

SUPER RESULTS WITH OUR "HOT" SET

THE HOW AND WHY OF THE VALVE

# Amateur Wireless

and  
Radiovision

Every  
Thursday 3<sup>d</sup>

Vol. XVIII. No. 465

Saturday, May 9, 1931

## Getting Stations with the "Century Super"

**EUROPE  
AT YOUR  
ELBOW**

ZAGREB  
GÖTEBERG  
BRESLAU

CA  
BRE  
LAHT.



SUNDSVALL

AUNAS  
SCHLACKER  
BERGEN  
ALGIERS  
SEVILLE  
HAMBURG  
LVOV  
FRANKFURT  
BUCAREST  
LEIPZIG  
BERLIN  
KOSICA  
RIGA  
VIENNA  
GRAZ  
ALGIERS  
HELSINKI  
PRAGUE  
HAMBURG  
MOTALA  
TURIN  
ALGIERS  
ISTANBUL  
BRUSSELS  
LYONS

**RANGE THE WORLD**



**T**HIS new LEWCOS achievement—the Super-het Coil Kit—which has a nine-kilocycle wave-band separation and consists of one triple wave-band Oscillator Coil, two I.F. Coils with “pigtails,” and one I.F. Coil without “pigtails,” marks a new epoch in radio reception. The I.F. Transformers are accurately matched, thus giving a remarkable degree of efficiency.

This Kit, which is recommended for the “Century Super,” can also be fitted with extraordinary ease in any set of similar design and the results will be truly astounding!

The small space available is completely inadequate to give even a short description of these wonderful new LEWCOS Coils, and you are invited to write for an illustrated explanatory leaflet.

with  
The

**LEWCOS**  
(Regd)



**SUPER-HET  
COIL KIT**

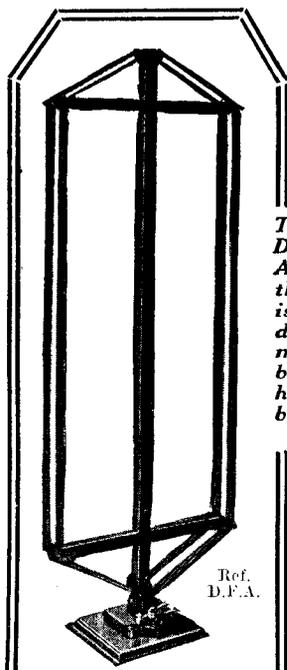
(Patent Pending)

which is recommended  
for the  
“CENTURY SUPER”  
receiver described  
in this issue.

Price 50/-

Ref. S.H.K. No. 1.

BRITISH THROUGHOUT



Ref. D.F.A.

GREEN

BLACK

RED

WHITE

BLUE

*This is a photograph of the LEWCOS Dual Range Centre-Tapped Frame Aerial which is recommended for the “Century Super.” The Frame is wound with silk-covered Litzen-draht wire and the switch and terminals are mounted on the moulded base, thus presenting a neat and handsome appearance. The wave-band change is effected by the turn of a knob.*

PRICE 32/6

LEWCOS “Spaghetti Resistances” of 15,000 and 20,000 ohms each  
PRICE 1 6 each  
are specified for the  
“Century Super”

A COMPLETE KIT OF PARTS FOR THE “CENTURY SUPER,” WHICH INCLUDES THE LEWCOS SUPER-HET COIL KIT AND THE FRAME AERIAL, CAN BE OBTAINED FROM

READY RADIO LIMITED  
H. & B. RADIO COMPANY  
AND THE  
PELO-SCOTT CO., LTD.

— See separate advertisements in this issue —



**LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION**

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED, CHURCH ROAD, LEYTON, LONDON, E.10

You will Help Yourself and Help Us by Mentioning “A.W.” to Advertisers

EVERYTHING **G.E.C.** ELECTRICAL  
*your guarantee*

# D.C. Mains Users

can now get A.C. mains efficiency in the

## New

# GECOPHONE

## D.C. ALL ELECTRIC RECEIVER

**SPECIALLY DESIGNED AS A D.C. JOB**

4-VALVES, ALL-ELECTRIC D.C. MAINS OPERATED WITHOUT HUM

CONFORMS TO RECOMMENDATIONS OF THE INSTITUTION OF ELECTRICAL ENGINEERS

SINGLE DIAL TUNING

TWO MATCHED STAGES OF SCREEN-GRID HIGH FREQUENCY AMPLIFICATION

TONE CORRECTED SUPER-POWER PENTODE OUTPUT

WILL OPERATE A MOVING COIL LOUD SPEAKER

HIGHLY SELECTIVE AND SENSITIVE

FOREIGN STATION RECEPTION WITH INDOOR AERIAL

HANDSOME SOLID WALNUT CABINET



MADE IN ENGLAND  
*Sold by all Wireless Dealers*

Here is a new GECOPHONE all-electric receiver which provides an entirely fresh outlook in radio enjoyment for those served by Direct Current electricity supply. Its performance is amazing—yielding immense range with perfect selectivity and powerful strength with delightful purity of tone. Add to these the advantage of one tuning knob, the beauty of a solid walnut cabinet and the low price of £25—and you have a set of outstanding quality and value.

**Fill in and post this coupon for leaflet in full colour giving all particulars of GECOPHONE D.C. ALL ELECTRIC RECEIVER.**

**HIRE PURCHASE**  
Terms: Deposit £2.10.0, 12 monthly payments of £1.19.5

**£25**  
INCLUDING OSRAM VALVES and ROYALTY

**COUPON**

Please send me particulars of the new GECOPHONE D.C. ALL-ELECTRIC RECEIVER

Name.....  
Address.....

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

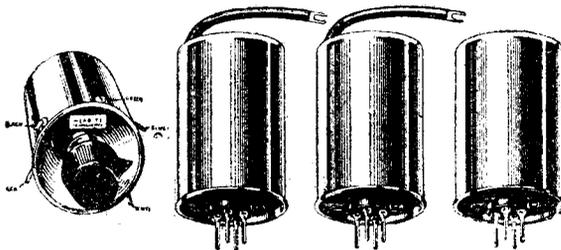
Cut out and paste on postcard, or enclose in unsealed envelope. Halfpenny postage in either case. A.W.

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

# SPECIFIED FOR THE "CENTURY SUPER"

*The Coils chosen by Mr. W. James for his "Century Super" are made specially by Wright & Weaire, Ltd., the oldest component manufacturers in the industry*

The outstanding performance of this receiver is only made possible by the use of Wearite

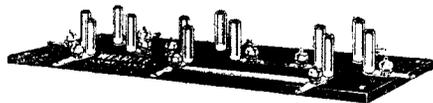


**WEARITE  
SUPER-HET  
COILS**

The Oscillator Coil is designed for panel mounting and is fitted with connecting tags. The three long-wave coil units are fitted with standard valve pin bases so that they may be mounted in ordinary 4-pin valve holders.

Price of complete set of coils **50/-**

*(Illustrated descriptive leaflets explaining the unique construction of these coils will be sent on request.)*



**TRIPLE COIL  
BASE**

Base for above coils, complete with terminals and tags. Coil sockets are sprung similar to valve holders. **PRICE 2/9**  
3-coil strip and 5-valve strip with all essential wiring complete as one chassis. **PRICE 7/-**

*Send for Free Illustrated Lists*

# WEARITE

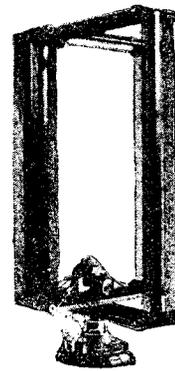
## COMPONENTS

**WRIGHT & WEAIRE, LTD.**

740 HIGH ROAD, TOTTENHAM, N.17

Telephone : Tottenham 3847-8-9

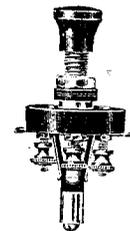
### ADDITIONAL WEARITE COMPONENTS FOR THE "CENTURY SUPER"



**WEARITE  
DUAL-RANGE  
FRAME AERIAL**

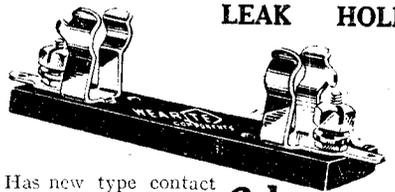
Entirely new in design and embodying exclusive features which give extremely high efficiency. The windings are of Litzendraht wire, carefully wound at even tension throughout, in order to maintain the accuracy of spacing. The winding is centre-tapped and provided with the necessary three terminals for connection to set. The change from short to long waves is affected by means of a switch at the base: no other alterations to connections are necessary. The frame aerial swings through 180 degrees and is mounted on a polished mahogany base. It is of particularly handsome appearance. **PRICE 42/-**

(Price per complete set of parts), less wire **30/-**



**WEARITE THREE-  
POINT SHORTING  
SWITCH**

Push-pull action. Sound self-cleaning contact. With insulated spindle. **PRICE 1/6**



**WEARITE GRID-  
LEAK HOLDER**

Has new type contact spring clips. Fits any size grid leak. **PRICE 6d.**

**WEARITE  
VALVE  
HOLDER**

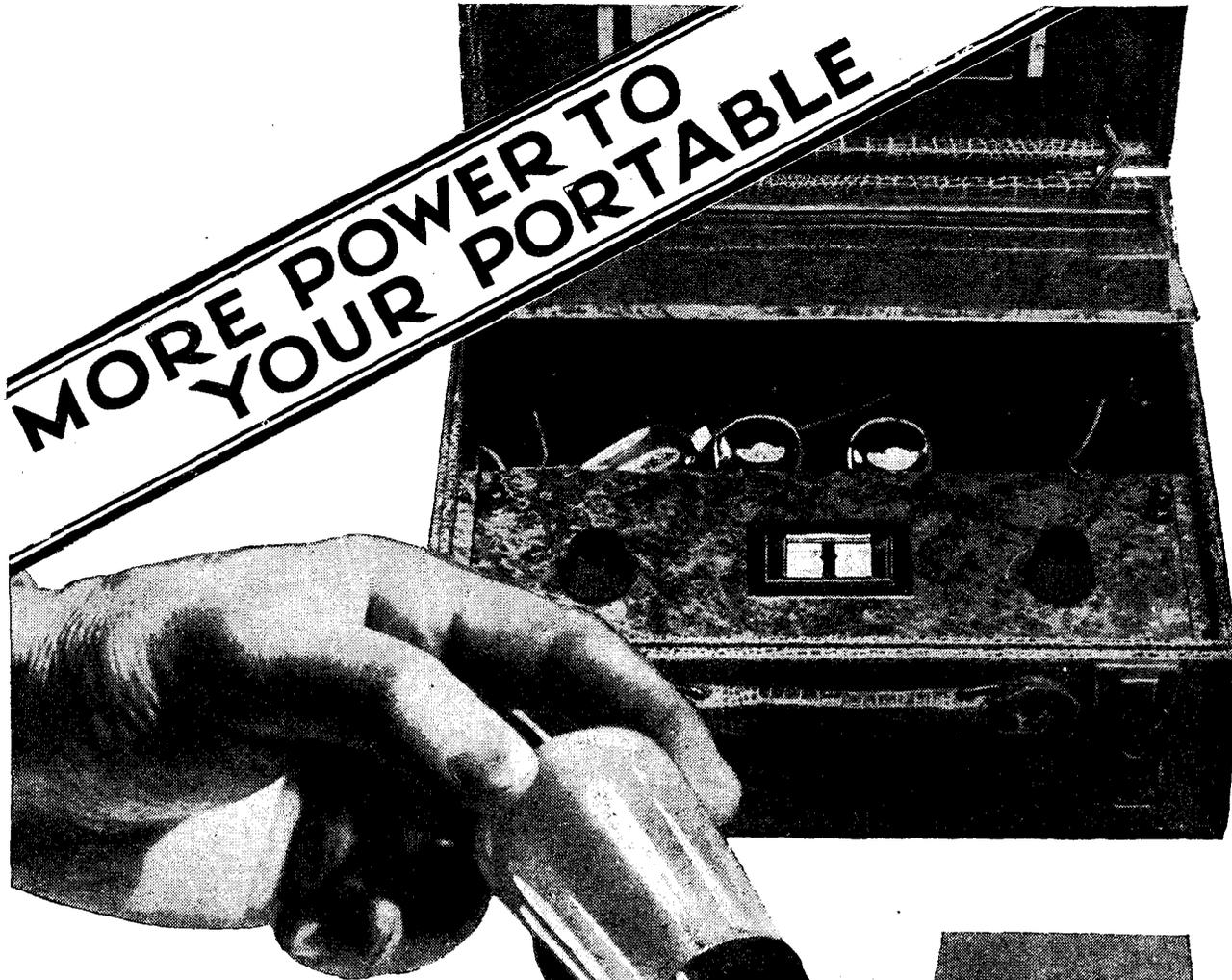
Robust construction. Sprung sockets ensure good contact. Fitted with terminals and soldering tags. **PRICE 1/3**



**GENUINE PAXOLIN  
PANELS MAHOGANY  
OR BLACK FINISH**

12 x 8 x 3/8 (Drilled to specification). **5/9**

12 x 8 x 1/8 (Drilled to specification). **4/-**



**MORE POWER TO  
YOUR PORTABLE**

**CHANGE OVER  
TO MAZDA . . .**

A 4-valve combination

S.G. 215 H.L. 210 L. 210 P.220 or P.220a  
20/- 8/6 8/6 10/6 13/6

**THE AMAZING**

**MAZDA  
RADIO  
VALVES**

You can get the correct Mazda valves for your set from all good radio dealers.

**EDISWAN RADIO**



V.117

*The Edison Swan Electric Co. Ltd., Incorporating the Wiring Supplies, Lighting Engineering and Radio Business of the British Thomson-Houston Co. Ltd.*

Advertisers Appreciate Mention of "A.W." with Your Order

Simple facts for  
Valve Users

# How Cossor ensures distortionless reproduction

Over 50 types of Cossor Valves are available from any Wireless Shop to suit all 2, 4, and 6 volt Battery operated and A.C. Mains Receivers

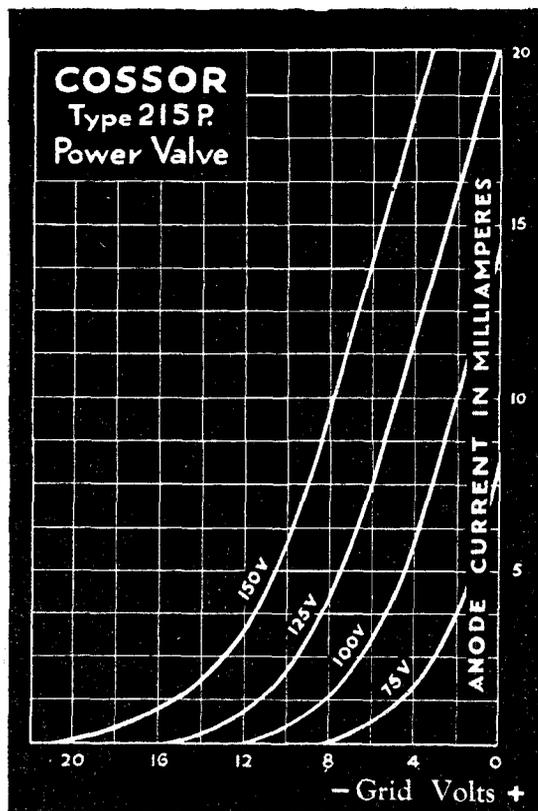
## Cossor 2 volt (Battery Operated) Power Valves

**Cossor 215 P.** 2 volts, .15 amp. Impedance 4,000. Amplification Factor 9. Mutual Conductance 2.25 m.a./v. Anode Voltage 75-150. Price **10/6**

**Cossor 220 P.** 2 volts, .2 amp. Impedance 4,000. Amplification Factor 8. Mutual Conductance 2 m.a./v. Anode Voltage 75-150. Price **10/6**

**Cossor 220 P-A.** 2 volts, .2 amp. Impedance 4,000. Amplification Factor 16. Mutual Conductance 4 m.a./v. Anode Voltage 75-150. Price **10/6**

**Cossor 230 X.P.** 2 volts, .3 amp. Impedance 1,500. Amplification Factor 4.5. Mutual Conductance 3 m.a./v. Anode Voltage 75-150. Price **13/6**



THE quality of the reproduction of your Receiver is largely controlled by its output valve which is called upon to handle very considerable grid swings. If it is unable to do this, distortion is inevitable.

Cossor Power Valves are specially designed to meet these exacting requirements. As you can see from the characteristics of the Cossor 215 P the long straight portion of the curve will handle very large inputs with the assurance of perfect quality.

Uniformity of characteristics is ensured by the special insulated bridge method of construction which retains the various elements in life-long alignment. This method of construction is found in no other make of valve. To be certain therefore of obtaining the maximum volume with crystal clear reproduction choose a Cossor Power Valve in one of the several types available.

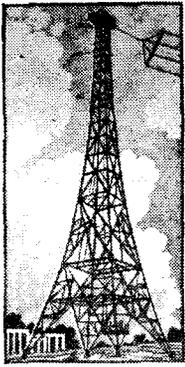
# COSSOR

POWER VALVES

A. C. Cossor, Ltd.,  
Highbury Grove,  
London, N.5.

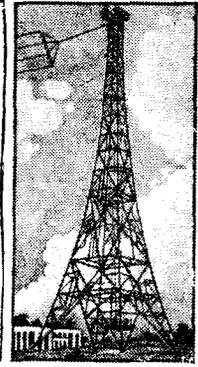
8291

To Ensure Speedy Delivery, Mention "A.W." to Advertisers



# Amateur Wireless

and  
Radiovision



EDITOR:  
**BERNARD E. JONES.**

TECHNICAL EDITOR:  
**J. H. REYNER, B.Sc., A.M.I.E.E.**

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

RESEARCH CONSULTANT:  
**W. JAMES.**

ASSISTANT EDITOR:  
**H. CORBISHLEY.**

## NEWS · & · GOSSIP · OF THE · WEEK

### NO SUMMER FADING

AS summer and summer-time introduced itself this year accompanied by a spell of bad weather, many of us stayed indoors and searched for stations instead of making the garden tidy or cleaning the car! And have you noticed that despite the long evenings the stations still come rolling in? Formerly we always talked of "summer effect," and prepared for a dearth of stations from May to September, but with the good sets we now have, the "summer effect" is a back number.

### ANNOUNCERS, AGAIN!

THE announcer frequently has to make his decision rapidly and seldom has time to refer to a gazetteer, or a universal pronouncing dictionary (which does not exist), so we may not be surprised if he does the best he can and gives us a purely English version. In the first three months of the present year there appeared in the news or in the programmes *over seven hundred foreign names or words taken from at least a dozen foreign languages*, and

every one of them had to be pronounced, somehow or other, by the announcers. Whereas it is quite easy for any one critic to be familiar with one, two, or possibly three languages, it is quite impossible for the announcers to know all languages." So says the B.B.C.

### THE PRINCE AGAIN

THE PRINCE OF WALES will be heard by National listeners on May 21, when his speech at the banquet given by the London Executive Committee of the British Empire Trade Exhibition, Buenos Aires, will be relayed from Dorchester House. A speech worth hearing, by a Prince with a fine broadcasting voice!

### JOHN HENRY

JOHN HENRY, the first of English radio comedians, is visiting Australia with his wife, and is giving sketches every evening from 2UW. He was the first comedian to broadcast in this country—his first broadcast was in 1922—and since then he has written over half a million original words of

### PRINCIPAL CONTENTS

	Page
News and Gossip ... ..	737
Making a Simple Tone-changer ...	739
Is That Old Set Worth While? ...	741
For the Newcomer ... ..	742
On Your Wavelength ... ..	745
At Manchester Broadcasting House What You Should Know About Valves ... ..	747
Philip Ridgeway Tests the "Century Super" ... ..	749
How Good Can We Make Tele- vision Images? ... ..	750
Without Fear or Favour ... ..	751
Getting Stations with the "Century Super" ... ..	752
In My Wireless Den ... ..	756
The Columbia Model 332 Console More About the "Regional Sup- pressor" ... ..	760
Readers' Ideas and Questions ...	762
Broadcast Telephony ... ..	770

revues, "double acts," and "single acts" for broadcasting.

### A NEW BELFAST

WE understand that the Belfast station of the B.B.C.'s system will be entirely reconstructed at the same time as Daventry 5XX. Latest indications are that this reconstruction work will be put in hand before the Regional Scheme is completed. We may therefore expect work to start on the new Belfast and Daventry stations some time early next year. The present power of the Belfast station is only 1.2 kilowatts, but the B.B.C. intends to use a power of at least 15 kilowatts for the new station. It should thus offer a service to many outside the immediate region for which it is designed. We are thinking of Dublin listeners, many of whom, even now, tune in to Belfast in preference to the local station.

### "STEALING" CROWD NOISES

SPECTATORS at Brooklands recently little realised that they were unwitting "supers" in Leslie Henson's play, *Speed*. Records were being taken by a "His Master's Voice" mobile recording studio of the noise of the racing cars, the applause of the crowd, and the cries of the bookmakers, and this will form a background of sound in the forthcoming production.

## "MR. BUGGINS" MARRIES



Michael Hogan, well-known to listeners as "Mr. Buggins," and who appears before the microphone with Mabel Constanduros, was married last week to Miss Midge Saunders, the actress. Here the bride and bridegroom are leaving the church after the ceremony

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

## RUBBISH ?

"ACCORDING to a scientist, the air is full of rubbish. But you needn't tune in to it if you don't want to!"—*Sunday Pictorial*.

## B.B.C. APPRECIATION

THE appreciations of musical broadcasts which swell the B.B.C.'s postbag to the largest extent are Joseph Lewis's "Memories" programmes. Among several

## A RARE BIRD!



A New York station recently broadcast the song of the tropical—a rare bird from the Amazon forest district, and of which only two are in captivity. The little broadcaster is here sitting on top of the "mike"

hundred congratulatory letters on one such programme recently given, three letters alone represented thirty-five, seventy-two and one hundred and twenty listeners. There is no doubt about the fact that these "Memories" programmes are popular; but don't let's have too many of them.

## THIS "STATIC" BUSINESS

FOLLOWING upon a recent Berlin case where a hairdresser was summoned for causing radio interference with a faulty hair-drier, it is announced that the authorities of one of the Belgian towns have made interference with radio reception an indictable offence with a heavy fine or one week as the penalty. Also we hear that a Calais hotel proprietress has been fined 5,000 francs for causing interference with radio programmes by using a faulty electric gramophone motor. They're very strict on man-made static in "furrin" parts, but unfortunately not so strict in England!

## SPONSORED PROGRAMMES AGAIN ?

ONLY 300 miles from London is Luxemburg. At present this state boasts a 4-kilowatt transmitter on 222.9 metres. But recently completed is a giant transmitter in Luxemburg having an aerial power

of 100 kilowatts. We naturally want to know why such a big transmitter is needed for such a small country. Perhaps it is to reach other countries, including England. Some syndicate is said to be preparing for radio advertising on an international scale and the medium of propagation is said to be Luxemburg. The language problem may be solved by announcing one night in French, the next night in German, the next in Spanish, and so on through the week to appeal to all the surrounding countries. If there is a serious attempt to put this idea into practice we imagine a longer wavelength will be sought.

## WIRED WIRELESS

QUESTIONS are being asked at the moment as to the *bona fides* of those responsible for the listeners exchanges now so widely in use. It is suggested that in addition to sending over B.B.C. programmes the "relay chief" may quite easily make announcements through a microphone; and if announcements are made, what is to stop them containing advertising matter?

## THAT SOCIAL SURVEY

SOME time ago a certain well meaning committee suggested to the B.B.C. that a nation-wide survey of the habits and customs of listeners would provide a useful index on which to base transmission times for educational matters. This scheme evidently scared Savoy Hill, for the suggestion has not been acted upon. But we understand that B.B.C. advisers are now playing with the idea of conducting such an experiment on a very limited scale. Our own view is that while the B.B.C. relies only on its correspondence to gauge the acceptability of the present programmes it will tend to be misled, for a fairly representative section of the people does not take the trouble to write.

