself is fitted with a very brightly-coloured knob and this is made to correspond with the coloured collar of the pin or spade terminal with which it is used.

The terminal is supplied in nine distinctive colours, so that this number of separate connections can be catered for. A set incorporating these "Rainbow" terminals should be attractive in appearance while wrong and dangerous battery connections can hardly be made. The "Rainbow" terminal, complete with

a coloured collar for affixing to pin or spade connectors, costs 5d. It is heavily made and well worth the money.

**LAMPLUGH "POPULAR" SET.**

The illustration of the above receiver accompanying Messrs. Lamplugh's advertisement in our issue of December 17th was inadvertently placed at a wrong angle, giving the impression that the back slopes forward. This is incorrect, the back, front and sides are all vertical as shown in previous illustrations of these well-known 2 and 3-valve sets.



A Graham Amplion Band Repeater outfit installed in a well-known cinema. A feature of the loud-speaker-film collaboration was the reproduction of realistic animal noises.

**Now 4 a Volt!**

ACCUMULATOR  
**MACOS**  
EVERLASTING

AND YOUR MONEY BACK IF NOT SATISFIED!  
THE CHEAPEST & BEST FORM OF H.T. SUPPLY. MADE POSSIBLE BY INCREASED MANUFACTURING FACILITIES.

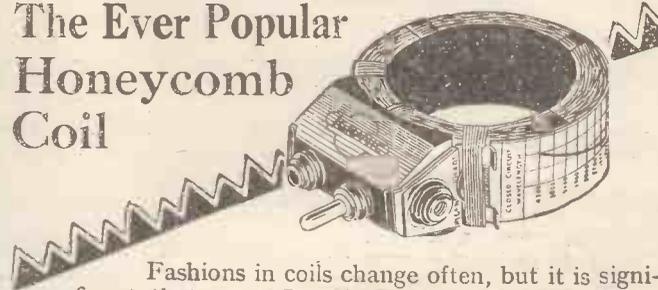
READY FOR USE  
DRY CHARGED AT WORKS

OBTAINABLE FROM THE MANUFACTURERS  
**MACOS B.T.Y. MANFG. CO.**  
ELEMENTS ROAD,  
LONDON. E.6.

To M.B.M. CO. LTD  
Enclose £ \_\_\_\_\_ s  
for Unit \_\_\_\_\_ s  
Name: \_\_\_\_\_ d  
Address: \_\_\_\_\_ Volts

60Volts  
2500 MILLIAMPS  
NOW 20%  
OTHER SIZES  
20-120 VOLTS, PRO RATA

**The Ever Popular Honeycomb Coil**



Fashions in coils change often, but it is significant that more Igranic Triple Honeycomb Coils are used to-day than ever before.

The reason lies in the formation of the winding, which is based on a principle fundamentally sound and which is recognised as giving the lowest self-capacity attainable for a given inductance.

By constant improvement in detail Igranic Triple Honeycomb Coils have kept the lead and remain unrivalled for the highest electrical efficiency and robustness of construction allied with adaptability for use in any circuit.

Send for List. No. R. 76 for full particulars.

Igranic components are always stocked by reputable dealers. All reports received by us of difficulty in obtaining them receive immediate attention.



149, Queen Victoria St., LONDON.  
Works: BEDFORD.

# Wireless in every room this Winter

THE LOTUS REMOTE CONTROL enables you to listen-in in the dining room, sitting room, bedroom, kitchen—everywhere—anywhere, simultaneously and without interference with each other.

Simply place the Lotus Relay near receiving set, wire up to rooms desired and connect with Wall Jack and Plug. No technical knowledge is needed. The same volume of sound throughout. The last one to switch off automatically disconnects the set. Suitable for any valve set.

From all Radio Dealers;

## THE LOTUS REMOTE CONTROL

Made by the makers of the Lotus Valve Holder, Lotus Vernier Coil Holder, and Jacks, Switches and Plugs.

Tear off here—

Complete Outfit for Wiring Two Rooms:

With set using L.T. Accumulator and H.T. Battery . . . 30/-

With set using L.T. Accumulator and H.T. Eliminator 45/-

With "All from the Mains" set 40/-

### FREE!

Please send me FREE BLUEPRINTS and Instructions explaining how two rooms can be wired in half an hour.

To GARNETT, WHITELEY & CO., LTD.  
Lotus Works, Broadgreen Road, Liverpool.

Name.....

Address.....

P.W.24:12.27.

## REFUSE IMITATIONS!



Standard Size panels supplied in three finishes, Black polished, Black Mat, and Grain polished, carefully packed in attractive cartons. Every panel and piece of ebonite guaranteed and made by British hands.