## THE WAVE CHANGES

SINCE Midland Regional, Glasgow and Manchester 2ZY changed over wavelengths recently, all sorts of pretty little

reception problems have cropped up. Glasgow listeners report difficulty at night in separating Glasgow from London and Midland Regional stations on each side of it. Manchester listeners, just a few of them, have had some trouble in tuning up to 479 metres.

## POOR ABERDEEN

WE have more than a little sympathy at the present time for Scottish listeners who must unfortunately suffer for a few months as the result of regional scheme developments. Thus, when the North National station starts up soon on 301 metres, Aberdeen, which at present transmits on that wavelength, will be relegated to the national common wavelength of 288 metres. We understand that special synchronising gear will be installed at the Aberdeen station in order to avoid as much deterioration in range as possible. Listeners should have no difficulty in re-adjusting their sets from 301 metres to 288 metres. All the same, we expect Scottish listeners are eagerly awaiting the completion of the Regional station at Falkirk. It is now well on the way.

## LONG WAVES SCORE

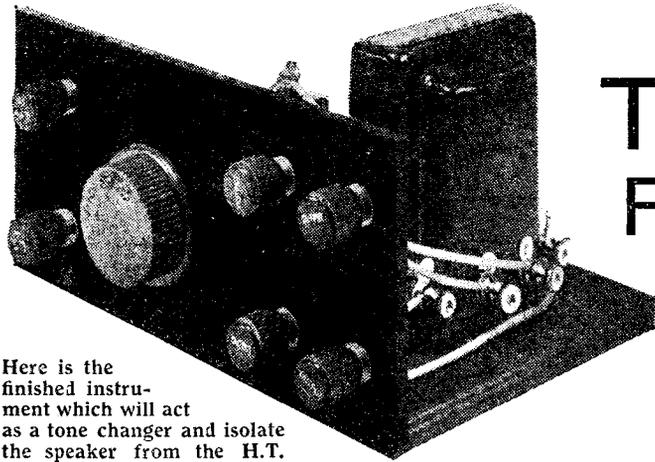
THE superiority of the longer wavelengths of the medium band is amply demonstrated at the present time by any London listener who cares to tune to 479 metres in the evening when Manchester 2ZY is transmitting on that wavelength with a power of only 1.2 kilowatts. Although nearly 200 miles away this low-power station can be received at fair loud-speaker strength on a good three-valver with an indoor aerial. Under these reception conditions Manchester 2ZY was very seldom heard when it was on the much shorter wavelength of 376 metres. Quite a number of northern listeners have written to the B.B.C. asking why Moorside Edge is so weak during the evening programme hours! Of course, Moorside Edge is not transmitting then and listeners are hearing the old 2ZY gear.

## "UNCLE ARTHUR" AGAIN

Arthur Burrows, the first B.B.C. announcer and one of the pioneers of broadcasting in this country, came back from Geneva recently and broadcast a short talk. He does not seem to have lost any of his microphone personality



# MAKING A SIMPLE TONE CHANGER FOR YOUR SPEAKER



Here is the finished instrument which will act as a tone changer and isolate the speaker from the H.T.

Here are constructional details of a little unit which any amateur can make and which, fitted to the output side of your set, acts as a tone changer and as an output transformer, insulating the speaker from the high-tension current.

WHY is an output unit necessary? That is what every amateur asks when he is advised not to connect his speaker directly to the set but to interpose some form of output circuit, either a transformer or a choke coupled arrangement.

Well, there are three main reasons. First the provision of, say, an output transformer

reducing motor-boating which is not a trouble common only to sets which work from the mains, but is likely to be experienced with a battery-driven set, when the high-tension begins to run down.

A third advantage and perhaps one which is the most readily obvious is that it enables one to change the tone and correctly to match the speaker with the power valve. This is very pleasing for two reasons; one is that by choosing the correct tapping on the transformer you can make sure that the greatest power is passed on to the speaker and that the general level of tone is satisfactory; also it is quite easy to fit a resistance and a condenser so that at the turn of a knob the tone can be changed.

### Simple To Make

Obviously this is a control well worth having. In this simple output unit and tone changer a tapped output transformer is used in conjunction with a variable resistance and a large fixed condenser. The circuit shows how these parts are connected, the resistance and condenser being placed in series across the primary of the transformer.

In an accompanying panel are given recommended parts for the construction of this unit and a word of warning is necessary inasmuch as it is very necessary to adhere to the electrical values given. The tone-changing condenser, for instance, a .05-microfarad job, and the resistance has a maximum value of 50,000 ohms. These have been found on test to be the best values, giving a wide margin of tone control.

The unit is shown made up on a small baseboard with the terminals and tone control mounted on a vertical strip of ebonite. This is a convenient form of construction but, of course, the unit may be built into the set itself provided there is room for the three main parts, without undue crowding.

If the unit is incorporated in an existing receiver then take care that the output transformer is not placed too close to any other parts in the set with which it may couple

### COMPONENTS FOR TONE CHANGER

Ebonite panel, 6 in. by 3 in. (Becol, Trelleborg, Potter).

Baseboard, 6 in. by 4 in. (Camco, Clarion).

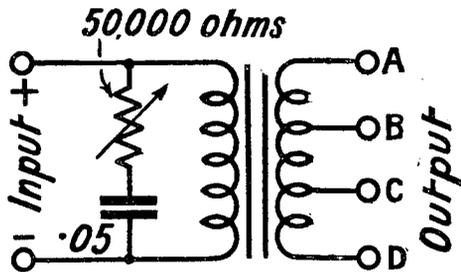
50,000-ohm variable resistance (Regenstat, Colvern Varley, Rotorohm).

.05-mfd. fixed condenser (T.C.C., Dubilier, Graham-Farish, Lissen, Ormond).

Tapped output transformer (British-General).

Six terminals, marked: L.S.+, L.S.—, Output (4). (Belling-Lee, Clix, Eelex).

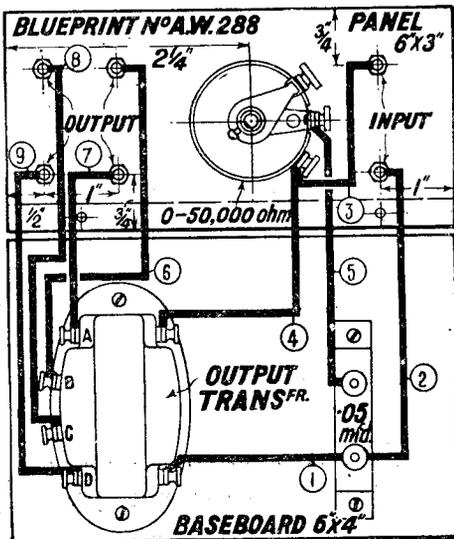
Connecting wire and sleeving (Lewcos).



The circuit of the tone changer

in the loud-speaker leads prevents damage to the speaker as may arise when the set is suddenly switched on or off and there is a surge of a relatively large high-tension current; also as the speaker is insulated from the steady direct current it is not likely to become demagnetised.

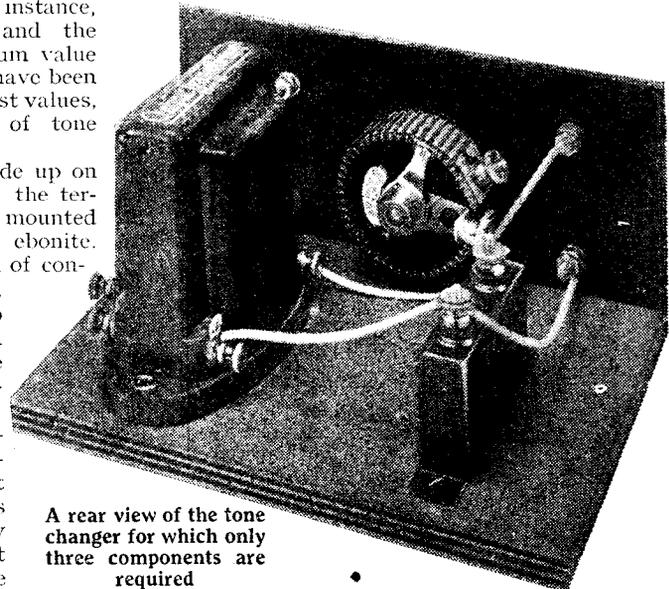
A second advantage in fitting an output circuit is that this goes a long way towards



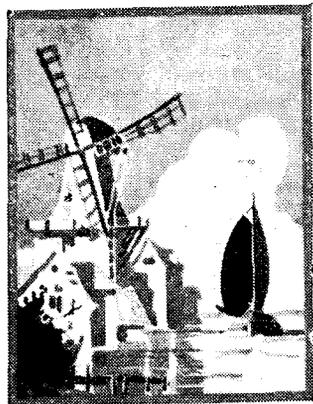
The layout and wiring diagram of the tone changer. A full-size blueprint is available, price 6d.

inductively.

When the tone changer is wired and connected up, make a preliminary test of the tappings in order to find the most suitable ratio. In many cases a tapping will be found to give suitable results and then for normal working it will not be necessary to touch the tone control knob. When trying for the best tapping the unit should be worked with the resistance set at "full in," so that the full 50,000-ohms is placed in series with the condenser.



A rear view of the tone changer for which only three components are required



# GETTING MORE FUN FROM FOREIGN STATIONS

*By brushing up your knowledge of one or two foreign languages you can make far more enjoyable use of foreign-station reception*

"*ALLO! Allo! Ici Radio-Paris, de la Compagnie française de Radiophonie. Mesdames, messieurs, vous allez entendre un concert exécuté dans notre auditorium.*"

It is, of course, Radio Paris, and you are bound to know it because you are tuned in to 1,725 metres. Perhaps, also, because this call is often repeated, you have caught the words "Radio Paris" rolled out as a sort of *Rrrradio Pahh-ry*.

The average British listener has to rely only on the music for the rest of the entertainment, the announcements being so much "double Dutch." It is an extraordinary thing that listeners know many European capitals only by the type of music most frequently broadcast and by their dial readings.

## What You Miss

Just imagine a B.B.C. listener setting out to enjoy an evening's programme without understanding a word of what is said! Imagine how distracting every song, every radio play, and every vaudeville hour would be if one could not understand the words; yet that is just the sort of doubtful pleasure that we all must be content with getting from the European stations if we have not a smattering of the language.

I do not want to suggest that we should all start to learn an international language, for, unfortunately, there are several international languages, which confuses the issue at the outset. Because we are all inclined to mental laziness, I do not suggest, either, that we can find even wireless enthralling enough to make us take up extensive language courses.

## Easy "Brushing-up"

I have been investigating various means of carrying out the brushing-up process recently, and I should like to bring several of them to your notice. People with radiogramophones and gramophones are fortunate, because now there are several series of records issued which you can put on and listen to in the ordinary way, getting quite a deal of enjoyment from them and at the same time making the foreign language as enjoyable as English.

Some time ago the *Daily Mail* printed a series of "Brush up Your French" talks, which are also available in book form. Now, the first twenty-five conversations have been recorded by Columbia on five double-sided 10-in. records, and the set is available with the accompanying printed talks.

The Linguaphone Institute is making a special appeal to wireless enthusiasts also through the medium of gramophone records, and in this pleasant way you can "swot up" any language from German to Chinese and Esperanto to Afrikaans.

The great thing with a course such as the Linguaphone is that, because you hear the records on your gramophone or through the same loud-speaker of your radio-gramophone through which the foreign stations come, you can understand the perfect accent, and in brushing up your knowledge of the language you yourself speak with a correct accent because you never hear a word wrongly pronounced.

## A Good French Course

For folk who are interested only in thoroughly understanding the French stations there is yet another gramophone record scheme, organised by Foyles, the book people, and known as the Foylophone course. I like this, because in the Foylophone records there are three voices—two men and one woman—and they all sound very "Radio-Paris-ish."

The Berlitz people make a great point of the slogan "Listen and Learn," and I believe that they make special arrangements for people who, taking the course, can also listen-in to the foreign stations and get additional pronunciation practice.

Admittedly, not everybody wants to go in for foreign-station reception so thoroughly as to take up a full course on any particular language, but from personal experience I can assure you that there is far more pleasure in being able to say, not "That is Heilsberg, because it is on 276.5 metres," but "That is Heilsberg, because I understood what the announcer said."—K.U.

## "1931 ETHER SEARCHER" COMPETITION

List of Chief Prize-Winners

::

We Increase the Money Prizes

WE have great pleasure in announcing the results of the "1931 Ether Searcher" competition. Readers will remember that we asked any builder of the "1931 Ether Searcher" to send us an account of his set. In due course we invited a number of the competitors to submit their sets, we paying carriage both ways.

The judging, as we fully expected, proved a task of considerable difficulty. So much so that we were unable to adhere strictly to our published intention of awarding fifteen prizes of a total value of £50. We shall be forgiven, however, when we say that we are awarding, instead, twenty-one prizes, totalling to £55, and, in addition, forty-eight consolation prizes of 5s. each, so that instead of the £50 offer, we are, as a matter of fact, presenting £69 in cash prizes. We have increased the prizes and their number partly because of the high standard of merit reached by the sets in general, and partly because of the consequent dilemma in which we found ourselves in attempting to restrict

the prizes to the number originally offered. Well, the competitors have the advantage of the alteration!

The chief prize-winners are as follows:

1st Prize: Cheque for Twenty Pounds.—

W. F. Watson, 42 Ramsbury Road, St. Albans.

2nd Prize: Cheque for Ten Pounds.—

Lawrence G. B. Davis, 66 Salford Road, Streatham Hill, S.W.2.

3rd Prize: Cheque for Five Pounds.—

N. H. Russell, 146 Finchley Lane, Hendon, N.W.

4th Prize: Cheque for Three Pounds.—

Chas. H. Wakefield, 65 Coston's Avenue, Greenford, Middx.

5th Prize: Cheque for Two Pounds.—

E. A. Jenner, 19 Ansdell Road, Peckham, S.E.15.

We have added a sixth prize, in which

four competitors are bracketed equally.

Each receives £1 10s., their names being:

R. S. Dunford, Selwood, Erskine Road,

Colwyn Bay.

Harry Cox, Brean Down, Burnham-on-

Sea, Som.

J. L. Bullimore, 73 Gloucester Court, Kew, Surrey.

S. Lewis, 9 Pipers Row, Wolverhampton.

A prize of £1 each goes to eleven other competitors, two in Wales, one in Ireland, three in Lancashire, four in London, one in Gloucestershire, and one in Warwickshire.

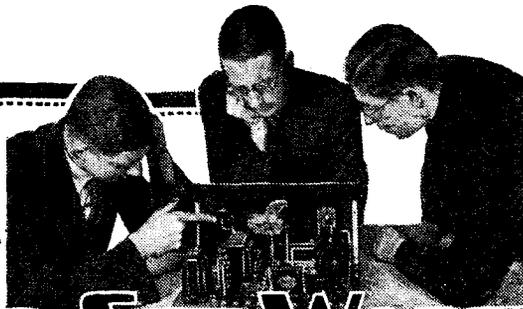
In addition to the above we are sending a little consolation prize of 5s. to each of forty-eight competitors distributed as follows: one in Bucks, two in Cheshire, one in the Channel Islands, one in Derby, one in Durham, three in Essex, four in Hants, one in Hereford, one in Herts, one in Ireland, one in the Isle of Man, four in Kent, four in Lancs, one in Norfolk, one in Northants, three in Scotland, two in Surrey, three in Wales, one in Wilts, two in Yorkshire, and ten in London.

Cheques in payment of all the prizes have already been posted.

In next week's issue we shall reproduce a selection of the chief prize-winners' letters with photographs of their sets.

SOME HINTS ON USING

MODERN VALVES IN OLD SETS



# IS THAT OLD SET WORTH WHILE?

Asks ALAN HUNTER, in this article of interest to all constructors using sets designed two or three years ago

TO scrap or not to scrap; that is the question not easily answered by many amateurs using apparatus two or three years old. I can quite appreciate the

attempt is made to bring it up to date, but quite hopeless when new valves are fitted. Fortunately, in old sets it is the exception to find high-frequency amplifying valves.

the resistance-capacity-coupling unit after the detector are all wrong for such modern valves as we are likely to fit. The value of the anode resistance may be .25 or .5 megohm, whereas we need only a 100,000-ohm resistance at most. Then the grid leak may be 5 megohms, whereas a 1-megohm leak would be preferable. The coupling condenser is probably too small; a .005-microfarad should be fitted.

What valves should be used after this coupling? Well, there are two considerations. Firstly, we want to avoid overloading, for owing to the high magnification of the first valve the voltage applied to the second valve may be quite considerable. For this reason a valve with a grid swing of 10 or so volts is advisable. Such a valve would have an impedance around 10,000 ohms. But there is another consideration; this low-impedance valve passes about 5 milliamperes with maximum anode volts and proper grid bias. Will the primary of the transformer, which follows this valve remember, pass such a current without saturating the core?

Probably not; unless the transformer is a particularly good specimen the primary current limit is two or three milliamperes. Here a slight alteration as shown by Fig. 1 is worth while. It consists in resistance-feeding the transformer. By this means the anode current is diverted from the primary and only the low-frequency signal current flows through it. The only draw-

*(Continued at foot of next page)*

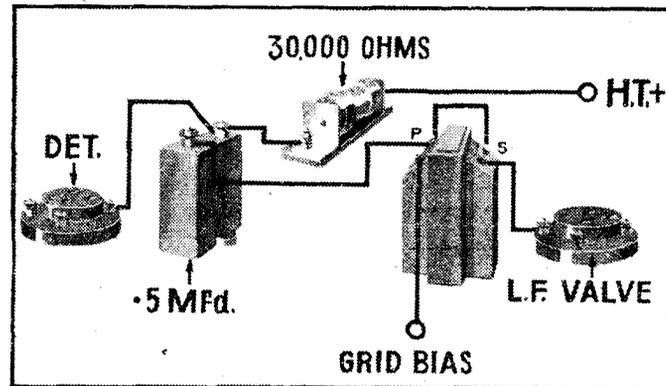


Fig. 1. A suggested alteration—resistance feed for the transformer

attitude of the reader with a set that, in spite of its antiquity, continues to provide the local station and a sprinkling of foreigners at loud-speaker strength. Why should such a set be scrapped?

Obviously it should not, but the snag is that valves do not last for ever; and when a modern valve is put in an old set several unpleasant things can happen. Quality may become terrible; the high-frequency stages may become unstable; and the output valve may be hopelessly overloaded by the increased amplification developed by modern valves.

An old set may be worth while before any

valves so much structural alteration that one would be better advised to build an entirely new set.

Let us consider a set with what must have been the most popular sequence of valves; detector, either anode-bend or leaky-grid, resistance-capacity coupled to a low-frequency-amplifying valve, in turn transformer-coupled to an output power valve. Suppose we fit this set with new two-volt battery valves. What shall we choose as a detector?

We have a wide choice now, impedances ranging from 50,000 to 12,000 ohms being suitable under various detection conditions. If we intend to keep to a fairly high value of anode resistance in the resistance-capacity coupling, and the maximum sensitivity is wanted, a high-impedance valve will be chosen, not because there is any advantage in high impedance but because only with a high impedance can we get a high magnification factor.

In these days, an impedance of 35,000 ohms is quite high enough, for a good valve will provide, for this impedance, a magnification of 35. If the set is to be worked particularly close to a broadcasting station, possibly a lower impedance, say 23,000 ohms, would be better, because with a lower impedance valve we can obtain a larger grid swing, and a larger grid swing means that a strong signal can be handled without overloading. A good valve with an impedance of 20,000 ohms should provide a magnification of 20.

Now we shall probably find the values of

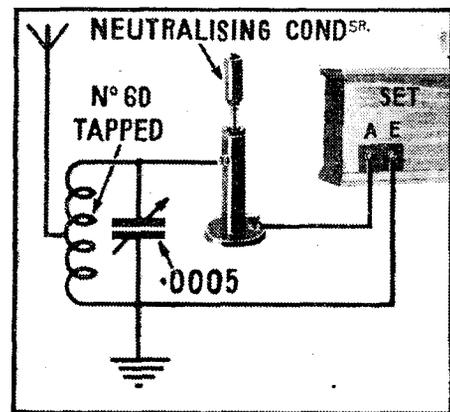


Fig. 2. Adding an external tuned circuit will improve selectivity

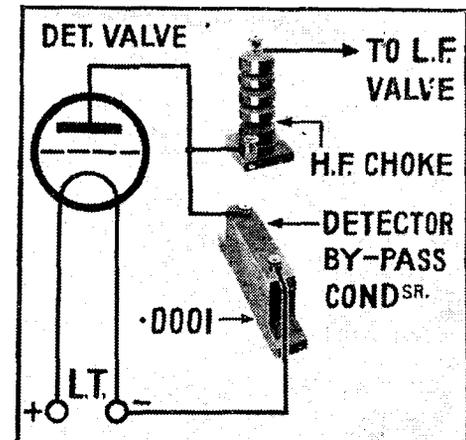


Fig. 3. An anode by-pass condenser will prevent instability

# For the Newcomer to Wireless : BATTERIES

AS you know I haven't electric light in the house at present, so that I must operate my set from batteries. Will you advise me what to get?

We will think about the valve filaments first of all. These, as you probably know, are heated by current supplied from an accumulator. How many valves do you want to use, and of what classes?

I am thinking of a three-valve set containing a screen-grid valve, a detector and a super-power valve.

Well, whatever the voltage you want to employ you can reckon about a quarter of an ampere for the first two valves and from a quarter to .4 ampere for the last one. Your total actually, therefore, will be between .45 ampere for 6-volt valves and .6 ampere with 2-volters. If you don't want to spend much on the accumulator initially then go for two-volt valves, but if you don't mind spending a little extra with a view to getting a slightly better performance then six-volt valves will be worth your while.

The two-volt accumulator appeals to

me I must say, partly on account of the ease with which I can carry it round to the charging station. Also I can buy two single-cell accumulators so as to have one in use and one under charge.

Quite sound reasons. In that case I would recommend accumulators with a capacity of about 20 or 30 actual ampere hours. So long as you regularly exchange one for the other you will always be sure of having plenty of filament "juice" available. If you had only one accumulator I would suggest something larger, with a capacity of, say, 60 ampere hours, and with 6-volt valves where you need a three-cell accumulator I would go for this capacity at least.

And now about the high-tension battery?

You may not know that high-tension batteries are made in four capacities, standard, double, treble, and quadruple. True economy consists in buying the battery best able to stand up to the load which your set imposes. Obviously, for example, it is foolish to spend 12s. 6d.

on a battery which lasts for six weeks when you can buy for 17s. 6d. one that will do the work for three months. With your set you will probably use 120 or 150 volts of high-tension, for I know that you value quality. This means a pretty heavy drain on the high-tension battery and I would recommend you to purchase one of at least treble capacity and preferably of the largest capacity obtainable.

You are talking about dry high-tension batteries, aren't you? Suppose that I go in for a high-tension accumulator.

You'll find one of these excellent so long as you purchase a good one. You will be wise again not to go for the smallest capacity but to buy something rather bigger. One good reason for this is that the charging rate of larger capacity H.T. accumulators is reasonably big and that there is not so much risk of their being damaged by a careless charging station.

And the grid battery?

Buy one of good make of the ordinary small capacity size and make a cast-iron rule to renew it every nine months.

## "IS THAT OLD SET WORTH WHILE?"

(Continued from preceding page)

back about this arrangement is the voltage drop across the resistance. Because of this a fairly high value of anode volts must be employed, say 150 volts.

Assuming the normal step-up ratio in the transformer, something fairly considerable in signal volts will be passed on to the third valve, at least when nearby signals are being received. Here a pentode is definitely ruled out. Such a valve requires only a small voltage input, as in a set using only one low-frequency stage. In the last two or three years the number of power valves has increased enormously, and so has power valve efficiency.