ORIGINAL PRIZE-WINNING "BECOL" LOW LOSS FORMER, No. 5. 3 inch diam. overall.

Insist on a Becol Low Loss Former, the Former "with a reputation," incorporated in sets that have taken four first prizes and gold medal, a proof of their superiority. Supplied in cut lengths, 3 in., 4 in., 6 in., packed in cartons, and standard lengths of 3 ft.

Specify



Registered Trade Mark.

products



Apply for particulars of our new foot-proof 4 and 6 contact Former with bases ready for winding, directions and fully illustrated booklet. Price 6d.



## FLUXITE



## UNITES

—IT SIMPLIFIES SOLDERING

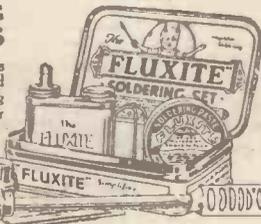
FLUXITE SOLDERING SET - - Complete 7/6

All Hardware and Ironmongery Stores sell FLUXITE in tins, price 8d., 1/4 and 2/8. Another use for Fluxite—Hardening Tools and Case Hardening. Ask for leaflets on improved method.

FLUXITE LTD.

(Dept. 324),

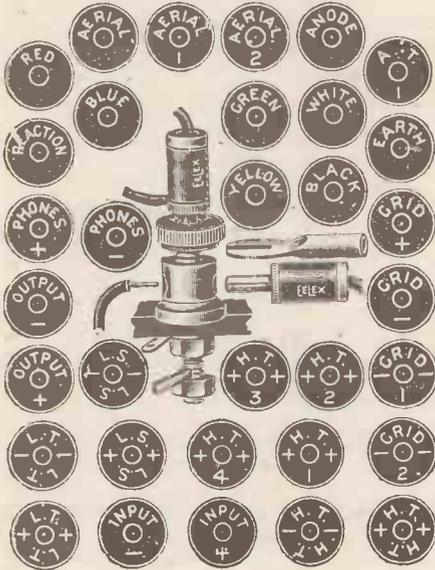
Rotherhithe, S.E.16



# Why not use



## TREBLE-DUTY TERMINALS



### Here are 9 Reasons why they are better

1. Designed to secure as firmly as held in a vice, spade, pin, or tag, plug or just bare wire.
2. Plugs can be secured at top or side of terminal.
3. 26 indicating tops, + Red-Black, and in White, Black, Blue, Green, Red & Yellow.
4. Slotted stem to save soldering internal joints.
5. Nickel-plated terminals.
6. Soldering Tab.
7. Standard Eelex Fittings are interchangeable.
8. Cheaper than any other nickel-plated terminal, with indicating top.
9. Chosen by leading designers and manufacturers, and millions being used by amateurs.

Terminal (T2LC). Price 4½d. each.  
With Plain Top, 3d. each (T2LN).

## SEND FOR THIS FREE CATALOGUE

Packed with Interest for the Radio Owner.

Every experimenter and constructor should send for a copy of this catalogue (T 26) which contains, besides full details of the Eelex System of standardisation, a host of accessories of exceptional value.



Eelex House,  
118, Bunhill Row, Chiswell Street, London, E.C.1.  
Telephone: Clerkenwell 9282-3-4.

# RADIOTORIAL

All Editorial Communications to be addressed to The Editor, POPULAR WIRELESS, The Fleetway House, Farringdon 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 and 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 receivers. 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.

### THE LOST CHORDS.

H. T. E. H. (Longton, Staffordshire).—“Not till I changed over from H.T. batteries to my eliminator did I realise how good wireless music can be—the volume was greater, and the chords rang out full and perfectly clear. No trace of harshness or distortion anywhere. For nine weeks I have been enjoying this perfect reception, but suddenly it has gone phut. Nothing has been touched, but all the volume and tone went suddenly one night, and the set is not worth listening to now. What could cause such a sudden and disappointing failure?”

It may help you to know that if I move the H.T. + or neg. plug in the eliminator now I get a bright little spark every time, but prior to the set going wrong I never noticed a spark there at all.

Probably one of your smoothing condensers has “gone west.” This could easily give rise to all the symptoms you name, and it would be likely to develop suddenly in the way you describe. Try disconnecting them one at a time, and if volume returns, discard the disconnected condenser and replace it with a good quality one of the same or a larger value.

### GRID LEAK CAUSES DISTORTION.

C. J. (Burton-on-Trent).—“Since I fitted the new grid leak I get harshness on certain notes. Could the new leak be the cause, or is it just a coincidence that I never noticed this before?”