In our hypothetical set, a valve with a grid swing of not less than 20 volts is advisable. A valve with this swing will avoid overloading and consequent distortion. There is little merit in a big grid swing and what is more important is the undistorted A.C. output. A valve such as the P2, will conform with grid-swing requirements and will deliver 300 to 400 milliwatts output,

which corresponds to average volume requirements.

The direct result of putting new life into a set by use of modern valves will be greater volume, better quality and probably improved sensitivity. But such improvements may entail loss of sensitivity and an increase in running cost. The simple single-tuned circuit with reaction is not good enough either for modern valves or modern reception needs. I suggest adding an external tuned circuit, such as that shown by Fig. 2, coupling it to the set by means of a neutrodyne condenser.

## Some Simple Suggestions

Or more simple methods may do the trick; try shortening the aerial or inserting a .0001-microfarad fixed condenser in the aerial lead, or a tapped coil if an untapped one is used at present.

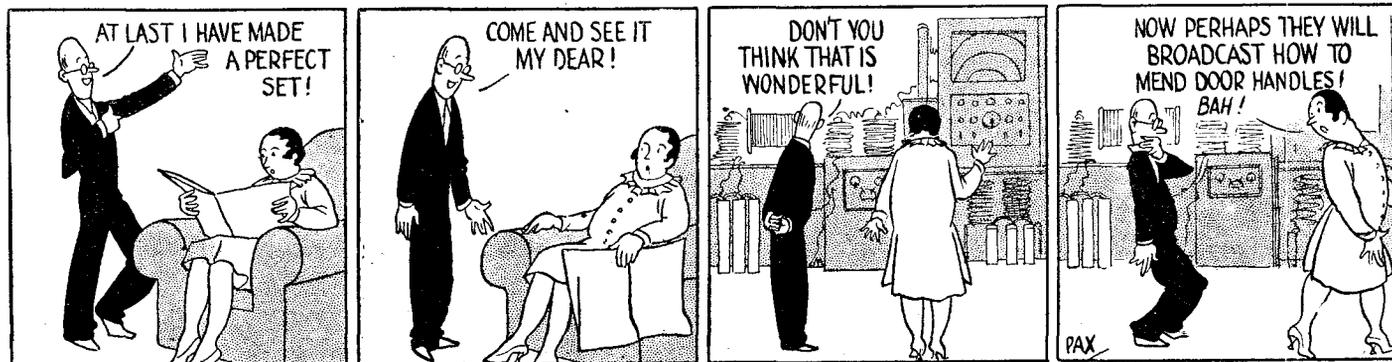
Reaction methods have improved appreciably in the last year or so. Probably a notable omission in the set we have in mind is an anode by-pass condenser. Connect a .0001-microfarad fixed condenser between the anode of the detector valve and earth

as shown by Fig. 3. This will improve detection and may easily prevent instability in the low-frequency stages.

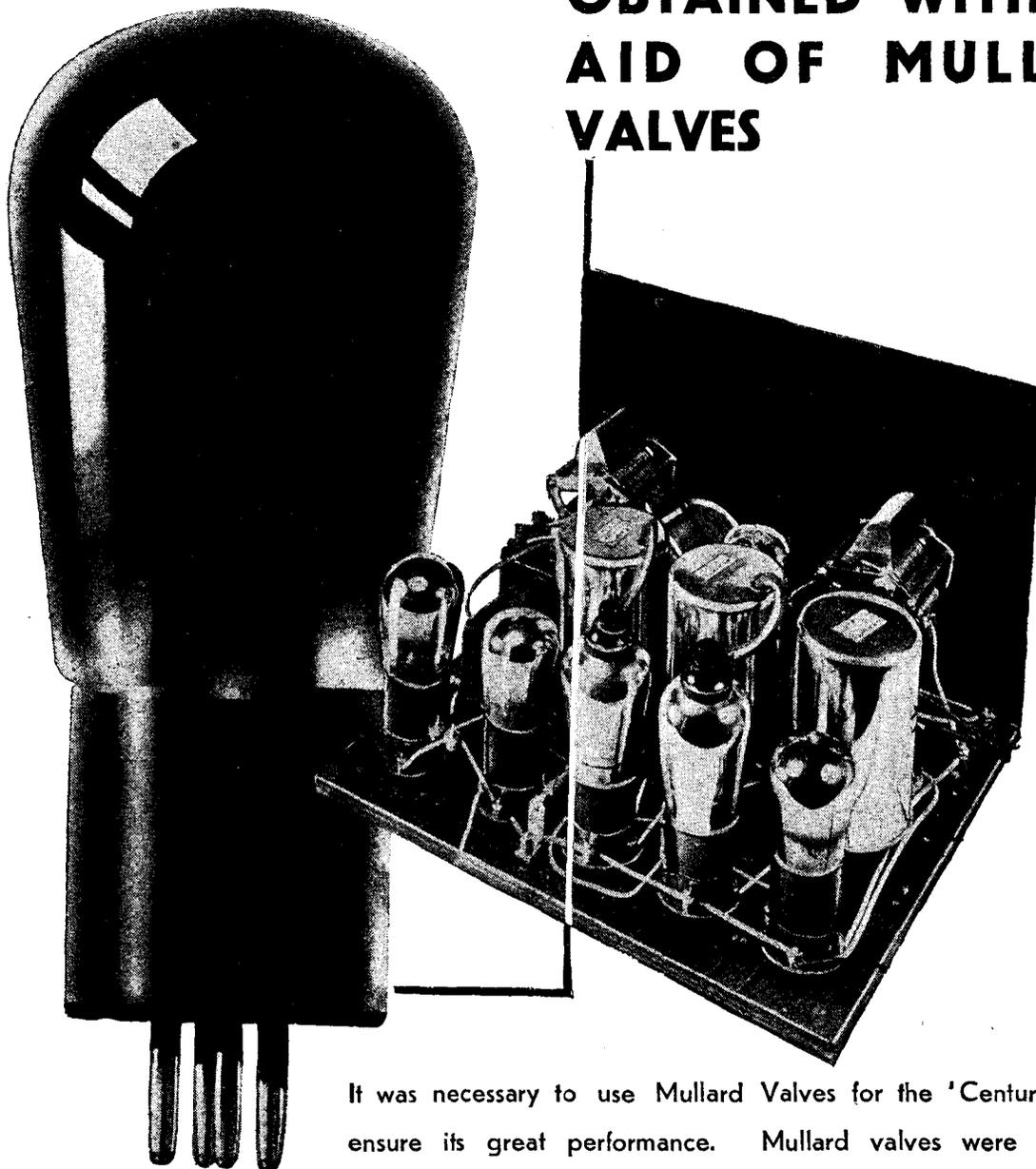
The values of the grid leak and condenser for detection have also been modified during the last year or so. Instead of the .0003-microfarad fixed condenser that used to be accepted as standard we now use a .0002-microfarad capacity. And the 2-megohm grid leak might well be replaced with one of 1 megohm.

The lowering of valve impedances has meant a corresponding rise in anode current. A three-valver with valves such as I have recommended would certainly need a double-capacity high-tension battery. If the standard-capacity type of battery is used, its voltage will quickly fall after a few weeks' running. Then the improvements due to the valves will be more than offset by the deterioration in the power supply.

From what I have said, readers will appreciate that making an old set worth while is mostly a question of fitting new valves. But the fitting of new valves entails many little difficulties.



## THE CENTURY SUPER'S AMAZING RESULTS OBTAINED WITH THE AID OF MULLARD VALVES



It was necessary to use Mullard Valves for the 'Century Super' to ensure its great performance. Mullard valves were selected for their efficient and consistent service, for their reliability and for their economy. The Mullard types which are used in this new and highly selective receiver can be bought now from your dealer.

P.M.1LF 8/6, P.M.1HF 8/6, P.M.12 20/-, P.M.12 20/-, P.M.1HF 8/6, P.M.2 10/6.

# Mullard

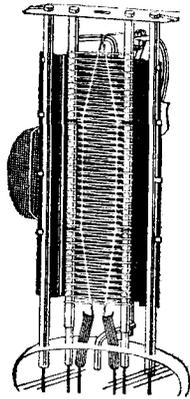
THE MASTER VALVE

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

Arks

Advertisers Appreciate Mention of "A.W." with Your Order

# New—Better—and of Universal Utility..



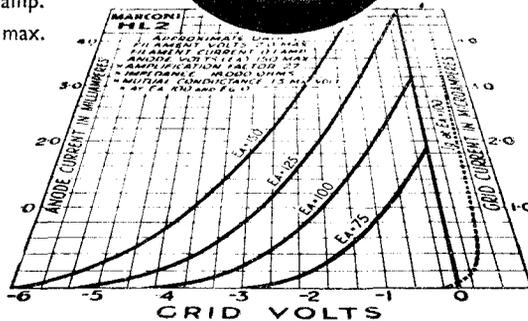
Showing the ultra-rigid assembly, interlocking mica bridge and very large electrode area of HL2.



## MARCONI HL2 CHARACTERISTICS

- Amplification Factor - - - 27.5
- Impedance - - - 18,000 ohms
- Mutual Conductance - 1.5 MA/Volt
- Filament Volts - - - - 2.0
- Filament Current - - - 0.1 amp.
- Anode Volts - - - - 150 max.

**PRICE**  
**8/6**



- ★ For the H.F. stages of non-screen grid portables
- ★ For the detector position in nearly all battery operated receivers
- ★ For the H.F. position in most neutralised - H.F. receivers
- ★ For the detector position in many portables
- ★ For the initial L.F. stage in practically every Detector - two L.F. receiver
- ★ For the initial L.F. stage of many portables
- ★ Marconi HL2 is a new 2-volt general purpose valve of exceptionally high efficiency, designed to provide greater amplification in modern circuits than is obtainable from existing valves in this class. Its high **mutual conductance (1.5 MA/volt)**, high amplification factor and small current consumption render it particularly suitable for portable receivers, where its **definite antimicrophonic properties**, obtained by the use of a special inter-locked electrode assembly, are of real value

# Marconi Valves

THE VALVES THE  EXPERTS USE ✓

ADVERTISEMENT OF THE MARCONIPHONE COMPANY LTD., 210 TOTTENHAM COURT ROAD, LONDON, W.1

To Ensure Speedy Delivery, Mention "A.W." to Advertisers

# Oh Your Wavereth!

## LOUD-SPEAKER CUT-OFF

THE other evening I had two all-electric consoles on test and I was comparing their relative merits as regards selectivity. On tuning one of the sets to Midland Regional I was surprised to find that a heterodyne whistle had apparently just started up near this station. A few minutes before I had been listening to Midland Regional on the other set and there had certainly not been a heterodyne. So as a matter of interest I switched back to this set and found the heterodyne had disappeared again.

## HETERODYNES AND LOUD-SPEAKER RESPONSE

NOW, this particular heterodyne note was of very high frequency and it did not take me long to realise that one of the sets had a loud-speaker with a sharp cut-off in frequency response, just below the frequency of the interference. That little test makes me wonder whether loud-speakers capable of very high-note response are really desirable in these days of heterodyne interference. There must be many examples of slight heterodyning causing a very high frequency audible note that actually remains inaudible unless the loud-speaker is particularly good.

It is interesting to record that the loud-speaker on which the heterodyne note could be heard was a moving coil, whereas the loud-speaker with the high note cut-off was an ordinary balanced-armature cone.

## CONSOLE SETS

I HEAR a good deal these days, as I expect the reader does also, of the coming popularity of the console set. By console is meant a pedestal cabinet containing the set, power supply and loud-speaker, but not necessarily the aerial. Of course, the neatness of such sets will have a strong appeal and the purchase of a set containing a loud-speaker will presumably imply that the loud-speaker will match the output valve of the chassis. But there is a drawback to this type of set not often mentioned, possibly because it is not realised.

I know many listeners whose reception is done in one room but whose set is in another room. And quite often when I am asked to recommend a set the stipulation is made for an external loud-speaker for this very reason. I suggest that set-makers concentrating on consoles should make provision for the connection of an external loud-speaker.

## WASTING THE H.T.

I RECENTLY advised a friend of mine, who has a five-valver, to try the effect of using a high-tension eliminator instead of a dry-cell battery. I met him again the other day, and asked him what he thought of the change. "Simply marvellous," he said, "especially on the distant stations.

Programmes which used to want a bit of coaxing, now come roaring in unless I use the volume control." So far, so good. Then he went on to say that one night he switched off the filament current, which he still takes from an accumulator, but clean forgot the H.T. eliminator, which was left in circuit for about twenty hours until the oversight was discovered. He was now wondering how much his mistake would cost him. I was at once able to assure him that he wouldn't notice any effect in the next quarter's bill from the Electric Supply Co.

## COUNTING THE COST

SO long as the valves in the set are not lit, the secondary of the supply transformer is open-circuited and therefore takes no current. A transformer, in fact, possesses the very useful property of automatically adapting itself to different circumstances. When the secondary circuit is open, the primary winding takes only an infinitesimal current—just enough to magnetise the core—which then acts as an automatic choke. If the secondary circuit is closed, then the primary supplies just enough energy to maintain the load and no more. In the case in question the secondary circuit was broken and was, therefore, out of action, so that the only current consumed was that taken by the filament of the rectifying valve. This would be approximately 1 ampere at 5 volts, or 5 watts in all. In the course of twenty hours this would account for about one-tenth of a unit, which, after all, doesn't amount to a row of beans.

## MAGNETOSTRICTION

THE piezo-electric crystal was merely a scientific curiosity until the radio engineer found a new use for it as a high-frequency oscillator. Another rival is now emerging from the laboratory in the form of an alloy of iron nickel and chromium which possesses the property of magnetostriction in a marked degree. A magnetostrictive body is one which vibrates mechanically, at very high frequencies, under the influence of an applied magnetic field. Expansion and contraction occur alternately along the length and breadth of the substance, to an extent which varies with the intensity of the applied field.

There is a certain fundamental frequency at which the magnetostrictive effect reaches a maximum so that, like the quartz crystal, it can be used as a master control for the carrier waves used in broadcast transmission. With so many new stations coming on to the ether this question of stabilising the carrier frequency is becoming more and more important as a means of reducing heterodyne interference.

## VALVE TROUBLE

I RECENTLY came across a case where a mains-driven set gave excellent reception for some little time after being plugged into the mains, and then proceeded gradu-

ally but very definitely to "give up the ghost", the signals dying away to a mere whisper. The symptoms rather pointed to some defective part gradually breaking-down under the effect of increasing temperature, but a careful search failed to find any circuit component at fault. The mystery was finally solved when, as a last resort, the existing valves were replaced by fresh ones. All the trouble at once disappeared. The trouble was caused by one of the valves suffering from what is called "grid emission." Under the influence of the heat radiated from the filament, the grid gradually reaches a temperature where it starts to emit electrons in large quantities on its own account, and in opposition to those coming from the cathode. The result is utter confusion inside the valve and a wholesale loss in signal strength. The defective valve was returned to the makers and was, needless to say, promptly replaced.

## THE FUTURE OF DESIGN

I WONDER how much longer broadcast receivers will remain in their present form? Commercial receivers are changing their appearance completely and are gradually becoming more and more like telephone repeaters. There is a great deal to be said for this construction. All the apparatus is mounted on panels which are housed one above the other in a rack. Each unit is complete and is simply provided with input, output, and battery leads. A really hot receiver contains several of these racks side by side.

The system is one of considerable flexibility, and I am not at all sure that I shall not do something of the sort myself. Mr. Reyner has had a receiver of this type at Elstree for some time, but it was not until the other day that I saw it approaching its full glory. Following telephone practice the equipment is sub-divided, the various parts being cross-connected in all sorts of ways. At the bottom are the power pack and power amplifier. Higher up are the attenuation pads and mixing panels, while on top is the receiver which has two panels to itself. The equipment also contains H.F. and L.F. check oscillators which can be introduced in various parts of the circuit.

## SIMPLE MODIFICATION

THE point about the whole thing is that any one unit can be taken out, modified to meet some requirement which experience shows to be necessary and reinserted without causing any upheaval whatever. We do not all require quite as much elaboration, but one cannot help being struck by the neatness of the system, and I am wondering whether our future receivers may not develop on these lines, at any rate as far as the real ham is concerned.

## THE "REGGIES"

INQUIRIES show that there is a bit of a fight between "London Reg." and

## On Your Wavelength! (continued)

"Midland Reg." in the area extending from the most northerly parts of London well into the Midlands. Those with very selective sets are not greatly troubled, but the crystalisers and users of broadly-tuned valve sets are having rather a poor time, since they cannot get either programme free from the other. One type of set which seems to be worse affected than almost any other is the cheap portable. Not so very long ago crowds of people invested in such receivers, mainly because they were cheap and simple to operate. In the early part of the year I saw scores of them in various shop windows offered at almost incredible prices—four-valvers, for example, at under a fiver apiece. Those who bought them were, without a doubt, delighted with their bargains at the time, but probably now they are wiser and sadder men.

### A CONTRAST

ON the other hand, the really good portable of up-to-date design has not the slightest difficulty in separating the two stations at quite short range. My place is fifteen miles from Brookmans Park and about forty from Daventry, but the portable that Mrs. "Thermion" has for her own use brings in either "Midland Reg." or "London Reg." at will and quite clear of any interference. It is the old, old story. Sound wireless goods are already so cheap that anything offered at bargain prices certainly ought to be looked at several times before any money leaves one's pocket. And, whatever you do nowadays, you should always buy with an eye to the not-far-distant future. Don't forget, for instance, that "Northern Nat" will be starting in before long. Again, should you live in what will be the service areas of the twin stations that will complete the regional chain, bear in mind that you are likely to want more selectivity than the average set usually offers to separate high-power twin transmitters at short range.

### ILLUMINATING

I TOLD you that I had recently spent a short time in Devon and that I had been surprised to find how well 5XX was received in every place where I tried a wireless set. There seems to be no doubt that 5XX's service area at all times of the year has a radius of at least 250 miles now for reception so long as one H.F. stage is used. Were the power of the station put up, as I have often suggested, to 100 kilowatts and were the station used as the only national transmitter, it could probably serve the whole country adequately and would have a very large area where no H.F. at all was needed. The more I move about the country and the wider my experience of reception under the regional scheme, so far as it has gone at present, the more convinced I am of the unsoundness of trying to jam nine British high-power transmissions into the broadcast band. I am convinced that by far the soundest plan would be for the B.B.C. to limit itself to a 100-kilowatt 5XX for the National programme and five stations of from 25 to

50 kilowatts on the medium band for the Regional programme.

### GIVING THE LEAD

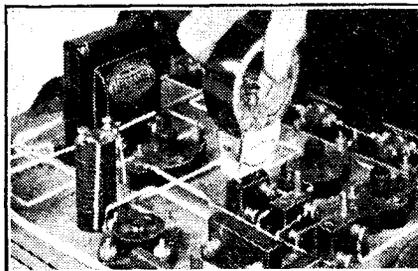
WHAT causes so much trouble at broadcasting conferences is that representatives of every country turn up imbued with the idea that all are going to stand by their rights at all costs. Great Britain has one long and nine medium wavelengths, and the B.B.C.'s idea is that she shall jolly well stick to them. Similar ideas are held about their own wavelengths by the French, Germans, and everybody else. If our people went to the next conference prepared to say: "Look here, the position at present in Europe is absolutely ridiculous. There are far more stations than there ought to be and the number is continually increasing. We are prepared to give up four of our wavelengths if other countries will make similar 'sacrifices.'" Don't you think that if this happened there would be a different spirit altogether and that we might hope to obtain peace rather than the present state of war in the ether?

### THE ONE FLY

SOMETHING, I think, could be done on those lines. There is, however, hanging over the future of European broadcasting a threat which is still so small that few people have realised what importance it may assume before this time next year. One country has so far stood outside all conferences and has refused to fall into any wavelength scheme. This is Russia. If you look at any report of the Brussels Laboratory published last year, you will see that Russian stations have elbowed their way in on channels between those assigned to European stations, and if you do any long-distance work you will have had some experience of the heterodynes that they have been causing. None of the Russian medium-wave stations is using any considerable power, but at least forty, and possibly as many as sixty, stations with outputs up to 100 kilowatts or more are to be constructed in Russia within the next eighteen months.

### A COIL HINT

Never insert or remove plug-in coils in the manner shown below. Continual treatment in this way is apt to



disturb the turns and may break the winding itself away from the plug fixing. Handle coils and valves by the base.

### CONFUSION WORSE CONFOUNDED

TO show you what trouble they may cause I would mention one instance which may have escaped you. Sometimes, when Vienna has been coming in particularly well, you may have noticed a rather faint heterodyne whistle. The station causing this heterodyne is Archangel—quite a small fellow. Think what would happen to that whistle if Archangel possessed a 100-kilowatt transmitter. The result of putting from forty to sixty high-power Russian stations into the medium wave-band is likely to be of very great importance. If these stations select, as other Russian stations have done in the past, channels in between those allotted under the Prague Plan, the net effect will be to reduce the frequency separation for Europe from 9 kilocycles to  $4\frac{1}{2}$  over the greater part of the broadcast band. One needs to be no prophet to foretell that the receiving set of the future will require super-selectivity. A determined effort should be made to induce the Russians to send representatives to the next conference.

### LOOKING FOR A SHORT

THERE is one tip, by the way, that I would like to give you about tracking down a high-tension short if one of those unwelcome manifestations occurs in your receiving set. Naturally, you have got to pass a current through the H.T. leads in order to find just where the leak is; but do not use the high-tension battery to supply this current, or you may do damage both to it and to other expensive things. My own method is this. I disconnect the high-tension battery just about as quickly as I can after switching off, and in its place I make use either of a flashlamp refill or an old grid battery that has still a volt or two left in it. You can then find where the short is occurring just as easily with the help of voltmeter, milliammeter, or ear-phones, and you don't run the risk of doing serious damage. If, by the way, you use the milliammeter for short tracking it is a sound precaution to place a spaghetti resistance with a value of 1,000 ohms in series with it. In this way you protect the instrument from an overload of current.

The reading that you get from the milliammeter will show you just what kind of short it is. If, for example, you do get  $4\frac{1}{2}$  milliamperes with a 1,000-ohm resistance there, this means probably that a high-tension positive lead is making direct contact with some earthed point. On the other hand, if you get practically no reading with the resistance, you can remove it and make just a flicking contact at first to see what happens. Should the needle not go right over, connect up and see what the reading is. If it is, say, 1 milliamperes and there are  $4\frac{1}{2}$  volts driving the current you know that there is a resistance of between 4,000 and 5,000 ohms in circuit somewhere. This indicates that the short is somewhere between earth and the plate end of the primary of an L.F. transformer.

THERMION.

# AROUND THE STATIONS

## AT MANCHESTER BROADCASTING HOUSE

An Inside View of the Northern Broadcasting Centre, by "A.W.'s" Special Commissioner

given via the London National and Regional stations.

The next studio, in order of importance, has floor dimensions 33 ft. by 16 ft., and is a general-purpose room where small orchestral combinations can perform and where the Children's Hour is given.

The adjacent talks studio, which is panelled and furnished in Jacobean style, is used by the announcers for the ordinary

news bulletins and, of course, by lecturers. There is a large reading desk, also in the Jacobean style, and the microphone is suspended above it on stranded cable. There is a gramophone in this room and this is occasionally used when "fill-in" gramophone items are not available in some other way, perhaps from London.

There is a very pleasantly-furnished reception room for the use of artistes going to any of these studios and a moving-coil speaker fitted in a large baffle in the corner  
*(Continued in 3rd column of next page)*

**W**HEN AMATEUR WIRELESS recently interviewed the North Regional Director, Mr. E. Liveing, he said that, "By this development" (referring to the opening of Moorside Edge), "we have at last a real opportunity for the North to express itself in the programmes." That is just the purpose for which the Manchester Broadcasting House in Piccadilly, in the heart of the city, was designed.

The previous studios were not central nor convenient for the artistes, and there was a rather obvious lack of *liaison* between the broadcasting staff and the engineers.