Probably the leak is at the root of the trouble, as an unsuitable resistance value will cause distortion and harshness.

### THE R SCALE OF STRENGTH.

H. L. W. (Grantham, Lincs).—“Looking through ‘P.W.’ I have often seen letters referring to signal strength as being ‘R5,’ or ‘R3,’ etc. What does R followed by the number mean? I am told that amateurs use such a scale for comparison of signal strength. Is this the case?”

Yes, the strength of signals received is generally denoted by the letter R, followed by a number. The weakest signals are called R1, and the strongest R9, the scale of comparison now in general use by amateurs all over the world being on the following basis:

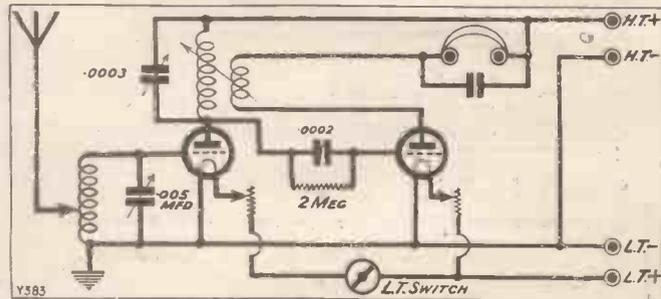
- R1—Faint signals (only just readable).
- R2—Weak signals (barely readable).
- R3—Weak, but readable.
- R4—Fair, easily readable.
- R5—Moderately strong.
- R6—Strong.
- R7—Good and strong, readable through atmospheres or jamming.
- R8—Very strong (readable several feet from the phones).
- R9—Extremely strong.

### SHOCKS FROM THE BOX.

ELECTRIC (Ross-on-Wye).—“Why is it that I am always getting shocks from the new set? Though I used the same batteries, I never had this trouble before, but now if I change a coil in the screening-box, or adjust H.T. I seem to get sharp shocks everywhere. Is there anything wrong?”

Nothing is wrong, but the fact that the screening box is connected to H.T. neg. means that to touch

### WHAT IS WRONG?



The above diagram is supposed to represent the connections of an H.F. (Tuned Anode) and Det. receiver. But it is wrong and the set would not work.

Next week the correct diagram will be given, and to test your skill we shall continue to publish every week a diagram in which a mistake (or mistakes) has been inserted. The correction will be published the following week.

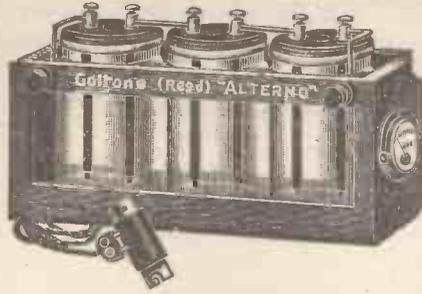
No prizes are offered, but by following this series and trying to solve the problems week by week the reader cannot fail to learn a lot about radio circuits.

the box is equivalent to “touching” the H.T. battery, so shocks will be felt if the H.T. positive is handled at the same time. (Incidentally, it is very easy to short a battery by touching leads or screening boxes, so care should be taken to avoid this.)

### AMERICA DIRECT ON ONE VALVE.

“Suspicious” (Ely, Cambs).—“This talk about picking up America on one valve—  
(Continued on page 904.)”

**Charge your own H.T. Accumulators efficiently & economically at home!**



**"ALTERNO"**

Thousands are using the "ALTERNO" at home for charging their H.T. Accumulators from Alternating Current Lighting Mains.

Cost of charge practically negligible.

Supplied complete and ready for use. Satisfaction guaranteed.

**Price 21/-**

(With Ammeter, as illustrated, 12/6 extra.)

Demonstrations daily at London Office, 80 and 9, Gt. Chapel St., Oxford St., W.1.

**Ward & Goldstone**  
PENDLETON MANCHESTER LTD.

Write for large illustrated Radio Catalogue, P.W./R117, post free on request.

**"INDISPENSO" HIGH TENSION ACCUMULATOR CHARGER.**

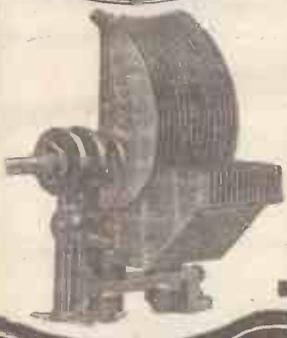


The "INDISPENSO" Accumulator Charger will charge your H.T. Accumulators effectively and at negligible cost from your D.C. Lighting Mains. Will trickle-charge your L.T. Accumulator at No Cost when light is in use. Complete with Polarity Indicator.

**Price 6/- each**

Both of these units are in constant use in thousands of homes throughout the country, and are giving every satisfaction.

**FORMO**



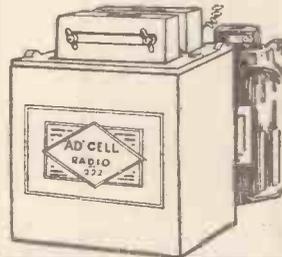
**LOG (or mid-line) CONDENSER**

Mounts either Panel or Baseboard.

00035  
00025  
0005 **10/6** each.

The most Scientific Condenser yet produced. Perfect in every detail of construction and performance. Crown Works Cricklewood, N.W.2 Phone: Hamstead 1787

**VALVE HEATING from Air depolarising "A.D." PRIMARY CELLS**

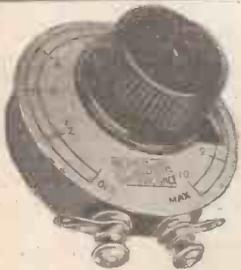


Operating EMP 1 volt or higher per cell, perfect simplicity; charged at home with sal-ammoniac. Most economical cell yet produced, as the following examples will show.

No.	Output Not to Exceed	Life per Zinc when used 3 hours daily:	Price per complete cell, with salt.
222	1 amp. 3.5 hrs.	350 days with 5 valves (each 100 m/a.)	30/-
229	300 m/a 3.5 hrs.	330 days with 3 valves (each 100 m/a.)	15/-
240	120 m/a 3.5 hrs.	350 days with 1 valve (100 m/a.)	5/6

Pro rata life for other types of valves 1 volt per cell, 2 volts 2 cells in series, etc. **PERFECT IN ALL RESPECTS** For Country Sets or anywhere where attention to battery recharging is troublesome. Ask your dealer to give fullest particulars or apply to:

**LE CARBONE**  
COVENTRY HOUSE,  
SOUTH PLACE, LONDON, E.C.2



**C.E. PRECISION RHEOSTAT.**

A beautiful little component - the smoothness of its control is remarkable. Prices from 2/9 to 3/9.



**C.E. PRECISION H.F. CHOKE** Has a minimum self capacity and a small external field. Covers a wide range of wave-lengths. Price 7/- . A Short Wave model is available at the same price. Write for full list of components and circuit diagram of the "ORCHESTRAL THREE," the Receiver that Sets the Standard of Perfection.

**C. EDE & CO., LTD., BYFLEET, SURREY.**  
Phone: Byfleet 226.  
Grams: Ceprecise, Byfleet.

**CUT THIS OUT FOR CABINETS**

and post to us for new FREE list illustrating Cabinets as shown in "Popular Wireless," etc., etc.

NAME .....

ADDRESS .....



(Write in block letters, please.)  
**CARRINGTON Mfg. Co., Ltd.,**  
CAMCO WORKS, SANDERSTEAD ROAD  
SOUTH CROYDON.

Telephone: Croydon 0623 (2 lines).  
Trade enquiries especially invited.



**Fresh as the Dawn**  
every morning.

**A permanent source of H.T. supply that re-charges itself while you sleep!**

No matter how much you use it—night after night, week in and week out—the Standard self-generating Leclanche battery will provide your set with abundant H.T. supply. Enthusiasts everywhere are loud in its praise, and they have good cause to be! It brings constant, permanent, unflinching H.T. current at a price within the reach of all. The secret is—IT RE-CHARGES ITSELF OVERNIGHT.

*Get this Free Book*

Take the first step by sending for a **FREE** Booklet describing every detail for installing and maintaining this super-efficient and money-saving battery. Write NOW to:

- For 2-Valve Sets, A. 4, 90 **25/1** volts
- For 3-5-Valve Sets, D. 6, 108 **37/3** volts
- For Super Sets, F. 6, 126 **69/6** volts
- Goods for 10/- or over carriage paid.
- Deferred Terms easily arranged.



(Dept. A), WET H.T. BATTERY CO. 12, Brownlow St., London, W.C.1. Stocked by Halford's Cycle Stores. State number and type of valve when ordering.

**STANDARD**  
SEE GENERATING  
**PERMANENT**  
**H.T.**  
**SUPPLY**

**The Vital Power in Radio!**  
M.B.19

**HEADPHONES REPAIRED.**  
Rewound and re-magnetised 4/- per pair. Loud Speakers repaired 4/-. Transformers rewound 5/- each. All work guaranteed and tested before delivery. Write for Trade Prices. Phone: Clerk 1795. MASON & CO., 44, East Rd., City Rd., N.1.