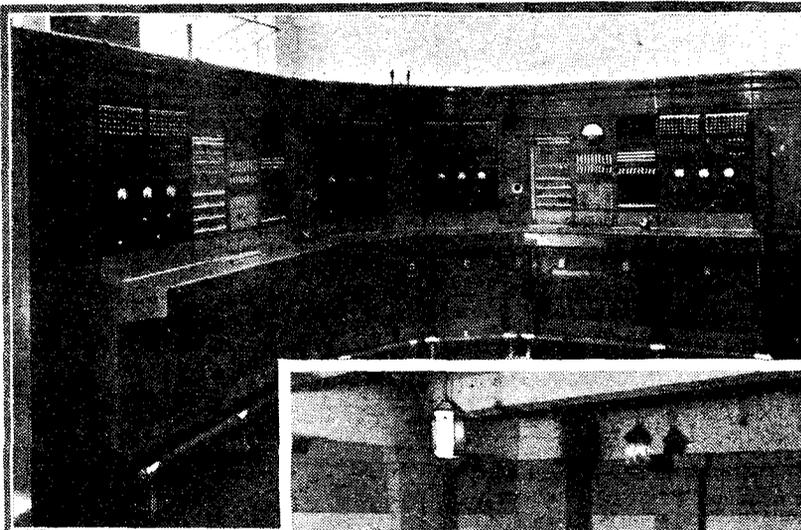
Now, the new premises, which have been opened for a sufficient time to enable the authorities to judge Manchester's position in the broadcasting scale, give ample facilities with regard to studios and to the engineering side.

The Manchester Broadcasting House is situated in Piccadilly, overlooking the Municipal Gardens. Actually the lower part of the building is a bank and the B.B.C. entrance is at the side. There are three studios, one a double-decker with a gallery, one a small talks studio and the third a general-purpose studio.

The double decker is still an impressive affair, despite the fact that the Scottish Regional station now possesses the converted Queen's Hall theatre, and in the gallery at Manchester there are seats for an audience.

In the studio itself there is a built-in silence cabinet, which is handy for checking up musical transmissions and for the occasional direction of radio plays, which, when a large caste is involved, are sometimes broadcast from here.

This large room has floor dimensions of roughly 54 ft. by 35 ft. and the extra height is obtained by utilising two stories of the building. There is a noticeable amount of echo and this appears to suit large orchestral broadcasts; perhaps that is why so many of these broadcasts from this studio are also



(Top left) The artistes' waiting room at Manchester. (Centre) Part of the extensive land-line switchboard arrangements which link up with Savoy Hill, Slaithwaite and several of the relay stations. (Right) A view from the gallery of the big No. 1 studio at Manchester which is used for large orchestral broadcasts. The silence cabinet is in the corner and one of the microphones is seen suspended on cables above the conductor's head.



**THE HOW AND WHY OF RADIO—XXXV**

# WHAT YOU SHOULD KNOW ABOUT VALVES

*Here is another of "HOTSPOT'S" weekly articles, written specially for beginners who want simple and practical explanations of the underlying principles of radio*

THE next few articles in this series are to be devoted to an elementary survey of valves, for whatever may be said about other components in the set, the valve is still by far the most important.

If we carefully break the glass bulb of a modern receiving valve (I have just done this to illustrate my text) the construction disclosed is something like Fig. 1.

Further examination shows that the outer structure is a thin metal shell. This

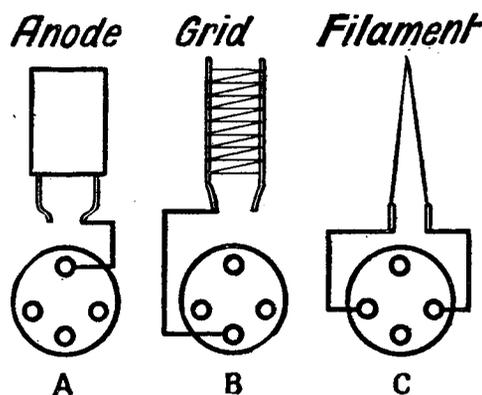


Fig. 2. Connections for anode, grid and filament of three-electrode valves

is the anode. Inside it is mounted a long thin wire wound in the form of a grid—and that is what it is called. Then right at the centre, inside the grid, is a V-shaped wire which is the filament.

There are thus, in a simple valve such as this, three separate parts, called electrodes. One, the filament at the centre, surrounded by, two, the grid, in turn surrounded by, three, the anode.

In the specimen I have just broken and illustrated by Fig. 1A, this triple structure is held up by six stout metal supports, embedded rigidly in the glass pinch. In this valve it is quite easy to see that four wires go right through the pinch and I can assure readers that these four wires come out to the four valve pins at the bottom of the bakelite base, in which the pinch is, literally, stuck.

One of the wires comes from the anode, another from the grid and the remaining two from the two ends of the filament. Here we come up against a first difficulty; why has the filament two leads and the other two electrodes—anode and grid—only one each? The answer is this: The filament has to be heated, by sending a current through it, and this can only be done by connecting its two ends to a battery.

For the action of the valve, the anode has to receive a positive charge and that is

applied by connecting one end of the battery—the positive end—to the anode, every part of which receives this charge, no matter at what point it is applied. So with the grid; for some functions of the valve the grid must be positively charged, for others negatively. Whichever charge is wanted can be applied by connecting any part of the grid to one end of a suitable battery. Then the whole grid, like the anode, assumes the potential applied to any given point.

If we care to carry on our dissection, the structure of the grid can easily be seen, as shown by Fig. 1B. I think beginners would do very well to follow my plan—to take a valve to pieces. Then at the Fig. 1B stage it will be clear how the filament forms the centre of things and how the grid comes between the filament and anode.

The relation between the filament-grid-anode structure of Fig. 1 with the pins on the base of the valve can be seen from Fig. 2. In this diagram the anode connection is shown at A, taken to the pin set distinctly apart from the other three. At B is shown the connection of the grid, taken to the pin directly opposite the anode pin. At C is shown how the two ends of the filament are taken to the two pins on each side of the grid and anode pins.

This irreversible formation of the valve pins prevents the valve being wrongly

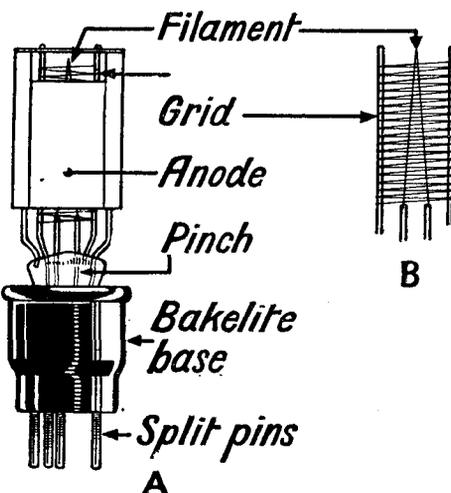


Fig. 1. The construction of a three-electrode valve

inserted. If the pins were interchangeable it would be easy to burn out the filament by inserting the valve so that the two filament pins came across the high-tension battery.

So much for the internal construction of a normal three-electrode valve. One thing

we did not see on breaking the glass—the vacuum! It is necessary to exhaust all trace of air from the valve, otherwise, just as in an electric-light bulb, the filament would be rapidly consumed. The silvery coating noted on the inside of the bulb consists of oxide of magnesium. A small piece of magnesium is left in the bulb when it is sealed and evacuated, and as a final precaution this is allowed to ignite. In burning it uses up any residual gases and

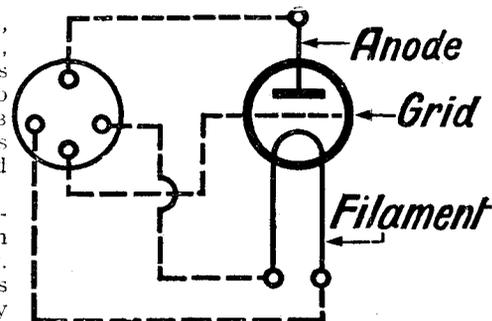


Fig. 3. Comparison between circuit symbol and valve holder

deposits itself as an oxide on the inside of the bulb.

Before finishing this introduction, I should like beginners to compare the circuit symbol for a three-electrode valve with the connections on a valve holder. At Fig. 3 can be seen the connection between the three parts of the symbol—anode, grid and filament—and the four sockets on a valve-holder. HOTSPOT.

## “AT MANCHESTER BROADCASTING HOUSE”

*(Continued from preceding page)*

of the room can be plugged in to one of the tone checking receivers.

Up on the top floor is the small room housing the dramatic control apparatus used for radio play production, and here again there is a pilot moving-coil speaker up near the ceiling in one of the corners of the room.

The various switching and fade-in and fade-out apparatus is of the very latest type developed by the B.B.C. engineers for their own particular requirements.

Cables go out to Manchester, to Moorside Edge, London, Leeds, Newcastle and many other centres and the importance of the Manchester Broadcasting House as a regional centre cannot be over-estimated.

Mr. Liveing, as North Regional Director, is bound to be a personality who will assume increasing importance as the scope of Moorside Edge widens.

# PHILIP RIDGEWAY TESTS The "CENTURY SUPER"

Mr. Philip Ridgeway, of "Ridgeway Parade" fame, has been trying out the "Century Super" during the past few days and here he describes his experiences with the set in an entertaining interview with an AMATEUR WIRELESS representative.



"WELL, how many stations have you managed to get?" I asked Mr. Ridgeway when I caught him at Savoy Hill last week after a rehearsal for one of the "Parades."

He started to count up on his fingers and then laughed.

"Seriously," he said, "if I told you, you might think that I was exaggerating, especially as I am not an expert.

"As you know, I had your 'Century' set made up for me by a friend who said that it was bound to whack the portable set with which I have been vainly striving to get results.

"And he is right, too. No, I did not make up the 'Century' myself, but since I have had the set working I have experimented quite a bit and the layout looks so simple that I am sure even I could make up a set like it. In fact, some of the 'Parade' people who have heard my 'Century' working at home have been enthusiastic about it, and when this broadcast series is finished, during my break, intermingled with other work I might try my hand at the soldering iron. I promise you shall see my first home-built 'Century' set!

"But about the number of stations I have logged. I have had literally dozens of foreigners, the names of which I had seen in station lists, but I had never dreamed that people in this country could get, except on the most expensive commercial sets. A funny thing is that I have had dozens of stations, too, which I simply

cannot log and which I believe are unknown quantities to the experts who make up the foreign stations lists!

"Would you believe it? Sometimes after coming back from Savoy Hill I have sat up until two and three o'clock in the morning. Stations have been coming in all the while. I never dreamed that there were so many stations on the ether, or that they worked so late at night.

"Another surprising thing is the large number of stations which I have logged and which have given announcements in English. Until I tried the 'Century' I did not know that there were so many stations which gave programmes which were quite intelligible to the average Englishman. This, of course, increases their 'programme value,' to use a familiar Savoy-hill term, and makes it all the more essential that nowadays you should have a good set like the 'Century' on which you can get a wide number of stations. I should be the last person to say that you need have a set which will only get B.B.C. stations! Everyone wants a set which gives a choice of Continental programmes, even though they may not always be so good as the local B.B.C. item, and, on the 'Century,' at any rate, you can do this.

"I have had Heilsberg, Breslau, Berlin, Rome, Milan, Vienna, Munich, Moscow, Radio Paris, Barcelona," said Mr. Ridgeway, reading from a scrap of paper in his pocket-book, "and there are dozens of others which I have not been able to log

by their announcements because my wife has been impatient at my wasting so much time at the set when I ought to be preparing new material for broadcasting, and so on.

"She works it too, of course. It's such an easy set to tune because the two knobs move practically in step. I like the strength control too, for I have to cut down the volume on the stronger stations like Rome.

"The tone is exceptionally good, and although my previous set, a five-valver also good in this respect, the 'Century' certainly has it beaten. I do know enough about wireless to realise that in the ordinary way you want large batteries and a big power valve to get a nice tone, but my 'Century' is working off only a 120-volt battery, and the volume is great enough if I want to dance.

"A friend of mine who is a very keen wireless fan laughed when I told him that I was actually listening to Mühlacker. He said it wasn't possible because London drowns the German station, no matter what set one uses. Anyway, I have shown him that it can be done and for the first time in my life I feel like a real wireless expert!"

I asked Mr. Ridgeway if there were any stations he *couldn't* get, and he thought for a while.

"Yes," he said, adopting the "Ramsbottom" tone well known to listeners, "the only station I can't get is Rawtenstall."

Nor can anyone else, and perhaps he is the only one who has tried. Mars may be his next attempt.

## INTERVALVE COUPLINGS

WITH two stages of L.F. amplification it is better to use choke or resistance coupling for the first valve, and a transformer for the second. If the arrangement is reversed, trouble is likely to be experienced in a mains-driven set, because if there is any "hum" in the output from the detector, this will be accentuated across the transformer, before being passed on to the last valve. By placing the transformer stage last, the relative amplification of any mains "noise" is reduced. Similarly on

the high-frequency side, it is better to use a tuned-anode before a tuned-transformer coupling, unless both stages are thoroughly "decoupled" from the mains supply.

M. B.

**EUROPE AT YOUR  
ELBOW WITH THE  
"CENTURY SUPER"**

## SCREENING

A NEW material designed for screening high-frequency components consists of paper coated with an extremely thin layer of aluminium. Electrically the material is equivalent to sheet aluminium, but is much more convenient to handle. It can easily be cut to any required shape, and if necessary glued on to a wood or ebonite former. M. A. L.

Genoa is testing on 524 metres with a view to taking up this position in the waveband, in future.



# HOW GOOD CAN WE MAKE TELEVISION IMAGES?

WHILE work on television continues in all parts of the world, along lines that may or may not eventually provide us with television on an entertainment basis, it is perhaps of value at this stage to see what degrees of perfection are possible through normal broadcasting channels. In this connection I have recently received some very interesting data from the Bell Telephone Laboratories of New York.

In the usual processes of tele-photography, as extensively used by newspapers, the picture can be considered as divided into a large number of small elements of equal size. The electric eye of the transmitting machine does not see the whole picture at once, but is focused on only one unit area at a time, passing rapidly along row after row until the whole picture has been scanned.

As each unit area is viewed in turn, an electric impulse is produced, the strength depending upon the light or shade of that particular portion. At the receiving end the apparatus re-creates the picture areas one by one, arranging them in the proper order to form a group that, viewed by the human eye, appear similar to the original picture.

Now it is obvious that in such a system any picture details smaller or closer together than the size of one picture element cannot be properly transmitted. In fact, the finest detail capable of being sent occurs when alternate picture elements are dark and light. The electric signals corresponding to these dark and light elements would be strong and weak respectively, a cycle being sent for each two elements. The frequency of this current is therefore the number of picture elements sent per second divided by two. For coarser detail the frequency could be lower.

From what has been said the reader will

realise that in order to transmit good detail the apparatus must be able to handle all frequencies up to that corresponding to the finest detail—a frequency equal to the number of picture elements per second divided by two. If the telephone wire or the broadcasting channel over which the picture currents are sent cannot transmit a sufficiently high frequency, the received picture will appear coarse, just as though the picture had been divided into larger elements at the beginning. The important point to understand is that, no matter how nearly perfect the sending and receiving apparatus may be, the best picture that can be received will depend upon the available frequency band.

### Television and Tele-photography

This condition applies just as much to television as it does to the more commercial process of tele-photography. The main difference between the two is the speed of transmission. In tele-photography several minutes may be taken to transmit a picture, but in television it is necessary to present to the observer a minimum of sixteen complete pictures per second in order to give the illusion of motion. This means that each picture can contain only the detail that can be transmitted in one-sixteenth of a second.

As an example, one might cite a 10-kilocycle broadcasting channel. With the usual broadcasting the total channel width is divided between two side bands. The highest frequency handled by the television apparatus is determined by the width of one side band, namely 5,000 cycles. As we have already seen, each cycle represents two picture elements, so the number of picture elements that could be received through a 10-kilocycle broadcasting channel in a second is 10,000 or 625

elements in one-sixteenth of a second.

From this it will be seen that no matter how good the television apparatus may be, the very best quality picture that could be obtained with a 10-kilocycle broadcasting channel would contain only about 625 elements, or about 22 by 28 elements. Television pictures of about this quality are illustrated in this article. These compare with the pictures obtained over the commercial tele-photography system containing 250,000 elements. To broadcast such good pictures as television images would require a frequency band with a width of 4,000,000 cycles, equivalent to 400 ordinary broadcasting channels!

Fig. 1 shows the detail obtained by tele-photography, corresponding to 400 ordinary broadcasting channels. Compare this with Fig. 2, which is barely recognisable, having 625 elements—the maximum number possible with a 10-kilocycle broadcasting channel. Figs. 3, 4 and 5 show the same pictures as they would appear when divided into greater numbers of elements than Fig. 2.

Fig. 3 has 1,250 elements, corresponding to two broadcasting channels. Figs. 4 and 5 have 9,250 and 12,500 elements, requiring ten and twenty broadcasting channels respectively. From these interesting comparisons, the reader will readily see that television with existing apparatus, even assuming that apparatus were perfect, requires a tremendous frequency channel for anything like good detail. Possibly the use of special single-side-band methods of broadcasting may help to solve the problem. It is instructive to note that in America, at least at the Bell laboratories, the present difficulties of accommodating television signals in broadcasting channels is far more fully recognised and admitted than in this country.

A. S. H.



These five reproductions throw interesting light on the amount of detail possible with perfected television apparatus used with various frequency channels. The corresponding amounts of detail for another picture are shown at the top of this page.

A Weekly Programme Criticism—By SYDNEY MOSELEY.

# Without Fear or Favour



## THE WRONG ATMOSPHERE

### A STRIKING PLAY

WHAT I have written in these columns about "compereing" still holds good. Those "Two Pairs" are usually a good turn, but they certainly did not shine in introducing the other turns.

Claude Hulbert, who can sometimes be funny, imagines that all he had to say was "Have a drink" in order to make us laugh.

I strongly protest against this drink propaganda, unconscious as it may be, in so many B.B.C. broadcasts.

Concert party after concert party put over quite the wrong atmosphere of "At Homes." These modern young things imagine that you cannot have a jolly time at a party unless from beginning to end it is a question of "lifting your elbow."

This is a matter of policy which should not be left to smaller men.

As I met both Sir Ian Hamilton and Compton Mackenzie out in Gallipoli, I was particularly interested in the broadcasting of what they called "a discussion."

As I anticipated, it was scarcely a discussion but an opportunity for Sir Ian Hamilton to justify himself again, with Compton Mackenzie acting as a good and respectful foil. A real discussion on Gallipoli would be between an Easterner like Sir Ian and a Westerner, of whom there were many.

I heard both John Gielgud and Harman Grisewood in the title part of Clemence Dane's *Will Shakespeare*. A striking and arresting play, and done much more efficiently and attractively than I thought possible.

I have paid lots of tribute to Grisewood, and he did very well, coming after so redoubtable a figure as John Gielgud, but the latter, who was recently accused of not being a mature "King Lear," was certainly more mature as Will Shakespeare than Harman Grisewood.

Yet, as a matter of fact, the honours fell to Lilian Harrison, who really touched the emotions with her acting as Anne Hathaway.

The rest of the caste were worthy of a great play which was produced with Val Gielgud's usual efficiency.

That was an amusing mistake by the commentator regarding the presence of Royalty at the Cup Final. George apparently knows more about players than princes.

I listened to the Theodora Gutter Trio—a name I have never seen before in the official programme. There are other new names too. This is good policy, for it enables the B.B.C. in searching for fresh talent to make discoveries. And you never know. As soon as they make names on the wireless they seem to go farther afield—where there is more money.

Our friend Leonard Henry was not in his most bubbling mood in the "Up River" romp.

Wynne Ajello sang nicely but she could sing just as nicely without the stupid words that seem to be necessary in productions of this sort. There was also a sad song about "Laughing at the rain." Where was the laughter?

Ernest Longstaffe usually produces bright things. This, too, was bright in parts, but the weather was all against the river outing.

## NEW TALENT

### SEA SHANTIES

Gillie Potter goes the way of all comedians—up and down. His talk about "The truth about the Press" was an example. To say that somebody whose "horses win except when they lose" may be a statement of fact, but is hardly a quip.

I went up to the studio to see, as well as hear, Sir James Sexton, Ben Tillett and the Chorus put over Sea Shanties. They made a great effort, although Sir James, with a cold, was palpably nervous. It was amusing to see him hitch his trousers! At first I thought his voice, owing to the cold, was too husky to get over, but I went into the padded box in the studio and put on the earphones and found I could hear every word—including the downright "damn" which was the only swear word they left in!

I saw two singers, Silvio Sideli and Gaby Valle, in the afternoon, and heard them over the wireless at night. Both have excellent full voices, but somehow they sang to better effect in the hall than at the studio. There is no doubt that we must hurry on television.

I have heard Henry Ainley, but didn't quite recognise him in the impression given by Lawrence Anderson.

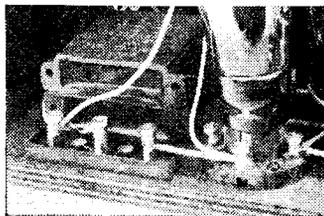
The pure tones of the Tyldesley Temperance Prize Band were noticeable, although the waltz in what is now called *Lilas Time* was taken rather slowly.

Edinburgh Town Council proposes to take no action with regard to a broadcast relay scheme. The Post Office authorities had pointed out in a letter to the Council that they were opposed to the granting of a monopoly for a broadcasting relay service.

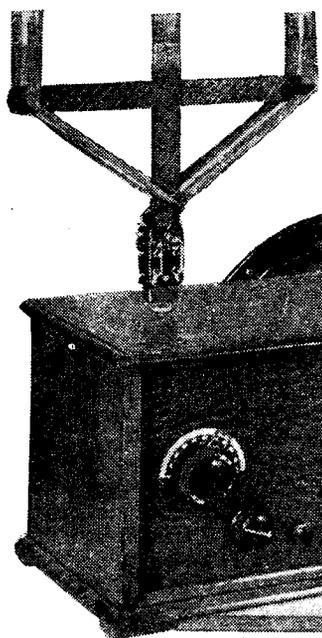
The Edinburgh transmitter of the B.B.C. which was situated at the Edinburgh University buildings since 1924, has been transferred to new premises at the St. Cuthbert's Co-operative Association, Port Hamilton, Edinburgh. The Edinburgh transmitter will remain at its new site until it is replaced by the high-power Scottish Regional station now being built at Falkirk.

### KEEPING THE LEADS SHORT

If you are designing your own set then take great pains to keep all connecting leads as short as possible. Here, for instance, are three input terminals to a set, one of which, as can



be seen, is only one inch or so away from the grid terminal with which it connects. The fixed condenser at the back is placed on its side so that its terminals, too, can be connected with very short wires.



# GETTING THE STATION with the "CENTURY SUPER"

A STATION  
EACH DE  
AND HO  
GET TF

By W. JA

IT is very easy to wire this set, using the large diagrams given in the two preceding issues (Nos. 463 and 464). Commence the work by removing the panel from the baseboard. In some instances a length of wire can be used to connect a number of points without cutting it.

Wires numbered 1 to 7, for instance, need not be separate wires but a single length joined to the terminals of the valve holders.

There are a number of flexible wires for connecting the batteries. These should be carefully marked in order that a mistake shall not be made afterwards when the batteries are being joined to the set. Note also the grid bias wires and be sure they are correctly labelled.

There are two forms of oscillator unit. One has connecting tags with coloured tabs for identification and the other has flexible wires leaving the can, these wires being coloured.

In the case of the units having connecting tags, flexible or 18-gauge copper wire may be used, the ends being pushed into the connecting tags.

The white wire goes to the centre termi-

nal on the frame aerial connecting strip, as it joins with the centre tap of the frame. One side of the tuning condenser goes to terminal 2 on the strip. This side is joined to the frame aerial only and does not connect with the circuit. Terminal 1 goes to the frame, the tuning condenser and the grid of the first valve. Note particularly the connections of the oscillator. The black coloured wire, or the wire having the

black insulating tab, goes to the anode terminal of the oscillating valve and the blue one goes to the grid of this valve and to the tuning condenser. The red wire goes

## VALVES TO USE IN THE "CENTURY SUPER"

**First Detector :** Mullard PM1HF, Cossor 210HF, Mazda H210, Marconi H210, Osram H210, Eta BY2023.

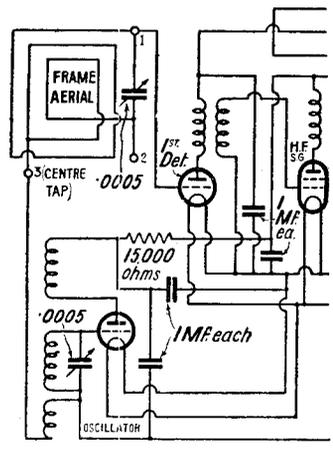
**Second Detector :** Cossor 210HF, Marconi HL210, Osram HL210, Mazda L210, Mullard PM1HF, Eta BY2023.

**Intermediate Stages :** Marconi S215, Osram S215, Mullard PM12, Mazda 215SG, Eta BY6, Cossor 215SG.

**Oscillator :** Mazda L210, Osram L210, Marconi L210, Cossor 210LF, Eta BY2010, Mullard PM1LF.

**Power :** Osram P215, Marconi LP2C, Mazda P220, Eta BW1304, Mullard PM2, Cossor 215P.

Here is the circuit of the "Century Super." A large pictorial diagram showing the battery connections is given on the following page



to the 1-microfarad fixed condenser and to the high-tension through a 15,000-ohm flexible resistance.

## COMPONENTS REQUIRED FOR THE "CENTURY SUPER"

Special cabinet and baseboard, and wooden panel (Camco, Peto-Scott, H. & B.).

Two .0005-mfd. variable condensers with slow-motion movement (J.B. "Tiny No. 2," Peto-Scott, Lissen, Ormond, Readi-Rad, Cyldon).

50,000-ohm wire-wound potentiometer (Colvern, Sovereign, Regentstat, Rotor).

Three-point shorting switch (Readi-Rad, Wearite, Bulgin, H.B., Benjamin, Lissen, Junit).

Set of super-heterodyne coils (Wearite, Lewcos).

Six valve holders (Telsen, Wearite, Lissen, Lotus, Benjamin, W.B., Clix).

Triple coil base (Peto-Scott, Wearite).

Five 1-mfd. fixed condensers (Dubilier, Lissen, T.C.C.).

Two .001-mfd. fixed condensers (T.C.C., Lissen, Telsen, Dubilier, Formo).

.0002-mfd. fixed condenser (Formo, Lissen, T.C.C., Dubilier, Readi-Rad, Graham Farish).

Grid-leak holder (Readi-Rad, Wearite, Lissen, Bulgin, Dubilier, Formo).

1-meg. grid-leak (Lissen, Dubilier, Telsen, Graham Farish).

Low-frequency transformer (Telsen "Ace," Lissen, Varley, Ferranti, Burton, Lewcos, R.I., Voltron).

Terminal strip with three small terminals for baseboard mounting (Peto-Scott).

15,000 and 20,000-ohm spaghetti resistances (Lewcos, Bulgin, Readi-Rad, Turner, Graham Farish).

Fuse-holder and fuse (Bulgin, Readi-Rad).

Five yards of thin flex (Lewcos).

Eight wander plugs marked: H.T. -, H.T. + 1,

H.T. + 2, H.T. + 3, H.T. + 4, G.B. +, G.B. - 1, G.B. - 2 (Belling-Lee, Clix, Eelex).

Two spade terminals marked: L.T. +, L.T. - (Belling-Lee, Clix, Eelex).

Connecting wire and sleeving (Jifilinx, Readi-Rad).

Frame aerial (Peto-Scott, Lewcos, Wearite).

## ACCESSORIES

One cone speaker (B.T.H., Amplion, Mullard, Ormond, Blue-Spot).

One double capacity 120-volt H.T. battery (Ever-Ready, Pertrix, Drydex, Lissen, Fuller).

One grid-bias battery, 9 volts (Ever-Ready, Pertrix, Drydex, Lissen, Fuller).

One 2-volt accumulator (C.A.V., Exide, Pertrix).

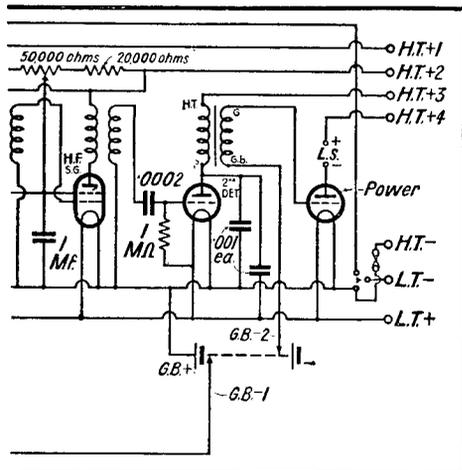
# IONS PER N FOR GREE W TO EM AMES

When the wiring is finished fit the fuse bulb and then the super-heterodyne coils. Note particularly that one of the coil units has no connection from the top of the can. This is the first coil and should be plugged into the right-hand coil holder looking at the back of the set.

The next two coil units have flexible connecting wires coming out of their tops. They are interchangeable.

The following valves have been used during initial tests, and a full list of suitable valves is given in the accompanying panel.

In the oscillator position a Mullard PM1LF (impedance 12,000 ohms, amplification factor 11). For the first detector a PM1HF (22,500 ohms and 18). In the two screen-



grid stages fit Mullard PM12 valves and for the second detector use a PM1HL, with a PM2 in the output stage. The PM2 valve is a small power valve having an impedance of 4,400 ohms, with an amplification factor of 7.5. Used with a high-tension of 120 volts, the grid bias should be negative 9 or 10.5 volts when the current is between 5 and 6 milliamperes. The second detector may be supplied with about 90 volts at H.T. +3 and the current is about 3 milliamperes. For the first detector we use about 100 volts, at H.T. +1, and the current taken is normally quite small, say .1 milliampere, or a little more when the oscillator is not connected and no signal is being received. The grid bias for this valve is taken from G.B. -1 and may be -1.5 or .3 volts. Both values should be tried when listening to a distant station and the

high-tension at H.T. +1 ought also to be adjusted.

With the powerful stations no great difference in the volume will be noted over a range of anode voltages but the valve must be accurately set when listening to a weaker signal.

## Frame Connections

Plug H.T. +2 has connected to it the anodes of the two screen-grid valves and also the potentiometer. As the total resistance of the potentiometer circuit is 70,000 ohms, the current flowing through it will be 1.7 milliamperes, with a high-tension of 120 volts. The two screen-grid valves themselves pass about 1.5 milliamperes each under normal working conditions, but pass less when the volume control is turned well down.

There is also the oscillator which is supplied from the tap H.T. +2, and this takes about 2 milliamperes.

With the batteries connected as shown in the diagrams and the loud-speaker joined to the set, switch on by operating the switch on the front panel. Set the switch of the oscillator to its mid position and the frame aerial to medium waves. The frame aerial, by the way, is connected by three flexible wires which should be as short as possible and be sure they are connected to the right terminals on the terminal strip. The centre tap goes to the centre terminal and the two outer ends may be taken to the outside terminals, it not mattering much which way round they are joined, although the effect of reversing them should be tried.

## Tuning

If you now turn up the volume control, set the frame aerial tuning condenser, say, halfway and *slowly* move the oscillator tuning condenser, you will hear when the oscillator is brought into tune by a rushing noise if there is no station working.

This rushing noise is too well known to need description and is due primarily to the slight atmospheric noises picked up when the circuits are in tune and the set is in a sensitive condition.

Alter the volume control so as to get the rushing noises as loud as possible, without, however, causing the beat-frequency amplifier to oscillate. It can usually be made to

oscillate, as the potentiometer circuit, to which the screens of the screen-grid valves are connected, is so arranged that slightly more than the normal voltage can be applied.

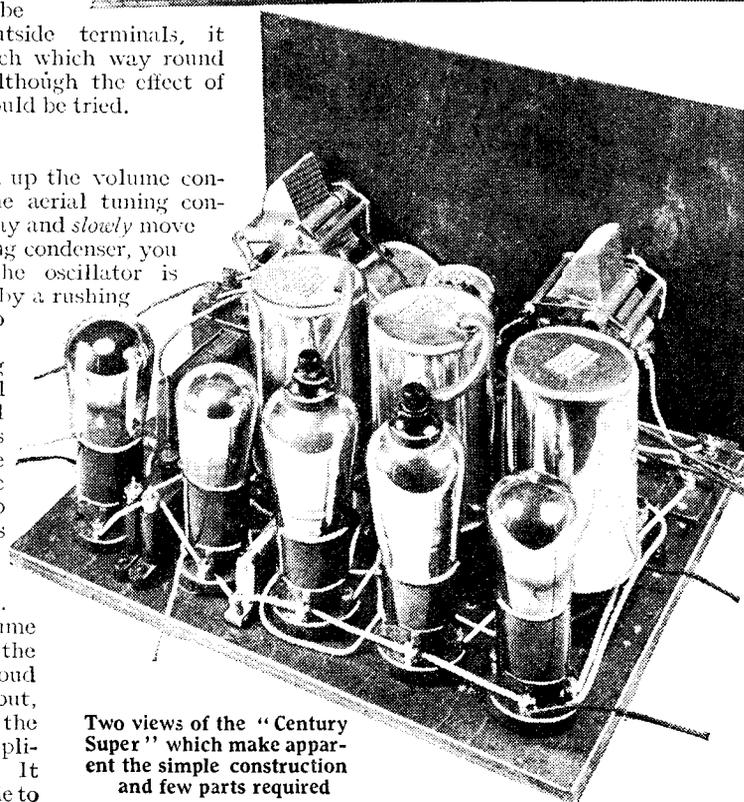
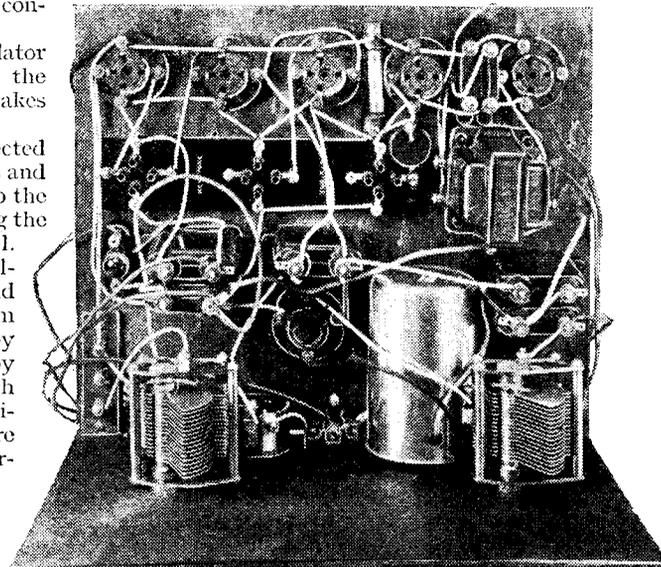
You must turn the oscillator very slowly.

## Adjustments

Having heard a station, try adjusting the voltage applied through tapping H.T. +1, and also the grid bias at G.B. -1. Try a bias of -3 volts for instance, and then alter the high-tension at H.T. +1 to suit. Then try a bias of -1.5 volts and again alter the voltage applied through H.T. +1.

In this way you will set the first detector correctly and obtain the maximum sensi-

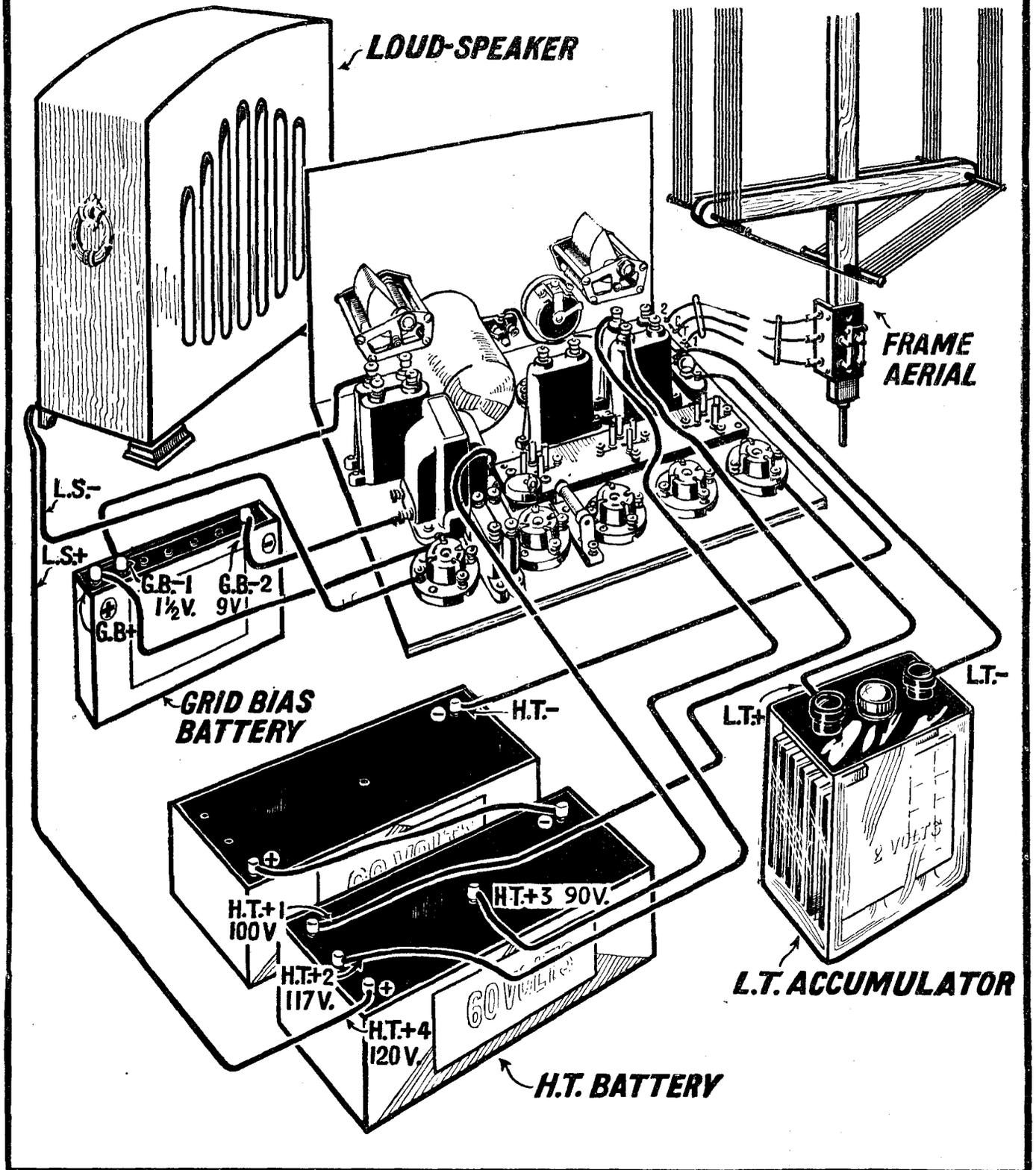
(Continued on page 766)



Two views of the "Century Super" which make apparent the simple construction and few parts required

# THE BATTERY & AERIAL CONNECTIONS FOR THE "CENTURY SUPER"

A HELPFUL PICTURE



# GET IT FROM READY RADIO

## THE CENTURY SUPER

	£	s.	d.
1 Cabinet complete with wooden panel 12" by 6" and baseboard 12" by 10" ...	15	0	
1 Frame aerial wound to specification ...	1	0	0
2 Jackson .0005 mid. variable condensers, Tiny No. 2 ...	17	0	
1 Colvern 50,000 ohm potentiometer ...	5	6	
1 Readi Rad 3-point shorting switch ...	1	6	
1 Set Wearite or Lewcos Super Heterodyne coils ...	2	10	0
6 Telsen 4-pin valve holders ...	6	0	
1 Triple coil base ...	2	9	
5 T.C.C. 1 mfd. fixed condensers ...	14	2	
2 Telsen .001 mid. fixed condensers ...	2	0	
1 Formo .0002 mid. "Mikadenser" ...	2	6	
1 Readi Rad 1-megohm grid leak and holder ...	1	4	
1 Telsen "Ace" L.F. transformer ...	8	6	
1 Terminal strip fitted 3 G.B.A. terminals ...	6	6	
1 Readi Rad 15,000 ohm link resistance ...	1	3	
1 Readi Rad 20,000 ohm link resistance ...	1	3	
1 Readi Rad fuse and holder ...	1	3	
8 Belling Lee wander plugs ...	1	4	
2 Spade terminals, red and black ...	3	3	
1 Packet Readi Rad "Jiffilinx" for wiring ...	2	6	
6 Valves to specification, 2 S.G., 2 H.F., L.F. and Power ...	3	16	0
5 Yards thin flex, screws, etc. ...	1	1	
<b>Total (including Valves, Cabinet and Wound Frame Aerial) ...</b>	<b>£11</b>	<b>9</b>	<b>6</b>

### RECOMMENDED ACCESSORIES

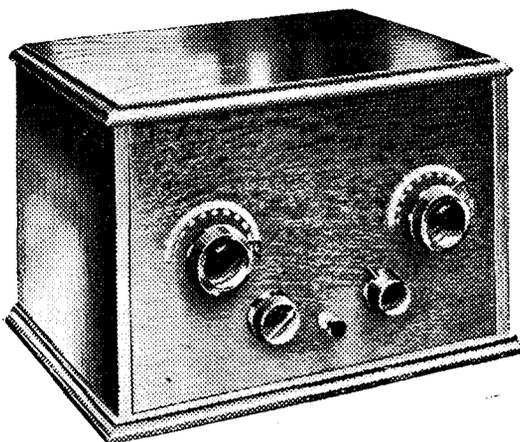
2 Fuller 60-volt "Super" capacity H.T. batteries ...	£	s.	d.
1 Fuller 9-volt grid bias battery ...	1	7	0
1 Fuller (S.W.X.9) 2-v. 40, 80 amp. L.T. accumulator ...	12	9	
1 Celestion D.10 loudspeaker or 1 Amplion cone loudspeaker A.C. 21 ...	3	0	0
1 A.C. 21 ...	1	19	6

Components can be supplied separately

### TO INLAND CUSTOMERS.

Your Orders are sent Post Free or Carriage Paid.

**ORDER NOW  
STRICTLY PRIVATE  
EASY PAYMENTS**



### THE CENTURY SUPER

Completely assembled with valves, cabinet and wound frame aerial, ready for use and aerial tested.  
Price ... **£14:10:0**  
or 12 monthly payments of 26/6.

**ORDER NOW  
IT COSTS NO MORE  
PAY ON DELIVERY**

## COME ——— AND HEAR ——— IT!

You are cordially invited to call for a free demonstration of the 'Century Super' at our Showrooms at 159 Borough High Street, London Bridge, S.E.1.

Come

and hear it!

### KIT A

(Less Valves and Cabinet, but including Wound Frame Aerial.)  
**£6:18:6**  
or 12 equal monthly instalments of **12/8**

### KIT B

(Including Valves, Wound Frame Aerial, but less Cabinet.)  
**£10:14:6**  
or 12 equal monthly instalments of **19/8**

### KIT C

(Including Valves, Cabinet and Wound Frame Aerial.)  
**£11:9:6**  
or 12 equal monthly instalments of **21/-**

### TO OVERSEAS CUSTOMERS.

All Overseas Customers Orders are carefully packed for export and insured to nearest port, charges forward.

Buy all  
your radio from  
**Ready Radio**  
R.R.L.<sup>TM</sup>  
159, BOROUGH HIGH STREET,  
LONDON BRIDGE, S.E.1.  
Telephone HOP 5555 (Private Exchange)  
Telegrams READIRAD, SEDIST

## IMMEDIATE DESPATCH ORDER FORM

To: Ready Radio (R.R. Ltd.), 159 Borough High St., London Bridge, S.E.1

**CASH ORDER.** Please despatch to me at once the goods specified for which I enclose payment in full of £ .....

**C.O.D. ORDER.** Please despatch to me at once the goods specified for which I will pay in full the sum of £ .....

**HIRE PURCHASE ORDER.** Please despatch my Hire Purchase order for the goods specified for which I enclose first deposit of £ .....

Cross out whichever does not apply.

Name .....

Address .....

**KIT REQUIRED** .....

You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers



# IN MY WIRELESS DEN

WEEKLY TIPS—  
CONSTRUCTIONAL AND THEORETICAL

By W. JAMES.

## New Valve Holders

TWO or three new makes of valve holders to hand prove that our manufacturers can do a good job. The valves with solid pins must be fitted to sound holders. Some of those now on sale are not very satisfactory, the contacts being too weak and flimsy. They give trouble in use. Good holders are worth paying for and the poor ones are dear at any price.

## Those Terminals

I often wonder why so many terminals fitted to transformers, coils, and other parts are round. The hexagon nut, with a slotted head, as used by some makers, is a so much more satisfactory job that I should have thought the old-fashioned circular terminal nut would have been discarded long ago.

## A New Reaction Condenser

I suppose we all consider at times whether to fit a plain reaction condenser or one of the differential type.

There are times when it seems by careful test that the differential has no advantage over the plain type and then, of course, the difference in cost is a big point.

Actually, most detectors seem to work best when there is a condenser across the anode and filament, and whether this takes the form of part of a differential or a separate fixed condenser is a matter for careful experiment. We must obtain smooth reaction and good detection as well. When in doubt it is the better plan to use a differential.

## Changing the G.B. Battery

How often should a grid-bias battery be changed? That is a question which we all have to answer, but I am afraid the answers show wide differences of opinion.

Some say every six months, others say at yearly intervals, and others reckon that a grid battery is good for the life of the set.

I have noted that one battery may be good for a few months only, while another is perfectly satisfactory after a year's use. For testing I prefer a low-resistance voltmeter and if the voltage falls rapidly I throw the battery away.

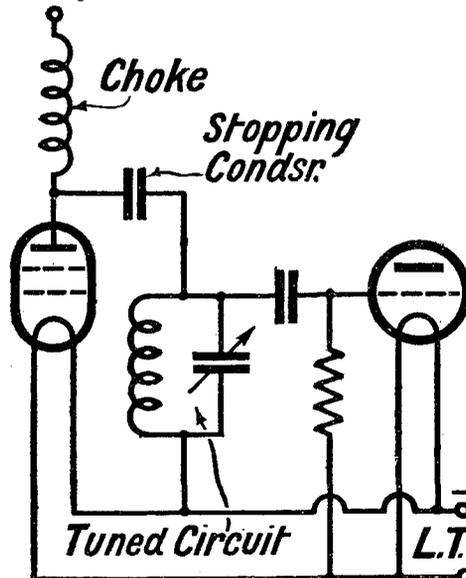
Those who have no voltmeter are in a difficult position unless they can have the battery tested for them. For safety the battery ought to be discarded after six months' service, unless testing shows it to be satisfactory.

When a high resistance develops and two or more circuits are connected to the battery, they are coupled and poor results may well be obtained. You may get poor quality or instability, and sometimes a high-pitched whistle may be traced to this cause.

## An H.F. Matter

There are a number of ways of connecting a plain tuned circuit to the anode of a screen-grid valve. The most popular appears to be the circuit which includes a high-frequency choke in the anode circuit, which is coupled to the actual tuned circuit through a fixed condenser, as indicated in the accompanying diagram.

A point to note is that the high-tension is not applied to the tuned circuit, the fixed condenser isolating the circuit from the high-tension.



This is the popular H.F. coupling referred to

This condenser must therefore be of a type well able to withstand the full high-tension. A further point is that as the choke is connected across the tuned circuit, any losses in this component will affect the tuning and the amount of the magnification.