**RADIO CATALOGUES FREE**  
FULLY ILLUSTRATED  
CONTAINING  
OVER **200** COMPONENTS  
WHICH ARE OBTAINABLE  
FROM ALL THE BEST DEALERS

**A.F. BULGIN & Co.**  
RADIO MANUFACTURERS  
9-11, CURSITOR ST, LONDON, E.C.4

**RADIOTORIAL QUESTIONS AND ANSWERS**  
(Continued from page 902.)

not relayed, but tuned in right over the Atlantic. Surely that is not true? Or, at least, if it has been done, I suppose it was only a fluke that isn't likely to be repeated?"

You know, you really ought not to be so "suspicious"—living in a cathedral town, too! For it is a sober fact that American broadcasting is being picked up direct all over the country after about ten in the evening. A one-valve set will do it, but generally a two is better. The secret is "short waves." We don't often hear the American programmes on 300 metres or so, but some stations duplicate their transmission on 32 or 45 metres, and it is these shortwave programmes that cover the distance so amazingly.

**FILADYNE ON SHORT WAVES.**

H. N. (Govan, Glasgow).—"Can the Filadyne type of circuit be used for short-wave reception?"

Yes. Remarkably good short-wave results have been obtained with one and two-valve Filadyne sets.

**"P.W." TECHNICAL QUERY DEPARTMENT**

*Is Your Set "Going Good"?*

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 offer an unrivalled service.

Full details, including a revised scale of charges, can be obtained direct from the Technical Query Dept., "Popular Wireless," 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.

**IS BROADCASTING INSTANTANEOUS?**

R. E. J. (Brighton).—"What I would like to know is this: Can I calculate how long it takes the broadcasting to travel from 2 L O's aerial to mine? The distance from London is just about fifty miles, and my friends tell me that no time at all elapses between a word being spoken at 2 L O and its reception here in Brighton. But that looks wrong to me, and I should like to prove to them that wireless *does* take time to travel, even if it moves as fast as light."

You are quite right in contending that some time elapses between the dispatch from London and the arrival at Brighton, but it is not very long! The wireless waves travel at the rate of 186,000 miles per second, so that to find how long they take to cover fifty miles you can divide that figure into 186,000. The answer is

$$\frac{186,000}{50} = 3,720$$

so that wireless can do the London-Brighton journey 3,720 times in one second: that is to say, the waves take 1/3,720th of a second to get from 2 L O's aerial to yours. And your friends aren't far out in calling it "instantaneous," are they?

**LOUD-SPEAKER LEADS.**

J. P. A. (Derby).—"My loud speaker is marked with a plus and a minus, but the terminals on the set are not marked: at (Continued on page 906.)

TRADE MARK **RD40 2/-**  
**RED DIAMOND**

REGD A RADIO EXPERT writes:—

"I have now thoroughly tested your RD40 Detector, both on crystal and reflex sets. I have found it very satisfactory in every way, it is very efficient."

Shield for same 6d.  
**"RED DIAMOND"**

THE RECOGNISED DETECTOR FOR ALL CIRCUITS USING CRYSTAL RECTIFICATION. By Insured Post 2/3 or 2/9 with shield. Can be mounted on brackets or through panel. Once set always ready. Not affected by vibration. Each one is tested on broadcast before despatch, and is perfect. Of all high-class Radio Dealers or Sole Makers:—  
**JEWEL PEN CO., LTD.**  
(Radio Dept. 46).  
21-22 Gt. Sutton St., LONDON, E.C.1.

**DR. PHOSFLUX YOU CAN SOLDER**

with the greatest of ease with PHOSFLUX, the paste flux for soldering all metals without fuss or bother. Keep a tin in your tool kit.

**DR. PHOSFLUX**

HEAD. ECONOMICAL EFFICIENT. 6d., 1/-, 2/-. from Ironmongers & Hardware Shops, or post free from the makers, 8 1/2, 1/3, 2/6.  
**OWEN CAMBRIDGE & CO. Southampton**

**CONDENSERS of QUALITY!**

No mass production methods are employed in the manufacture of Camden Condensers. Every Condenser is stamped with a Serial No., and accompanied with a guarantee of 6 months' real service. Telegrams: KAMELECO. Telephone: Runcorn 109.

Send for list and prices to  
Camden Electrical Co., Stanley Chambers Runcorn.