It is rather surprising what a large difference is to be noted as between various makes of chokes. Some are very good and others are so constructed that their inclusion in a set lowers the effectiveness.

It is not to be wondered at that such differences are found. Some chokes have at least twice as much wire on them as others. The former of some chokes is of good quality insulating material, and others again have poor electrical properties. So you see that the choke is an important component.

## What Size Frame?

You may often hear the remark passed that a very small frame aerial is all that is

needed for reception, as the set itself is so powerful.

This may be true enough and the tuning may seem very sharp when a small frame is used. The fact remains, however, that it is better to employ a frame of fair size, as usually the ratio of signal strength to noise is greater than with the smaller frame.

In experimenting with the "Century Super" I found out several things about frame aerials.

The fact is that the set itself provides so much magnification that a large frame is not needed from the point of view of signal strength. If you try, as I did, however, two frames, one of fair size and one of small size, you will see where the larger frame scores. Reception is definitely better with the larger aerial.

Incidentally, the presence of an outdoor aerial affects the results. It is interesting to tune the "Super" to a station and then to tune the outdoor aerial. All you need is a coil and condenser in the aerial circuit, and as you pass through the tuning point quite a difference in the results will be noted.

## Those Fixed Condensers

The question is sometimes raised as to whether a metal case is better for condensers of the 1- or 2-microfarad type than a bakelite moulding.

Personally, I believe that electrically there is not much to choose between them. The manufacturers use the metal cased type possibly because they are cheaper than types having a moulded case.

Considering the parts used in condensers and the fact that sealing is essential, it will be understood that a sound case is essential. Small fixed condensers usually have a moulded case and when this forms part of the construction of the condenser itself cheap units are possible.

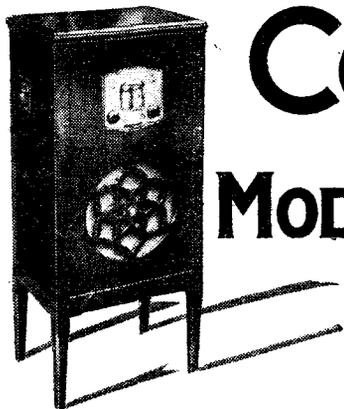
Some fixed condensers are well made in compact forms. The actual elements are small and a large case is not an essential.

A site for the new Leipzig high-power transmitter has been found in the neighbourhood of Pegau, only twelve miles from that city. Work on this station is to be started at once.

According to an official notice issued by the Italian broadcasting authorities, the new Palermo station will be opened in the course of next month. Its power is 3 kilowatts (aerial). Although a wavelength of 200 metres has been suggested, there is a possibility that it may effect an exchange with another Italian transmitter as the figure chosen would be unfavourable in view of the geographical site.



SETS OF DISTINCTION



# COLUMBIA

# MODEL 332 CONSOLE

Makers: The Columbia Graphophone Co., Ltd.  
Price: 23 Guineas

MY recent remarks on the subject of consoles have come home to roost. We now have an extremely inexpensive console in Columbia model 332, just announced by the Columbia Graphophone Co., Ltd. Here we have an installation that is entirely self-contained except for the aerial and earth connections. And judging by the strength of stations received during my tests, only a short indoor wire would be needed for the aerial.

At 23 guineas this pedestal set is certainly remarkable value for money. It works from A.C. mains of 200 to 250 volts and I am glad to say that there is also a model for D.C. mains.

### A Compact Set

The size of the cabinet can best be visualised if I say that were a normal three-valve all-electric set stood on top of a cabinet cone loud-speaker, that would be about the space taken up by this new Columbia model. There is something very attractive about this cabinet. It is quite big enough for its job but is not so big that it would be cumbersome in the average home of to-day.

The nucleus of model 332 is a powerful three-valve all-electric set, comprising a screened-grid high-frequency amplifying valve, a leaky-grid detector valve and a transformer-coupled pentode power valve. There is another valve for converting the A.C. supply into direct current for the three receiving valves.

The set cannot be called expensive to run. Assuming electricity to cost 6d. per unit, the A.C. model can be run for ¼d. per hour and the D.C. model for ½d. per hour.

I spent an interesting evening at the controls of this Columbia console. Most of them are accommodated on an escutcheon plate fitted above the loud-speaker grille. There are two tuning controls, which take the form of thumb-operated dials mounted side by side, so that both can be rotated simultaneously. The right-hand dial is calibrated in wavelengths and the left-hand dial in degrees from 0 to 100.

I found the wavelength calibrations usefully accurate. They enabled me to find most of the powerful foreign stations without the need for a lot of preliminary skirmishing. The medium waves are calibrated in steps of 25 metres from 225 metres to 540 metres. The long waves go from

1,000 metres to 1,900 metres in steps of 100 metres.

In addition to these two tuning controls which are, by the way illuminated while the set is in operation, there are two other important controls, an intensifier on the left and reaction on the right.

### Easy Control

The intensifier is really a pre-detector volume control and plays a great part in the separation of distant stations. There is a considerable degree of magnification in this set and for many foreign stations the use of reaction was found unnecessary, provided that the intensifier was at its maximum.

On the left-hand side of the cabinet is a small plate carrying the mains on-off switch, the aerial and earth sockets and a selectivity control in the form of an aerial series condenser. For a three-valve circuit one can hardly do with less controls than are fitted to this Columbia set. I am glad the makers have not omitted any of them. There is quite a false impression that simplicity of control is the same thing as absence of controls. Actually, in a three-valver any cutting down of controls means either critical operation or lack of efficiency.

One quickly grows accustomed to the operation of the various knobs on the Columbia console under review. It is necessary to make intelligent use of the selectivity control and of the intensifier control in order to separate the stations received. This applies especially when the set is worked within 20 miles of a station like Brookmans Park.

### Selectivity

Some idea of the selectivity possible with this set, when the selectivity and intensifier controls are set to their half-way position, will be appreciated from the fact that London Regional then had a 30-metre spread. Thus Strasbourg below London Regional and Toulouse above it were brought in clear of interference. Sottens, just above Midland Regional was tuned in clear, which is good for a three-valver. On the long waves I was able to get Radio Paris and Eiffel Tower clear of Daventry, but considerable use had to be made of the subsidiary controls. The strength of Radio Paris and indeed of several other long-wave stations, was exceptionally good.

As I have said, this set has a good degree of sensitivity, which is not too greatly impaired when the set is made selective. I obtained a good log of stations by turning

the calibrated dial to the required wavelengths.

The quality of reproduction is not the least attractive feature of this console. The makers have utilised a 12-inch cone, driven by a powerful balanced-armature unit. But even this does not entirely account for the extremely pleasing balance of tone noted during tests. Possibly the fact that the loud-speaker chassis is contained within a cabinet much larger than is usual in a cabinet loud-speaker accounts for the absence of "boominess." Speech is delightfully clear and music has a fine round tone.

SET TESTER.

### AT THE QUEEN'S HALL

MYRA HESS was the soloist in the Schumann Concerto in A minor, for Pianoforte and Orchestra, given by the B.B.C. at their concert on April 29. She gave a spirited and brilliant performance.

Arnold Bax's No. 2 Symphony has moments of great poetical beauty, and the composer himself was accorded an enthusiastic ovation at its conclusion.

The greatest success of the evening, however, was Gota Ljungberg, who sang the arduous and difficult part of Salome in the final scene from "The Dance of the Seven Veils," by Strauss. Her voice possesses great power and range, but is never harsh. —E. K.

**A Century Super "Gadget."**—"Century Super" builders should note that Messrs. Wright and Weaire are producing a strip, ready wired, carrying eight valve holders for the coils and valves of the set, together with numerous other small parts, such as grid leak clips. The use of this strip eliminates a great deal of the wiring, and simplifies the constructional work; it is bound to appeal to all builders of the "Century." The price is only 7s.

Radio Strasbourg has been compelled to suspend its relays of concerts broadcast from local cafés and restaurants, as the proprietors of these establishments have decided that such transmissions induce their customers to listen to them in their own homes!

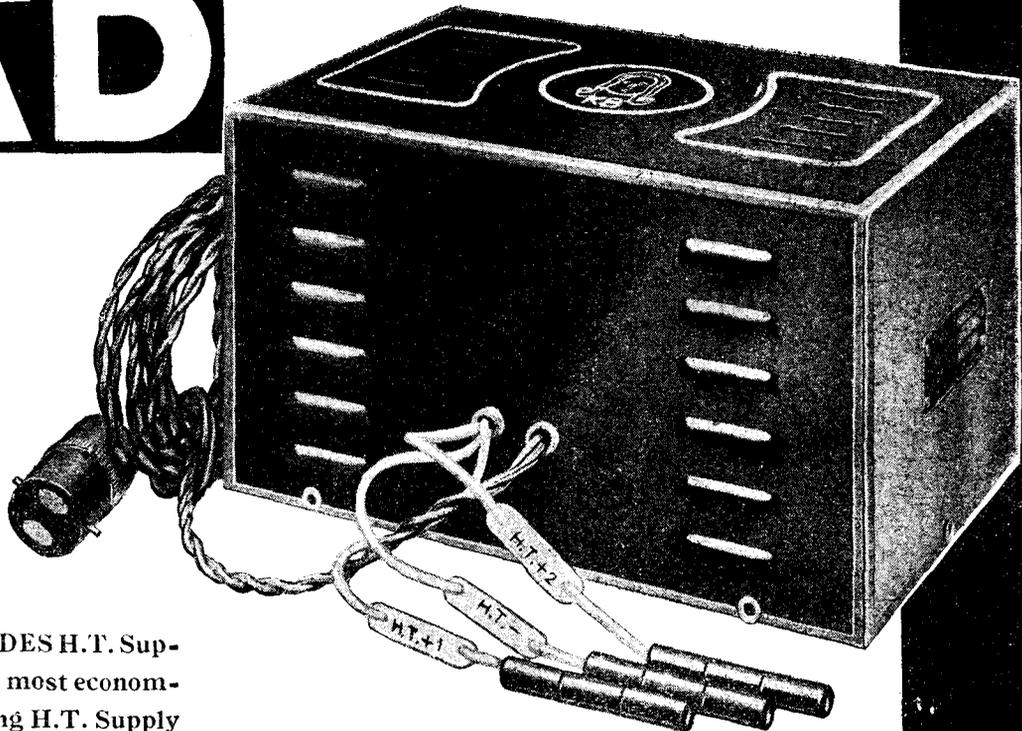
It should be noted that the cartoon shown on page 711 of "A.W." No. 464 is a Robert's impression of Neil McKay, the popular Scots comedian

# SAVE MONEY AND TROUBLE

BUY A

# K-B

# H.T. SUPPLY UNIT



**K**OLSTER-BRANDES H.T. Supply Units are the most economical means of obtaining H.T. Supply from either A.C. or D.C. electric supply mains; they overcome the necessity and continual expense of H.T. Batteries. With a K-B. Unit the H.T. Supply remains constant and the performance of the receiver consistently good. Just as the K-B. 'Pup' Receiver has set a new standard in radio value, so are K-B. Units creating new ideas of eliminator value.

*There is a model to suit any kind of Battery Receiver.*

- K-B. 262 D.C. ELIMINATOR, 120 volt at 10 milliamperes ... .. £1.9.6  
Or 3/- down and six monthly payments of 5/4.
- K-B. 263 D.C. ELIMINATOR, 150 volt at 30 milliamperes ... .. £2.10.0  
Or 5/- down and six monthly payments of 8/9.
- K-B. 261 A.C. ELIMINATOR, 120 volt at 10 milliamperes ... .. £3.7.6  
Or 7/- down and nine monthly payments of 7/9.
- K-B. 259 A.C. ELIMINATOR, 120 volt at 20 milliamperes ... .. £4.2.6  
Or 8/- down and nine monthly payments of 9/3.
- K-B. 260 A.C. ELIMINATOR, 150 volt at 25 milliamperes ... .. £4.10.0  
Or 9/- down and nine monthly payments of 10/-.

K-B. 261 (A.C.) and K-B. 262 (D.C.) ELIMINATORS, as illustrated, have been specially designed for the famous K-B. Battery 'Pup.'

*Ask your dealer for details or send the form below.*

The K-B. 'Pup' RECEIVER has proved an outstanding success. Complete with Speaker, Valves and Batteries (incl. Royalties)

**£5.3.9**

# Kolster-Brandes

## INEXPENSIVE RADIO

To KOLSTER-BRANDES LTD., CRAY WORKS, SIDCUP, KENT.

*Please send me full details of the new K-B. H.T. Supply Units, together with the name of the nearest K-B. dealer.*

NAME .....

ADDRESS .....

A.W. 1.

*Don't Forget to Say That You Saw it in "A.W."*

THE "Regional Suppressor", a simple but effective wave-trap designed primarily for use with new North Regional station, but applicable to any programmes within the 250 to 550 metre band, was described in last week's issue, and I mentioned there that I would give particulars this week regarding the effectiveness of the trapping and the influence on other stations.

To be effective, a wavetraps should absorb energy at the frequencies immediately around that to which it is tuned, but should exercise as little absorption as possible on other frequencies only a little removed. When conducting the experiments on the Regional Suppressor the well-tried rejector principle was utilised. This can be used in any form of set no matter what the aerial coupling system is, and as will be seen from the curves (Fig. 1), a very serviceable arrangement has been produced which will meet the needs of the great majority of listeners.

### The Test Circuit

The circuit for the tests is illustrated by Fig. 2. The laboratory standard totally-screened oscillator was employed to generate an artificial signal. This signal is under complete control, its strength being capable of variation from a whisper to several hundred millivolts per metre, this latter value corresponding to the signal received from a Regional station at between five and ten miles range. The signal from this oscillator is introduced into an artificial aerial circuit having constants equal to that of the average aerial.

This artificial aerial circuit was coupled to a tapped six-pin coil which was tuned to the signal in the ordinary way. The voltage developed across this circuit was applied to a sensitive valve voltmeter, and the signal strength was measured by this means.

### Measuring the Voltage

The first test consisted in measuring the voltage across the circuit alone at different frequencies. This, of course, is not constant even though the input may be constant, because the magnification of the circuit depends upon the ratio of inductance to capacity. It is well known that if a small high-frequency voltage is introduced into the circuit—from an aerial for example—the voltage across the circuit is many times greater than the original voltage induced. This is the basis of the whole principle of tuning, and it is this property which enables us to select the station we want and disregard those which we do not require. The extent of the magnification depends upon the ratio of inductance and capacity, the circuit being more effective with small condenser values. Consequently as the wavelength is reduced, so the voltage across the circuit increases somewhat rapidly.

Most readers will have noticed this effect in tuning their sets. The amount of reaction required is usually quite small at the bottom of the tuning range, and increases as we go towards the top end of the scale. This is entirely due to the varying magnification of the coil. In the experiments being described no reaction was employed, of course, since this would introduce a variable factor into the results. The

# MORE ABOUT THE REGIONAL SUPPRESSOR

*The simple device described in last week's issue for cutting out the local station.*

*By J. H. Reyner, B.Sc., A.M.I.E.E.*

coil was used as it stood and consequently the voltage developed was much greater at 300 metres than at 600 metres. The actual variation is shown by the dotted line in the curve, from which it will be seen that there is a steady increase in the

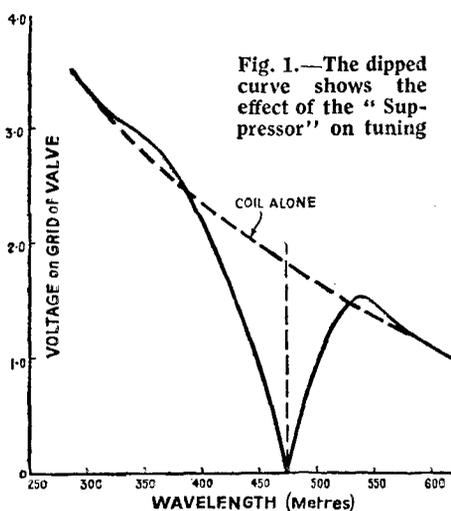


Fig. 1.—The dipped curve shows the effect of the "Suppressor" on tuning

efficiency of the circuit as we go towards the shorter wavelengths.

Now we may take this dotted line to represent the normal state of affairs. If we introduce any extra circuit into the system and then measure the voltage which is developed, we can, by comparing this

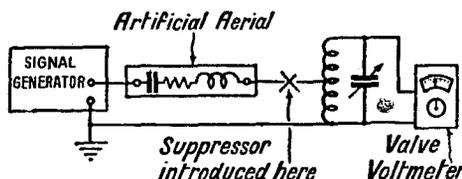


Fig. 2.—Circuit used for testing the "Regional Suppressor"

voltage with that obtained from the coil alone, see at a glance whether any serious change has resulted.

Consequently, the next part of the experiment consisted in connecting the "Regional Suppressor" in the lead between the artificial aerial and the coil, as shown at X in Fig. 2. This duplicates practical conditions, since, as was explained last week, the Suppressor is connected in between the aerial and the aerial terminal of the set. The coil was tuned to 475 metres, at which point the voltage deve-

loped was just over 1.8 volts. The Suppressor was then tuned as carefully as possible to the same wavelength when the voltage dropped to a value so small that it could not be measured with accuracy. It was in the neighbourhood of one hundredth of its normal value. The wavelength from the oscillator was then adjusted to various values on either side of the 475-metre mark, and the tuning circuit was carefully adjusted to give the maximum deflection at each point, leaving the Suppressor tuned to 475 metres. This again represents the practical conditions in which one adjusts the Suppressor to the interfering station, and then carries out the tuning on one's receiver in the ordinary manner.

The voltages obtained by this means are shown by the full line in the curve attached. It will be seen at once that we have not an ideal arrangement, but on inspection it will be clear that the departure from the ideal is not too serious. At 25 metres on either side of the tuning point the signal strength has risen again to 1 volt, while at 530 metres the signal strength with the Suppressor in circuit is exactly the same as when we started. On the other side, equal signal strength is not reached until 385 metres, due to the fact that the voltage with the coil alone has been rising rapidly as we decreased the wavelength, so that the action of the Suppressor is slightly more pronounced on the lower wavelength side of the tuning mark.

### Reading the Curve

These are the points at which the signal strength is equal but the discrepancy between the readings is not very great for some distance closer than this. As we have seen, at 25 metres on each side of the tuning point, the voltage is about 50 per cent. of the normal and this means that distant stations can be heard quite well and tuned in with the aid of a little reaction without difficulty, whereas without the Suppressor in action they would be completely swamped by the powerful local transmission.

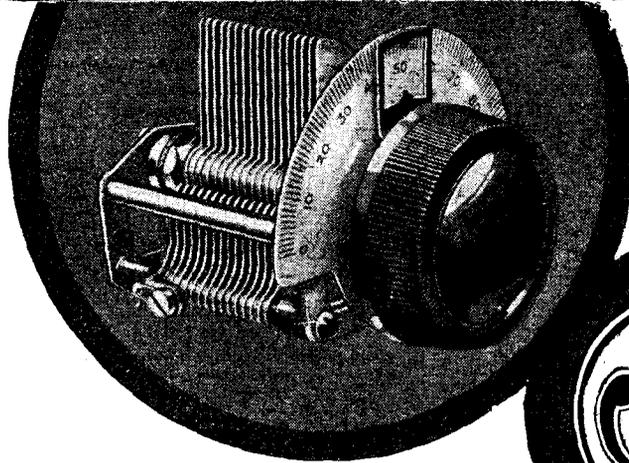
The result shows up one rather interesting point which is not usually appreciated regarding wave traps. While a circuit of the type employed in the "Regional Suppressor" undoubtedly cuts down the signal strength over a band of wavelengths on each side of the actual tuning point, it is not always realised that it gives something in return for this. The curve shows that just beyond the point where the signal strengths are equal the voltage developed with the Suppressor in action is actually greater than that with the coil alone. The difference is admittedly not very great, being a matter of some ten or twelve per cent. only.

The point which is naturally of some interest is how quickly the local station can be tuned out with a normal circuit when the "Regional Suppressor" is in use. It is not possible to say this with any degree of certainty from the results given in this article. A comprehensive series of tests would have to be taken, because the answer really depends very largely upon local conditions and the distance from the transmitter. Generally speaking, however, it may be taken that if the strength from the Regional station can be reduced to one fiftieth of its normal value, foreign stations can be tuned in without much difficulty.

# TINY No 2 scores in the CENTURY SUPER

Over a hundred programmes separated with ease by the J.B. "Tiny No. 2." . . . Last week's test report of the "Century Super" shows 115 stations tuned in on the loud-speaker, including 8 Americans! Hear them yourself by using the condensers specified—"Tiny No. 2"—typical examples of J.B. precision. The slow-motion mechanism is housed in the bottom bearing, taking no extra space. It is smooth in action, free from backlash, and controlled by a large knob. Super-hardened brass end plates and hard aluminium vanes give absolute rigidity and accuracy. One-hole fixing; ball-bearing centre spindle; pigtail to rotor. See this excellent condenser at your dealers. It is compact, light, and rigid—ideal for portables or confined spaces.

Price, complete with knob, pointer, and scale: .0005, 8/6  
**IMMEDIATE DELIVERIES**



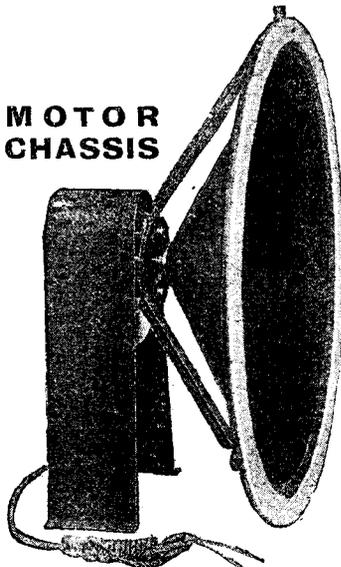
**J.B. "TINY No. 2."**  
**USED AND SPECIFIED** in  
**the CENTURY SUPER**

**PRECISION INSTRUMENTS**

Advertisement of Jackson Bros., 72 St. Thomas' Street, London, S.E.1

Telephone: Hop. 1837

## MOTOR CHASSIS



### TYPES C44 & C46

A master-built assembly with attractively finished vibrationless stand. Fitted with the famous Type S4 Super-power Isophon-MoToR Unit. Brilliant performance, power and tone.

**C44.** 12 in. Cone - 42/6  
**C46.** 15 in. Cone - 47/6

### TYPE ISODYN C55

A popular chassis outfit (without stand) with strong cast frame and Type S5 Isophon-MoToR Super Unit and 12-inch Cone.

**PRICE 35/-**

## THRILLING, VIVID REALITY

With all your experience of Loud-speaker performance you have yet to hear the finest, from MoToR Units and Chassis. Their fidelity to tone and wealth of volume give a vividness of reproduction that is almost vision.

• The range of MoToR Cabinet Speakers and Chassis caters for every individual need. If any difficulty in seeing and hearing them locally, send us the name of your nearest dealer.

# MOTOR

## UNITS • CHASSIS • SPEAKERS

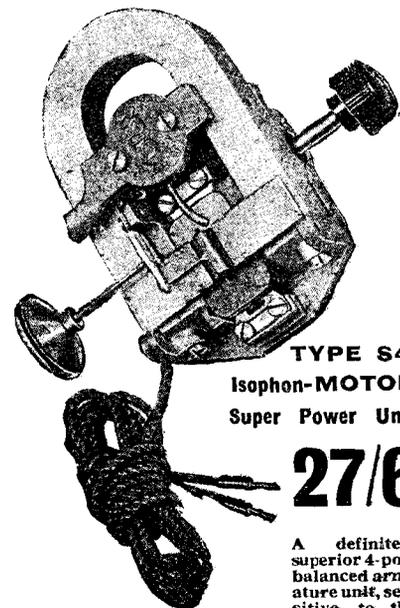
**TEKADE Radio & Electric LTD.**  
29 Farrington Street, London, E.C.4

Telephone: Central 2482.

Northern Distributors:

L. KREMNER, Ltd., 49a Shudehill, Manchester. HARDMAN & Co. Ltd., The Baum, Yorkshire St., Rochdale; 61 Bridge St., Manchester; 2a Leach Lane, St. Annes-on-Sea; 25 Trinity Street, Leeds.

Agent for Scotland:—R. G. J. Nisbet, 132, Renfrew Street, Glasgow, C.2.



**TYPE S4.**  
**Isophon-MOTOR**  
**Super Power Unit**

**27/6**

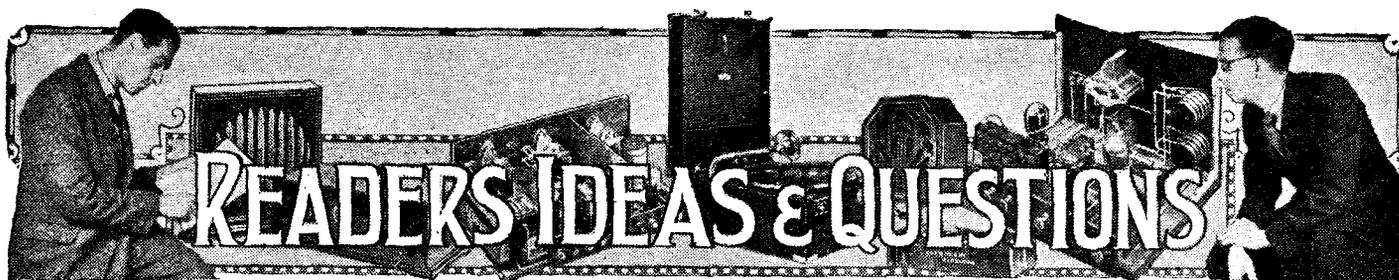
A definitely superior 4-pole balanced armature unit, sensitive to the slightest im-

pulse, yet capable of handling an amazing top-load power without rattle or distortion. Quality of reproduction and wealth of volume are exceptional. High notes are brilliantly clear and low notes richly emphasised. Provided with alternative resistances to suit various output valves.

### Type S5. Isophon-MOTOR Super Unit

Compact in size, but generously large in power, richness and purity of tone. Handles output up to 3 watts.

**22/6**



### "1931 Ether Searcher"

SIR,—I have made up the "1931 Ether Searcher," using a kit of components. The receiver certainly works, but there is no "punch" from it and although I can hear plenty of carrier waves, these cannot be resolved into stations. Can you suggest in what way I can improve my receiver and make it give the results you claim?

P. B. (Warrington).

As quite a number of readers appear not to have followed the special notes we published in regard to the general working of this set, we give below a résumé of the various points which have been explained and require special mention. First, see that you have arranged your coils in their correct positions. The two coils nearest the aerial terminal of the set should each have a fixed condenser in their bases. The other coil, nearest the detector-valve holder, has no such fixed condenser. Also check up the ganged condensers and ascertain whether the lower edges of the fixed plates are making contact with the metal screen surrounding the condensers. Then look to the screen-grid valve grid-leak holder. The terminals on this component must not make connection with the metal foil on the baseboard. If you are not using the special L.F. transformer recommended by the designer, try the effect of disconnecting wire No. 22 from the terminal of the detector-valve by-pass condenser. It may also be necessary to break wire No. 21 and connect a good H.F. choke between the points thus broken. Before attempting to gang up the receiver circuits it is essential to unscrew fully the knob of each trimming condenser. It sometimes happens that the mica between the plates of the trimming condensers becomes dislodged, and this allows the two plates of the trimmer to short the main tuning condenser. Finally, it is imperative that either the special H.T. battery recommended be used or a triple-capacity dry-cell H.T. battery of any other make.—ED.

### "D.C. Ether Searcher"

SIR,—A number of friends and myself are interested in the D.C. version of the "1931 Ether Searcher," but as we all have ordinary battery-type valves, we would like to know whether these can be incorporated in this particular design of receiver?

W. W. (Leigh-on-Sea).

If you want to make up the "All-electric D.C. Ether Searcher," it is necessary that you use the special valves recommended. Ordinary battery-type valves cannot be used in this design of set. If you are not prepared to go to the expense of the new type of valves, then you should make up the battery model of the "Ether Searcher" and use a simple H.T. unit for D.C. mains. You cannot have an all-mains set without complications, when using ordinary battery-type valves.—ED.

### "All-electric Century Super"

SIR,—The "Century Super" receiver is just the set I have been waiting for and I am prepared to go ahead and build it, provided it can be made all-electric. Can you, therefore, advise what changes or

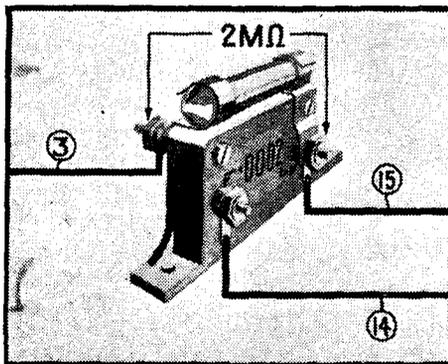
alterations are necessary to effect all-mains working?

J. G. (Croydon).

The design of any all-electric set is rather a knotty problem and any design worked out theoretically must necessarily be experimented with to ensure good results. We do not and cannot undertake to advise readers in regard to the changes necessary to convert a battery-type set into an all-electric A.C. set. Our Research Consultant, Mr. James, is now working on a design such as you require and when it is completed we shall publish the details in the pages of this journal.—ED.

### The "20s. Two"

SIR,—I have made up the "20s. Two" receiver, but fail to get reception of any kind. In going over the receiver connections, with the batteries connected up, I found that the tuning coil was quite warm. On disconnecting the batteries, the coil returned to normal and, so far as can be



The grid condenser and leak wiring of the "20s. Two".

seen, no damage was done to the coil. Can you suggest where I have gone wrong, because, so far as my reading of your blueprint is concerned, my wiring is quite correct?

G. D. (Kent).

It seems that you have misread the wiring connections for the grid condenser and grid leak, and as it is difficult to illustrate the connections clearly in a wiring plan arrangement of drawing, we have shown a perspective drawing of the condenser and leak and the numbered wiring connections to each. If you will follow the wiring from this illustration, you will overcome your present trouble.—ED.

### Adding the "Booster Speaker Unit"

SIR,—I have considered adding the "Booster Speaker Unit" to my loud-speaker, but an amateur who seems better informed on the subject than myself tells me that I shall probably experience distortion when the unit is added to my two-valver. He says, "As your set already incorporates a stage of transformer-coupled

L.F., the extra transformer-coupled L.F. stage will give rise to distortion." He further suggests that I should make the extra stage R.C. coupling. Can you, therefore, advise me in this matter?

H. S. (Hammersmith).

If you have a nondescript transformer in your existing set then no matter what class of transformer you have in the "Booster" unit you will certainly be liable to experience some distortion. When using two good transformers you should get quite satisfactory results. In any case, distortion and overloading can easily be remedied by the following simple expedient. Disconnect the wire joining the secondary of your first L.F. transformer to your existing first L.F. valve and then connect one outer terminal of a 50,000 ohm potentiometer volume control to this terminal of the L.F. transformer. Take the other outer terminal of the volume control to the other secondary terminal of the transformer (which connects to the grid bias) and, finally, take the centre terminal of the volume control to the grid terminal of the first L.F. valve holder. Suitable adjustment of this volume control will now enable you to operate the set to give maximum volume with purity. R.C. coupling should not be used to follow a transformer-coupled L.F. stage, except in exceptional cases.—ED.

### "The 1931 Ether Searcher"

SIR,—I should like to say that your "1931 Ether Searcher" is *all*, and *more*, than you claim for it—good tone and volume, and a "universal provider" of stations.

A. P. (Brighton).

### The New "A.W." Crystal Set

SIR,—You may be interested to know that as an experiment I made the crystal set described in "A.W." No. 459, the only difference in construction being, using a home-made crystal detector and catwhisker. London Regional could be heard, Rome, and other Continental stations. This is indeed a most satisfactory result in Torquay.

W. B. C. (Torquay).

### The Best Receiver

SIR,—I have submitted the "Century Super" to extended test and find it to be the best receiver your staff has ever produced. I tried it out with various valve combinations and I found the following to give very excellent results:

- Cossor 210LF (oscillator)
- Osram H210 (1st detector)
- Cossor 215SG (intermediate stages)
- Osram HL210 (2nd detector)
- Mullard PM2 (last output valve)

or, alternatively, Osram P240 (with suitable grid bias) if large loud-speaker is used. Heartiest congratulations to Mr. James and to your staff.

By the way, I strongly advise a bigger tuning dial with higher ratio, as this greatly facilitates tuning.

JAY COOTE (Eastbourne).

LET "A.W." SOLVE YOUR  
WIRELESS PROBLEMS.

**The "Century Super"**

SIR,—I have been a regular reader of AMATEUR WIRELESS almost from the first copy published and have made and tested several of the sets described in your wonderful paper. The "Century Super" tops the lot and is, everyone will agree, the last word. When the 1931 Ether Searcher came out all readers, I am sure, thought that the set of their dreams had come true, and I am sure thousands have been built to your specification and are giving entire satisfaction. I am sure AMATEUR WIRELESS will be catering for all if in the future all sets appearing have circuits for (a) battery sets, (b) A.C. all-mains, and (c) last but not least, D.C. all-mains sets.

The popularity of the paper can easily be seen as within a very short time yester-

day, all the newsagents were sold out. R. E. P. (Holyhead).

**Stations Roll In**

SIR,—It may interest you to know that I have just built the "1931 Ether Searcher," and to say that I am pleased with it is only to put it mildly. The way

**MORE ABOUT THE "CENTURY SUPER" NEXT WEEK**

stations roll in with the slightest of adjustments and without any interference seems too good to be true. I have not yet made a list of the stations obtainable, but so far I

have touched nearly the fifty mark, and that without any special effort. It is a set I would recommend to anybody and I wish you all the success your paper deserves.

W. E. (Woking).

**A Suggestion**

SIR,—May I suggest that low-frequency transformers be made similar to valves, viz., with four pegs as terminals, so that they could be plugged in a valve holder in the set. This would be a great help to experimenters, enabling them to try out various transformers (makes or ratios) without touching the wiring at all. Of course, there would have to be agreement between all makers as to which of the pegs would be used for each connection.

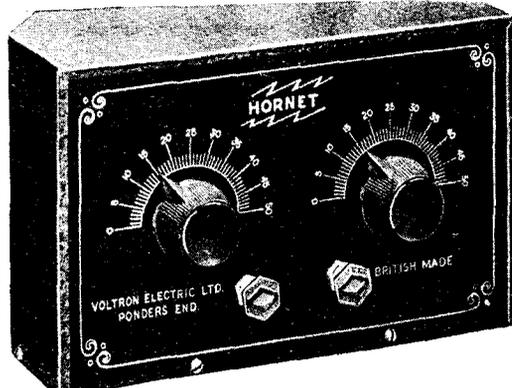
A. H. (Holloway).

**SEE IT AT THESE DEALERS' SHOWROOMS**

**LONDON.**—Jones Radio Stores, 17 Pilgrim St., E.C.4. Peto-Scott, 77 City Rd., E.C.1. Polchars, 98 High St., Deptford, S.E.8. Shiels, 11 Upton Lane, Forest Gate. Lait, 897 Fulham Rd., S.W.6. Murray & Son, 22 Nelson St., Greenwich. Graham Elec., 226 Graham Rd., Hackney. Hollands, Harringay, N.8. Pugh Bros., 97 Holloway Rd., N.7. Cox, 2 Connaught Mews, Connaught Rd., Ilford. Ko-Nek-Tit, 9a Belgrave Market, Ilford. Woolfman, 76 Ilford Lane, Ilford. Dawsons, 227 Balls Pond Rd., Islington. James & Williams, 31 Queens Rd., S.W.8. Lee Supply Stores, 121 Lee Rd., S.E.3. Leyton Elec., 531 Forest Rd., Walthamstow. Leyton Elec., 373 Church Rd., E.10. Sacker, 16 Parade Grove Green Rd., E.11. Radiogram, 65 St. Anns Rd., Notting Hill. Kerns, 9 High St., Putney. Creedwards, 164 Goldhawk Rd., W.12. 24 Hr. Bat. Ser., 6 Cazenove Rd., N.16. Hogben, 272 High Rd., Tottenham. Elec. Instal. Co., 39 Broadway, Wembleton.

**ALFRETON.**—J. Vasey, Hall St.  
**BARNET.**—Gillam, 91 Wood St., High Barnet. Howard Cycle Co., 92 High St., Barnet.  
**BELFAST.**—Holland & Co., 27 Franklin St.  
**BIRMINGHAM.**—Clarke, 79 Alum Rock Rd., Salfrey. Eldridge, 615 Bordesley Green.  
**BLACKPOOL.**—Duxbury, 80A Central Drive.  
**BOLTON.**—Robinson, 259 Deane Church Lane.  
**BOURNEMOUTH.**—Excello, 5 Castle Rd. Parade, Winton.  
**BRIDGEWATER.**—Pine, 34 Cornhill.  
**BRIGHTON.**—Butlin, 143B Preston Rd.  
**BURNT OAK.**—Hinfrey, 20 Kingsbury Parade.  
**CAMBRIDGE.**—Islip, 42 Chesterton Rd.  
**COVENTRY.**—Brooks, 45 Earl St. Cattell 172 Clay Lane.

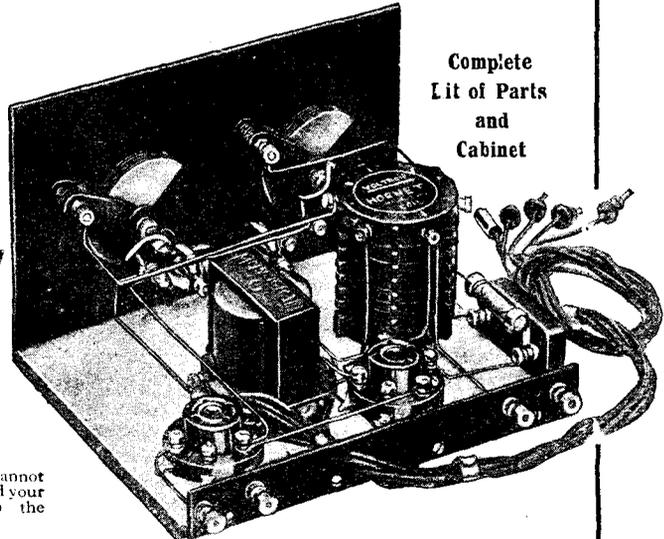
**DARTFORD.**—Batty. Ser., 56 Spital St.  
**DEAL.**—E. W. Smith, 20 Queen St.  
**DUDLEY.**—Sherratt, 145 Wolverhampton St.  
**DUNDEE.**—Swainston, 53 King St.  
**GATESHEAD.**—Urwin & Co., 223 High St.  
**GLASGOW.**—Youngs, 40 Stockwell St.  
**HASTINGS.**—Burton, 12 South Terrace, Queens Rd.  
**IRON-BRIDGE.**—Lloyd, Paradise.  
**JACKSDALE.**—Taylor & Bakewell, Main Rd.  
**JARROW-ON-TYNE.**—Thomas, 6A Grant St.  
**KIRKCALDY.**—Gibb & Watson, 270 High St.  
**LEICESTER.**—Woodward, 57 St. Stephens Rd.  
**LOUGHTON.**—Loving, 9 Forest Grove.  
**LUDLOW.**—Packer, 147 Corve St.



**Announcing the HORNET 2-VALVE KIT-SET INCLUDING CABINET 29/6**

A full size two-valve loud-speaker set with full size performance. Covers both medium and long Broadcast wave-bands. Razor sharp selectivity to suit Regional conditions. A triumph of British Engineering skill and resource. Save yourself pounds by building it yourself. Simple as A.B.C. Ask your dealer or write to us for constructional leaflet No. H.2B.

**ALL BRITISH**



Complete Lit of Parts and Cabinet

If your dealer cannot supply, please send your Order direct to the Manufacturers.

**VOLTRON ELECTRIC LTD., Queensway, Ponders End.**

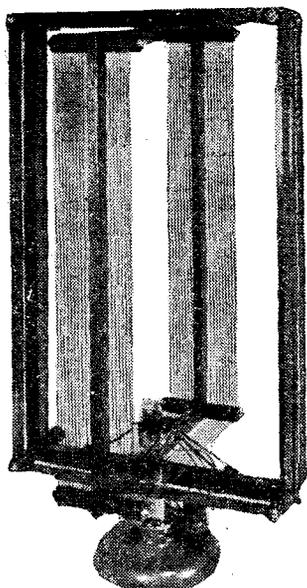
**STILL SETTING THE PACE**

**MALVERN.**—Riders Stores, Newtown.  
**MANCHESTER.**—Bolton, 8 Baker St., Strangeways. Gladiator, 819 Rochdale Rd., Queens Park. Simpson, 298 Claremont Rd., Moss Side.  
**PRESTON.**—Wilkinsons, 47 Cannon St.  
**ST. ALBANS.**—Statham, 22 George St.  
**SALFORD.**—Rex Radio, 242 Regent Row.  
**SALISBURY.**—Hancock, 20 Fisherton St.  
**SITTINGBOURNE.**—Gandon, 57 West St.

**STAINFORTH.**—W. Hill, West End.  
**STOCKPORT.**—Betts, 488 Gorton Rd., Reddish.  
**SUNDERLAND.**—Hurrell, 31 Crowtree Rd.  
**SUTTON, SURREY.**—Collins, 333 High St.  
**WELLING.**—Welling Radio, 3 Parade, High St.  
**WELLINGTON, SALOP.**—Bishop, 17 Orleton Terrace.  
**WEYBRIDGE.**—E. W. Farrow, High St.  
**WITHAM.**—Marshall, Bridge Cycle Stores.

# THREE FRAMES FOR THE "CENTURY"

*A description of three popular frame aerials which are eminently suitable for use with the "Century Super"*



A highly efficient frame with separate medium and long-wave windings, the Wearite

THE "Century Super" is designed for frame-aerial working, of course, and a double-range frame is advisable so that the set can be used either for medium or long-wave reception.

The "A.W." Technical Staff has now had an opportunity of testing three popular makes of frame on the market which are quite suitable for working with the "Century Super," and very good results have been obtained with each. The constructional details and general arrangement of each type of frame are different.

Last week the "Century Super" was illustrated working with the new Peto-Scott frame, a very low-priced job and one which was specially designed for the "Century." This frame is not supplied with a base, but fits into a boss on the top of the set cabinet, where very short flex leads suffice to connect up with the three terminals of the first detector.

The two winding sections of this aerial are concentric, but on separate formers, and a small double-pole double-throw switch on the pedestal of the turns enables the user to switch over from long to short, or vice versa.

On test we have found that this aerial is strongly sensitive to direction only at the minimum point, and this naturally is a convenience, for while a fair degree of directional effect is helpful in aiding the natural selectivity of the set, too sharp a

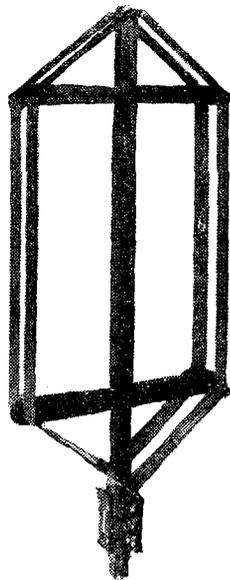
directional effect makes station searching more difficult, for the frame has to be placed in the correct plane. A well-defined silent point is an advantage, however, for it prevents stations at right angles to the desired plane interfering with reception.

The Lewcos frame, wound with the well-known Lewcos frame aerial wire, also has the two sections concentric, and a rotary

make it necessary to "swing" the frame accurately in order to select stations. Once a station was tuned in, then in many instances a readjustment of the frame's position helped still further to sharpen up the tuning.

The Wearite aerial is of a slightly different pattern from the Peto-Scott and Lewcos frames, and on test has also given excellent results.

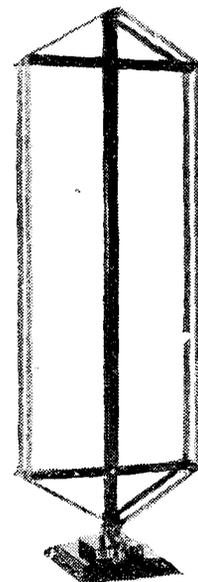
The two windings are on separate formers, the special medium-wave winding being spaced on tubular ebonite separators. The connections from each of the windings are taken out in a convenient manner to a terminal strip at the base. The medium-wave winding is at right angles to the long-wave winding, and so no absorption effect is noticed owing to the wire of the long-wave winding in the medium-wave field.



Specially designed for the "Century"—the Peto-Scott frame

switch on the very neat base with which the frame is provided connects the winding as desired. This aerial, on test, was found to have a very good factor of efficiency, and this increases the already sharp tuning of the aerial stage. It was found that the frame tuning condenser, usually not quite so sharp in its readings as the oscillator condenser, gave considerably finer readings, and indicated a higher degree of natural selectivity on the part of the frame.

The arrangement of the Lewcos frame is such that the vertical sections of the windings are long in comparison with the small horizontal sections. It was found here, too, that the silent point was more noticeable than the point of maximum reception, but the directional effect was not so great as to



The Lewcos frame aerial which incorporates a neat switching arrangement for medium and long waves

The Wearite frame, tested with the "Century Super," was found to be particularly sensitive and selective. The rotary switch, with an engraved scale, in the centre of the two windings, changes over from one set of turns to the other.



**EBONITE  
LOW LOSS  
FORMERS**

**PANELS, TUBES  
BRITISH MADE**

NOTE—Formers tested before despatch

**RIGID—RELIABLE** LOOK FOR TRADE-MARK

Sole Makers—

**THE BRITISH EBONITE CO., LTD.**  
HANWELL, LONDON, W.7



Ask your dealer for "ASTRA" and you will get the Dial that is being regularly specified by designers in the technical press.

"ASTRA" Dials, because of their marvellous geared action, give you that ideal tuning—Firm, smooth, no slip. Slow-motion and Direct drive. Fit any condenser.

"Astra" "Popular" 3" diam. 3/-

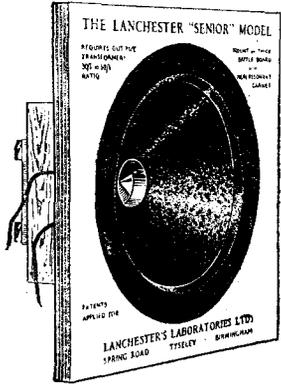
"Astra" Type No. 1 3" diam. 3/6

"Astra" Type No. 2 4" diam. 5/-

Various Attractive Finishes.

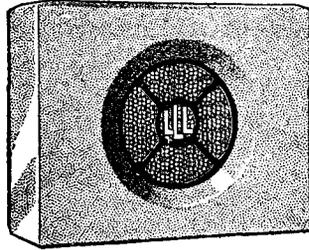
"Astra" are the only dials manufactured under Ormond licence.

**"ASTRA" PRODUCTS ARE OBTAINABLE FROM ALL DEALERS**



# A Permanent Magnet Moving Coil Speaker

of perfect reproduction and full volume



"Sensitivity of a high order, and quite equal to the average moving coil with mains energised field... crispness and brilliance in upper register... speech quite exceptionally good... general effect surprisingly good"

WIRELESS WORLD, 18th Feb., 1931

## The Lancheater

MOVING-COIL SPEAKERS are sold direct to the public only, on 7 days' Free Trial against cash with order or C.O.D. Write for particulars

**SENIOR MODEL**  
Complete in Cabinet  
**£4:4:0**

**JUNIOR MODEL**  
Complete in Cabinet  
**£2:8:0**

Chassis only, £2:18:0  
Output Transformers extra.

Chassis only, £1:8:0  
Particulars on request.