**WET H.T. BATTERIES**  
Solve all H.T. Troubles.

SELF-CHARGING, SILENT, ECONOMICAL  
JARS (waxed) 2" x 1 1/4" sq. 1/3 doz.  
ZINCS, new type, 1 1/4 doz. SACS 1/2 doz.  
Sample doz. (18 volts), complete with bands and electrolyte, 4/3, post 9d.  
Sample unit, 6d., 16-page booklet free.  
Bargain list free.

AMPLIFIERS 1-VALVE 19/-, 2-VALVE 30/-.  
2-VALVE ALL-STATION SET 24.  
P. TAYLOR, 57, Studley Road, STOCKWELL LONDON.

**BELLING-LEE DIAL INDICATORS**

**REACTION**

A neat, attractive designator and pointer for any tuning dial or control knob. Fitted by simply drilling one 3/16 inch hole above each dial and then screwing a nut on the back. Solid cast metal with raised polished letters showing white on black background. Fourteen different letterings.  
**PRICE 6d.**  
Made by the makers of the famous Belling-Lee Terminals.  
Queensway Works, Ponders End, Middlesex.

**D-XELLENT!**

**DX PLUG-IN COILS**

From 1/- DX COILS, LTD., London, E.8.

**PICKETT'S CABINETS**

**The "RADIOLA BUREAU"**  
HIGHLY COMMENDED by "Popular Wireless," October 22nd issue, page 416

3 ft. high, Solid Oak or Mahogany, beautifully finished. In many sizes.  
From £5-5-0  
Sent on Approval Direct from Factory.  
No need to rebuild! Will take every Set and heaviest batteries. Full Lists FREE.  
**PICKETT'S CABINET (P.W.) WORKS, BEXLEY, HEATE, KENT.**

# Another Met-Vick Constructor Set



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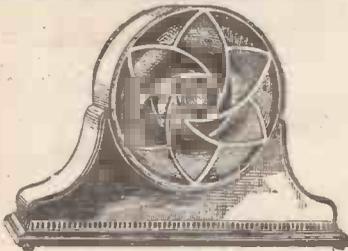
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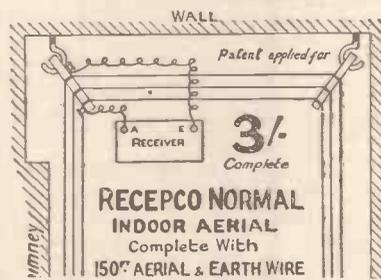
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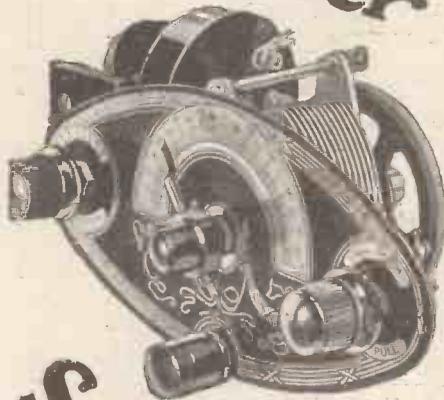
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## RADIO TORIAL QUESTIONS AND ANSWERS

(Continued from page 904.)

least, they are marked 'L.S.', but nothing else. I know nothing at all about wireless, so how do I know which side to connect the plus and which minus ?

Have a peep inside the set, and you will notice that one of the loud-speaker terminals is joined to the H.T. positive terminal. (If the set has two H.T. positives it will probably be to H.T. + number 2; if three, H.T. + number 3 etc.) Mark this loud-speaker terminal with a +. The other L.S. terminal will be connected to the plate socket of the last valve, and this one is the one to which is connected the loud speaker's minus lead.

### THE EXTRA TERMINAL.

E. D. I. (Ely, Cambs).—" I have bought an American audio-frequency transformer and I do not understand the marking of the terminals, which is as follows: A, B+, C and G. There is a fifth terminal which is marked Gr. How should these all be connected ?"

The terminal marked A corresponds to plate; that marked B+ to H.T. + C means grid bias negative, and G means grid. The terminal which is marked Gr is intended to be connected to earth, which in America is called "ground."

### "SILENT-POINT" RECEPTION.

E. T. (Hunstanton, Norfolk).—"What is 'silent-point' reception ?"

Silent-point reception is one of the greatest nuisances under the sun. It gets its name from the fact that although a set using too much reaction generally whistles or howls, there is one particular "adjustment" for it which gives a comparatively silent point, even when it is oscillating.

When adjusted under these conditions reception is louder than normal, but it is harsh and distorted, and it is invariably causing very bad interference in all neighbouring sets.

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### ADJUSTING THE LOUD SPEAKER.

J. A. R. (King's Norton, Birmingham).—" I do not understand the necessity for adjusting the loud speaker. What is the knob at the back for ?"

The action of the loud speaker depends upon the fact that it contains a permanent magnet which exerts a steady pull upon the diaphragm. In addition, it contains electro-magnets, which either resist or oppose the permanent magnet according to the currents flowing round the wire. To get the maximum effect the diaphragm must be attracted strongly towards the permanent magnet, but not too strongly. The adjusting screw is for the purpose of varying the distance between the permanent magnet and the diaphragm so that any desired degree of "pull" is obtainable.

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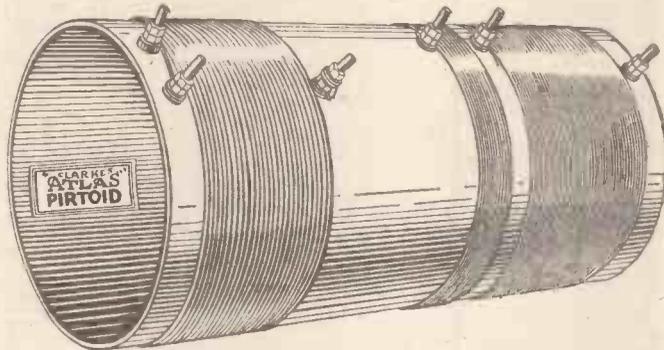
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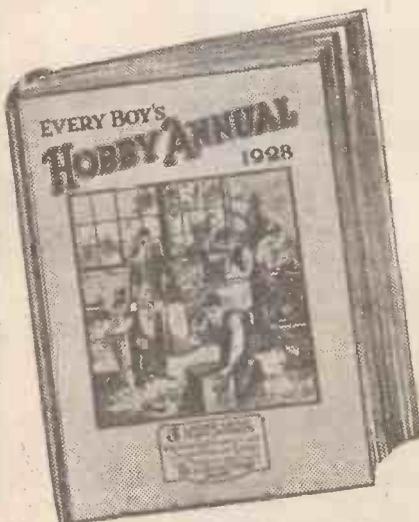
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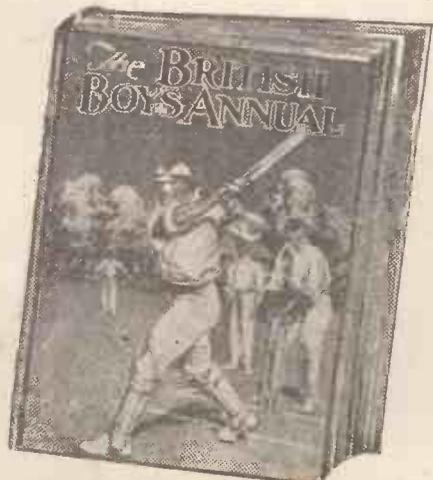
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# SHORT-WAVE NOTES.

By W. L. S.

**A**T last there actually seems to be some sign of activity awakening on wave-lengths other than the 45-metre band! The Americans, of course, have been using 20 metres with great success for quite a long time, but it is only recently that any considerable number of Europeans have made themselves heard on this wave-length, and there is certainly a rapidly growing number of them at work now.

## Speech Tests.

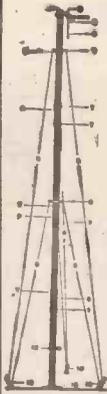
Finland, Norway, Sweden, and Russia seem to come in much better on the 20-metre band than on the upper wave-lengths, and even the British stations are sometimes quite strong. With regard to 90 metres, quite a few British stations are using this as a "gossip wave-length" on Monday nights. It certainly is a treat to get away from hunting "DX" and to have a chat with old friends, especially when, as is the case now, one has 180 degrees of condenser-scale populated by about-eight stations! Ninety metres is certainly a wonderful wave-length for uninterrupted conversations.

2 XG seems to be on a different wave-length almost every night. The writer heard him a few nights back on exactly 46 metres, giving out his usual "write down Shakespeare, etc, etc." These word tests are quite interesting, as they show up the difficulty in following a voice that only speaks casually and repeats nothing, when the station is subject to fading. Whether the authorities intend to learn anything about the actual fading of the signals from them is a different matter, but it seems that when a word is missed it is almost equally due to fading, interference, and the enunciation of the person reading the words out.

## The "Critical" Wave-length.

How long will it be before someone really discovers the "critical wave-length" at which waves are no longer refracted in the Heaviside layer and returned to the earth, but pass right out into space through the layer? It seems possible that all sorts of extraordinary things may happen to transmissions on this exact wave-length. It is generally believed to be somewhere in the neighbourhood of 10 or 12 metres. Perhaps this is something to do with the rumour that 5SW is going to start up experimentally on 10 metres?

It is almost impossible to publish a "timetable" giving the best times to listen for the different countries on wave-lengths below 30 metres. This time last year, when the 38-45-metre band was more universally in use, it was generally possible to compile such a table, but the shorter waves are much more erratic. United States stations on 20 metres, for instance, are sometimes at their strongest at about 5 p.m. Yet on other days they have been very strong at mid-day and noticeably fading out by 2 p.m. Truly there is much to be learnt before we think of descending any further in the scale!



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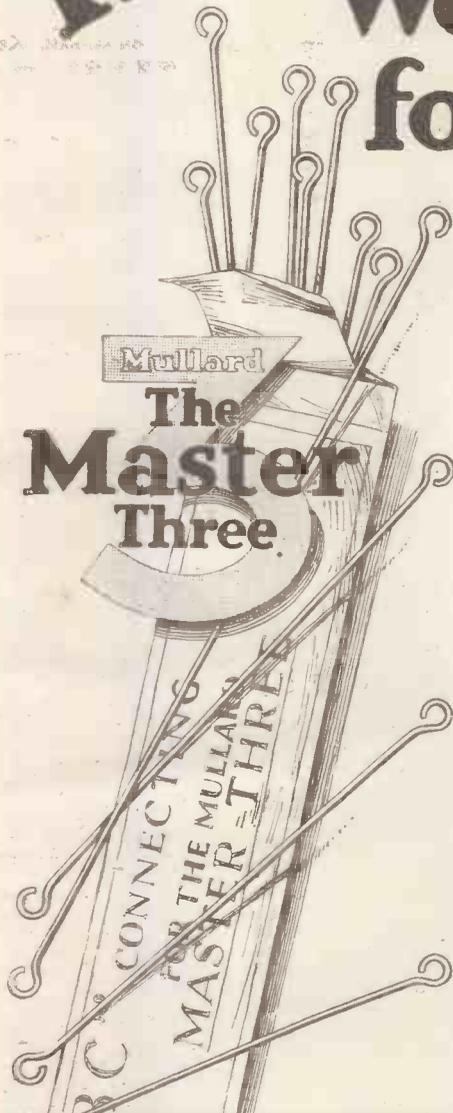
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At Trifling Cost.  
The secret of successful reception is AN EFFICIENT "EARTH."  
**"VITORE"**  
The Chemical Earth Compound, gives to owners of small sets and restricted Aerial the advantages of an expensive outfit.  
Increased Volume. Purer Tone. No Distortion. Increased Conductivity of Earth 50%.  
The power of a Valve at one quarter the cost. Merely incorporate "Vitore" with earth surround. "It is impossible to exaggerate the importance of a good earth."  
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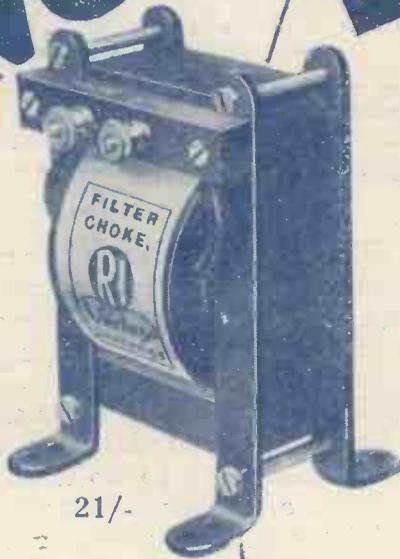
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# AVOID DISTORTION



21/-



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The surest way to avoid distortion and protect loud-speaker windings from the effects of heavy I.T. currents is by the use of the R.I. and Varley Filter Choke. The core of this famous component has a cross-sectional area of over one square inch (the largest of any proprietary filter choke on the market) and can comfortably handle a load of 25 milliamperes without saturating the iron. The winding is of ample section to ensure minimum ohmic resistance. The use of this component—inductance 20 henries, D.C. resistance 250 ohms—is essential in all good class modern receivers to avoid distortion, and ensure real tonal purity at the loudspeaker. 21/-.

## PUSH-PULL OUTPUT TRANSFORMER.

This component enables valves in parallel to deal with twice the grid swing, resulting in much stronger signals. Special care has been taken to see that there is sufficient iron content. The R.I. and Varley Push-Pull Output Transformer has been carefully designed to give the best possible performances in push-pull practice, and is suitable for use directly coupled to loudspeakers whose D.C. resistance is between 650 and 2,000 ohms. 22/6.

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