**LANCHESTER'S LABORATORIES**  
TYSELEY LIMITED BIRMINGHAM

YOUR NAME ADDRESS

## THE "A.W." CONDENSER

THE WORLD'S FINEST DIFFERENTIAL CONDENSER

(used in building the best Sets) is now available at your dealers. To use any condenser but the A.W. is to be old-fashioned.

Prices :

- .00015 - - 3/-
- .0003 - - 3/6
- .0005 - - 3/9

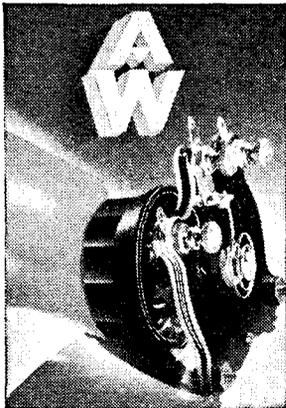
Your Dealer stocks A.W. Condensers

Sole Distributors :

**G. ROBINSON & SON, LTD.**

River Plate House, South Place, London, E.C.2

Telephone : Metropolitan 5889-7-8



## FOR THE CENTURY

### SOVEREIGN VOLUME CONTROL

Recommended by "Amateur Wireless" for use in the "Century Super." Convincing proof of Sovereign quality. Complete satisfaction to thousands already using this famous component. Fit this (50,000 ohms) and other Sovereign components to your "Century Super" to perfect this wonderful set.

TO HELP YOU BUILD THE "CENTURY" FIT 2 SOVEREIGN Fixed Condensers (.001 mfd., 1 3 each; .0002 mfd., 10d.); 1 meg. Grid Leak, (10d.); 2 Spaghetti Resistances (15,000 and 20,000 ohms, 1/3 each), etc.



Bakelite case, nickelled fittings, etc. in values of 50,000, 100,000 and 500,000 ohms, 1 and 2 megohms, each **4/6**

If your dealer cannot supply write direct (also for list of full range of Sovereign Components).

**SOVEREIGN PRODUCTS LTD.**  
52, 54, Rosebery Avenue, London, E.C.1



# H & B GUARANTEED KITS

for the

## "CENTURY SUPER"

### H & B GUARANTEED STANDARD KIT

	£	s.	d.
2 .0005 variable condensers with slow motion (J.B. "Tiny")	17	0	
1 50,000 ohm wire wound Potentiometer (Colvern)	5	6	
1 Three point shorting switch	1	3	
1 Set of 4 superhet coils (Lewcos or Wearite)	2	10	0
6 Valve holders (Telsen)	6	0	
1 Triple coil base (H & B)	2	0	
5 1 mfd. fixed condensers (Dubilier)	12	6	
2 .001 fixed condensers (T.C.C.)	3	8	
1 .0002 fixed condenser (Formio)	6		
1 Grid leak holder (Lissen)	6		
1 1 meg. grid leak (Telsen)	1	0	
1 L.F. transformer (Telsen "Ace")	8	6	
1 Terminal strip with three terminals for baseboard mounting (H & B)	8		
1 15,000 and one 20,000 Spaghetti resistance (Lewcos)	3	0	
1 Fuse holder and fuse (Bulgin)	1	3	
5 Yards of thin flex (Lewcos)	7		
6 Wander Plugs, engraved (Belling Lee)	1	0	
2 Spade terminals, engraved (Belling Lee)	8		
Connecting wire and sleeving (H & B)	1	3	
<b>Cash Price</b>	<b>£5.16.10</b>		

### H & B GUARANTEED SPECIAL KIT

	£	s.	d.
2 Variable condensers .0005 with slow motion (Polar "Idea")	1	5	0
1 Potentiometer, wire wound (Electrad)	6	0	
1 Three point shorting switch (W.B.)	1	3	
1 Set of 4 superheterodyne coils (Lewcos)	2	10	0
6 Valve holders (W.B.)	6	0	
1 Triple coil base (H & B)	2	0	
5 1 mfd. fixed condensers (Dubilier)	12	6	
2 .001 mfd. fixed condensers (T.C.C.)	3	8	
1 .0002 mfd. fixed condenser (Formio)	6		
1 Grid leak holder (Dubilier)	1	0	
1 1 meg. grid leak (Dubilier)	1	8	
1 L.F. transformer (Lewcos)	17	6	
1 Terminal strip with three terminals (H & B)	8		
1 15,000 Spaghetti resistance (Lewcos)	1	6	
1 20,000 Spaghetti resistance (Lewcos)	1	6	
1 Fuse holder and fuse (Bulgin)	1	3	
5 Yards of Lewcotex	7		
6 Engraved wander plugs (Belling Lee)	1	0	
2 Spade ends (Belling Lee)	8		
Connecting wire and sleeving (H & B)	1	3	
<b>Cash Price</b>	<b>£6.15.6</b>		

MARVELLOUS VALUE, 100% EFFICIENCY, SIMPLE TO BUILD, 2 TUNING DIALS, NO EARTH, NO OUTDOOR AERIAL

H & B CABINET in OAK with polished Oak panel and Baseboard **15/-**  
H & B DUAL RANGE FRAME AERIAL, complete with Turntable, rubber flex, three plugs and three cb.mite spacers **20/-**

H & B DUAL RANGE FRAME AERIAL fitted with WAVE-CHANGE SWITCH, complete as illustrated below. The switch gives immediate change-over with out having to disconnect any leads **25/6**

- RECOMMENDED ACCESSORIES:**
- 2 Siemens Full-o' Power 60-volt H.T. Batteries **27/-**
  - 1 Siemens 9-volt Grid Bias Battery **1/6**
  - 1 Exide 2-volt 100 amp Accumulator **14/6**
  - 1 Ormond Loudspeaker in Cabinet **29/6**
  - 6 Mullard Valves (as specified) **£3 16 0**
  - LEWCOS C/T Frame Aerials in Stock £1:12:6**

**KITS NOW READY FOR IMMEDIATE DISPATCH.**

No delay the H & B Way.

**TERMS:** Carriage Paid on all Cash Orders. C.O.D. charges paid on orders over £1.

**TRADE SUPPLIED.**



To meet the wishes of our clients we have built a "Century Super" on show in our offices, you are welcome to inspect it without any obligation.

## H & B RADIO CO.

34, 36, 38, BEAK STREET, REGENT ST., LONDON, W.1

Telephone: Gerrard 2834

Don't Forget to Say That You Saw it in "A.W."



# FREE BLUE PRINT!

## SIMPLE SCREENED-GRID RECEIVER

This receiver has been designed in response to the many requests received from constructors who have built our "Imperial Three" and would like to build a Screened-grid Receiver incorporating our T.31 Tuner.

The receiver is extremely simple to construct—without any complications, and has a high degree of selectivity with a long range. There is no coil changing and surprising results will be obtained from this instrument.

This blueprint will be sent free, but we should esteem it a favour if two 1d. stamps are enclosed to cover postage.

It is approximately full-size and is laid out for easy wiring. Write Now.

CARDIFF,  
30th March, 1931.

To WATMEL WIRELESS CO., LTD.,  
Edgware.

Dear Sirs,

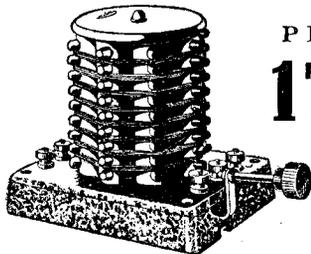
May I, as a satisfied customer, express my thanks for a very efficient tuning unit. Until recently I was using a circuit of a very well-known firm and was very dissatisfied; but, happening to notice your offer of a free blueprint incorporating an S.G. H.F. stage, I wrote, and, after receiving a prompt reply enclosing blueprint and other items of interest, I immediately decided to build the set.

Stations now roll in, and when things brighten up in this part of the world I intend dumping my old components and using your make. . . .

Faithfully yours,  
(Signed).

## UNIVERSAL DUAL-WAVE TUNER (Type 31)

This tuner can be incorporated in all receivers and greatly increases the selectivity of any set, cutting out all interference. It has had exceptionally good press reports and is accepted as the most efficient tuner possible.



PRICE  
**17/6**

# Watmel

WRITE TO—

**WATMEL WIRELESS CO., LTD.,**  
Imperial Works, High Street, Edgware.  
Telephone: Edgware 0323.

M.C. 2S

## "THE CENTURY SUPER"

(Continued from page 753)

tivity. Afterwards you can try the effect of adjusting the voltages through H.T.+2 and H.T.+3. The voltages are not critical, but it is just as well to satisfy yourself that the best results are being obtained.

To tune in station after station is easy, but do not forget that the setting of the oscillator condenser, in particular, is sharp and the controls must be turned slowly, always keeping them in step.

It is of no real use tuning hurriedly, going rapidly over the dials, for only the more powerful stations will be heard.

Some frame aerials are much more directional than others, so the frame should be turned a little when tuning. A weak signal may be made strong by altering the direction of the frame aerial.

### Condenser Settings

The oscillator and frame aerial tuning condensers will not keep in step as regards dial readings over the tuning range, but this does not matter much. You had better prepare a log, noting the readings of the dials of the two condensers. No doubt you will find it necessary to divide the scale readings at times, the tuning being so fine.

Stations are actually to be heard in two positions of the oscillator condenser when the wavelengths fall within a certain range. There is a sound reason for this.

## BE UP-TO-DATE AND BUILD THE "CENTURY SUPER"

Suppose the frequency of the beat-frequency amplifier is 126,000 cycles and we wish to receive a station working on a frequency of 1,000,000 cycles (300 metres). Then we turn the frame aerial to the station, adjusting its frequency to 1,000,000 cycles. We also tune the oscillator to a frequency which can be 126,000 cycles above or below, that is, to 1,126,000 or 874,000 cycles. With these two settings of the oscillator we shall hear the station, because with both of them we produce a signal in the anode circuit of the first detector which has the frequency of the beat-frequency amplifier. Actually the amplifier is fairly broadly tuned and so passes a band of frequencies, but it is the central or carrier frequency that we are referring to.

If you understand this matter the operation becomes extremely easy and you will not worry why a station is heard at two places of the oscillator.

### Tuning

It would be pure chance if your own dial readings agreed exactly with the published ones, as naturally the exact size of the frame aerial and the capacities of the tuning condensers affect the dial readings. Then again the oscillator coils may differ by a few per cent. The long-wavelength coils are, of course, accurately matched and are absolutely alike.

When you turn the oscillator to the long-wavelength position and also the frame aerial, you will have to tune just as carefully as when tuning over the medium wavelengths. Turn the dials slowly as before.

For the short waves a special aerial coil is needed and will be described later, as it is possible to bring in a number of the short-wavelength stations.

Do not use a small-size high-tension battery with this set. Use a large size if possible and about 120 volts. If you want to increase the volume of sound, a larger power valve can be fitted. Such a valve is the Mullard PM252, which with 120 volts at its anode passes a current of about 12 milliamperes with a grid bias of —12 volts.

The question now arises as to whether a mains unit can be used for the high-tension. Tests show that a good unit is suitable and the results will be perfectly satisfactory. But more of this in the next issue.

Probably there are readers who have valves by them and naturally want to fit them in the set if at all possible. They should be compared with the valves specified and if their characteristics are roughly correct, may be tried.

### Choosing Your Valves

It is obviously necessary to use good valves in a set of this description, so do not use very old ones. Do not use an old grid-bias battery, either, as an old battery may give trouble.

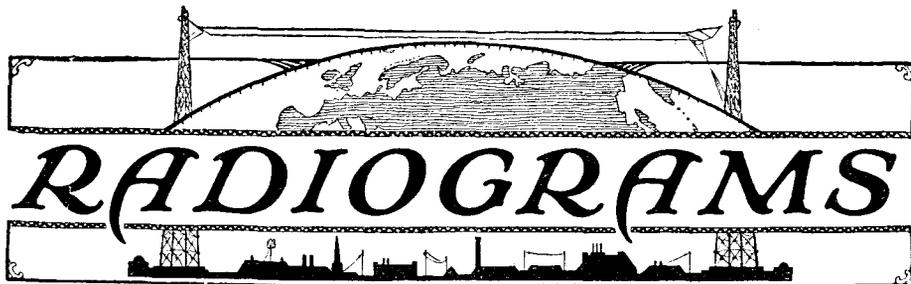
There is no choke-condenser output filter in the set, as the current taken by the power valve is not large. Do not use too long loud-speaker wires, however, as they may act as an aerial. A fixed condenser of about .002-microfarad connected between the anode of the power valve and the filament wire helps to avoid trouble. Do not lay the loud-speaker wires near the frame aerial wires, as there may be a little coupling effect.

A big point in the operation of the set is that there is no deliberate reaction. The tuning of the frame aerial is not affected by that of the oscillator, although they must both be tuned to receive a signal. The point is that a slight adjustment may be made to the frame or the oscillator without affecting the other.

Altering the volume control does not affect the tuning of the set, as the efficiency of the screen-grid valves only is changed by this control. The tuning of the frame circuit may change a shade as the aerial is turned, but this is because of the flexible wires going between the frame and the set. Their relative position alters slightly as the frame is tuned and so the tuning condenser may need slight adjustment. The amount is not sufficient to lose a station, however, and I mention it only because you may hurriedly swing the frame and not take care to retune before noting the strength.

Tone is largely decided by the last stage, its high-tension, grid bias and, of course, the loud-speaker that is used. The low-frequency transformer and the detector stage also play a part and an effort has been made to arrive at satisfactory results considering the cost. The tone will be the same or better than from other smaller sets but having equivalent low-frequency circuits.

This super-heterodyne gives good quality, as the circuits are stable and satisfactory parts are used. I stress this matter as there are some who expect the quality from a super-heterodyne set to be inferior. This is not true of the present set.



SEVERAL excerpts from the Piccadilly Theatre play, *Folly to be Wise*, will be played in the National programme on May 23. Mary Eaton and Chorus will sing "Looking for a Sunbeam," while Cicely Courtneidge and Nelson Keys will be heard in the popular "All the King's Horses."

On most evenings a Belgian transmission on 43 metres can be picked up between 8 and 10 p.m. B.S.T. The broadcast emanates from a private station at Villereille-lez-Brayeux, near Binche. The call is: *Ici station expérimentale Radio Wallonia à Bonne Esperance*. The power is 20 watts (aerial).

Vivian Ellis, the composer of numerous song successes in the West End theatres, will play his own compositions throughout the National vaudeville programme on May 16. Tex McLeod, "the spinner of ropes and yarns," makes a welcome reappearance for the B.B.C. in this programme, and Leonard Henry will be another star turn.

The Bugginses—Mabel Constanduros and Michael Hogan to wit—will view the Variety Artistes' Benevolent Fund Command Performance at the London Palladium on May 11 from the cinema projection-room at the back of the auditorium. From this loophole they will give listeners a running commentary on the turns which are not self-explanatory.

Iceland possesses a population of roughly 100,000, of which some 10,000 are registered broadcast licence holders. As the programmes of the Reykjavik station are developed it is expected that the percentage of listeners will increase.

The National Orchestra of Wales is paying its first visit to Aberystwyth to take part in the Cardiganshire Musical Festival, which is being held at the University Hall, Aberystwyth, on May 20. A concert in the

afternoon by the orchestra, the Festival Choir, Robert Parker and Myfanwy Ellis, will be broadcast from 3.25 to 4.45 p.m. In the evening a performance of *Elijah* is being given but this will not be broadcast.

An orchestral and choral concert will be given from the studio on May 17, when the Cardiff University Madrigal Society, conducted by I. C. Williams, will give unaccompanied madrigals and folk songs

From 9.5 to 10.30 p.m., on May 10, the Northern Studio Orchestra, which on this occasion will consist of some thirty players, will give a light orchestral concert in the Manchester and Leeds programme.

Massenet was born on May 12, 1842, and for three quarters of an hour on his anniversary the Northern Studio Orchestra will play selections from his works.

A religious service will be relayed from Siloh Baptist Church, Tredegar, on May 17, at 8 p.m.

A Welsh service on the Daventry National wavelength will be relayed from St. Dunstan's Church, Ferndale, on May 17.

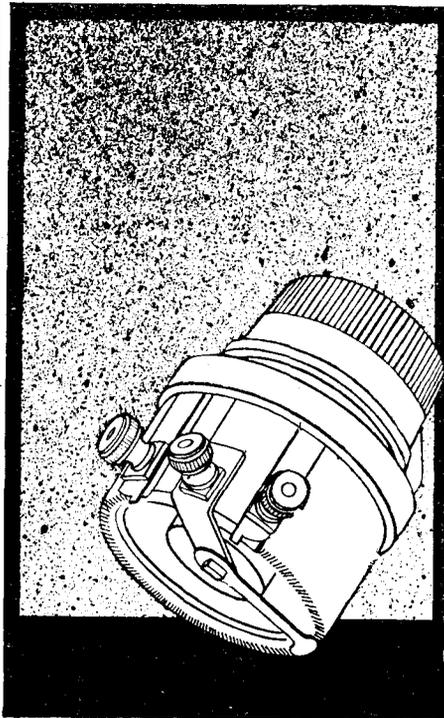
On May 10 there will be a brass band concert for Northern listeners from 4.15 to 5.30 p.m.

A programme entitled "Melodies of Yester-year" will be broadcast from the Belfast studios on May 28, and will include Tom Kinniburgh in a "Signor Foli" programme, John Rorke in an "Albert Chevalier" programme, and Alexander McCredie in a "Sims Reeves" programme. The Light Orchestra will play barn dances, quadrilles and other old measures.

The Northern Studio Orchestra, from Manchester and the Bramley Ladies' Choir, from Leeds, will participate in an orchestral concert on Saturday, May 16.

In Russia all letters addressed to the broadcasting stations by listeners are allowed to be sent post free.

## A NECESSITY IN EVERY SET



### —THE VARIABLE COLVERSTAT

Made by the manufacturers of Colvern Coils—a guarantee in soundness of construction—this component has established itself firmly in the world of radio and has been specified in numerous home-constructed sets.

Specified for the "Century Super"

Wire wound, smooth in movement, silent in action, constant in setting. For all voltage regulation and volume control. In the following standard values: 1,000, 2,500, 5,000, 10,000, 15,000, 20,000, 25,000 and 50,000 ohms.

Price 5/6

# COLVERN RADIO

SEND FOR THE COLVERN BOOKLET

Advt. of Colvern Ltd., Mawney Road, Romford.

## 8d. Per Year!



It appears almost incredible, but this is this actual running cost of the Heayberd Model C.150 Mains Unit for 12 months—four hours use every day. Guaranteed for Two Years against breakdown, these powerful Units are built by specialists for every type of Receiver.

### MODEL C.150

150 volts at 25 m.a. Westinghouse rectification. Three tappings—one variable. Assembled in handsome case and requires wiring up only. Simplified point-to-point diagram for non-technical men.

PRICE 76/-

L.T. supply, 8/- extra.

### HEAYBERD,

10, Finsbury St., LONDON, E.C.2

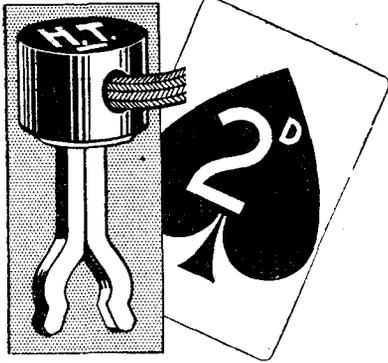
Send List 947 showing how easy it is to build the Mains Unit best suited to my Receiver and details of Two Years' Guarantee. I enclose 3d. stamps.

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_

BUILD THE "CENTURY SUPER"

CHEAP TO RUN AS ANY THREE-VALVER

# THE ACE OF SPADES



Patent Nos. 329463 & 124287/30

NEW

## BELLING-LEE SPADE TERMINAL

All-British and the world's best. The new Belling-Lee Spade Terminal clips on to any terminal, grips it between powerful spring prongs and "stays put" if the terminal becomes unscrewed. Makes connecting up a one-hand job.

The neatest connection to terminals, tapped coils, accumulators, etc.—also ideal for hook-ups, clipped on to any screw or wire.

Handles permanently engraved. The whole flex gripped, wire, fray and rubber.

"Radio Connections" handbook 2d. post free



Advertisement of Belling & Lee, Limited, Queensway Works, Ponders End, Middlesex.

## DOES YOUR SWITCH SPINDLE TURN ROUND ?

IF SO, YOUR SET "CRACKLES!"

By FITTING A "BUSCO" SWITCH your trouble is ended because there is no contact point to turn round, and when you "switch on" you have contact like a power switch. WHY NOT FIT ONE? They are as cheap as the inferior type but far superior in operation. From your local dealer, Halford's Cycle Stores, or

**BUSBY & CO., LTD.** (Patentees)  
Dept. A.W., PRICE ST., BIRMINGHAM

1/3 each  
1/6 Post Free  
Patents Pending

## ROLA MOVING COIL SPEAKERS

Highly efficient, latest, for mains or batteries, tested; guaranteed, 2,000 to clear immediately, 39/6 each. Cash order, seven days approval.

A. F. POLLOCK & Co., 50 Alric Avenue, New Malden, Surrey.

# OUR LISTENING POST *By JAY COOTE*

ON Sundays, when the B.B.C. stations are resting, there are a number of good programmes to be picked up from the Continent, and if light entertainment is desired you might do worse than turn to Germany. Königswusterhausen is well within the reach of most receivers and usually supplies what is required. Recently, when I tuned in to that station I was taken over to the *Gossen Schauspielhaus* for a dance-band competition, in which most of the orchestras regularly found in the Berlin programme were doing their very utmost to secure a first prize. In the course of this transmission I was able to pass in review the Ben Berlin, the Barnabas von Geczy, the famous Najos Bela, the Eddy Walls, and the Billy Barton dance bands. Such an entertainment helped to while away the dreary hours of a wet Sunday afternoon. On the other hand, if you want to hear some of the latest gramophone records, switch over to Radio Paris at 2 p.m. B.S.T. for a sixty-minute sponsored recital with French and English announcements.

When listening to Barcelona and San Sebastian a few evenings ago I made two noteworthy discoveries: firstly, that, contrary to both report and expectation, Spain has not adopted Summertime this year, and secondly, that the transmissions, since the advent of the Republican Government, end up with that conventional revolutionary anthem, "La Marseillaise." Of course, with Spain working to Greenwich mean time, you will find Madrid, San Sebastian, and Barcelona frequently until 1.30 a.m.

It seems to me that our ex-friend Radio Belgique, now Brussels No. 1, is showing less initiative in its programmes than when privately operated. On the other hand, Brussels No. 2 on the lower wavelength has recently considerably developed its relay system, and on several occasions has broadcast from theatres and other places of entertainment. I learn also that this station intends to make a regular feature of the famous *carillon* of the Church of St. Rombaut at Malines. This relay is to be carried out on every Monday in June, August, and September from 9 to 10 p.m. B.S.T. Well-known melodies will be included in these recitals, given by the Chevalier Jef Denijn, already a familiar name to many listeners in the United Kingdom.

Have you noticed any decrease in strength in Bordeaux-Lafayette? For some time its power was advertised as being 35 kilowatts, but I am told that the station has never been used "all out." As a matter of fact, I am assured that the transmitter seldom radiates more than 11 kilowatts in the aerial. This seems to make little difference to the signals received for they are still on most nights at loud-speaker volume.

It might be worth your while to visit Radio Toulouse during the next few weeks at 11 p.m. on Mondays, Wednesdays, and Saturdays, if only to get an idea of the kind of gramophone records appreciated by French listeners.

Radio Strasbourg during the coming summer months (it still seems a long way off!) intends to carry out relays of concerts from the famous Orangerie in that city, also from the Esplanade at Metz, as well as performances from Nancy and Mulhouse.

By the way, I have been able to confirm the fact that the "Century Super" is a very efficient short-wave receiver. On a casual preliminary test, I found that *no aerial* was necessary to log such stations as Rome, Poznan, or Moscow. All that is needed is a five- or six-turn centre-tapped short-wave coil connected up to the existing frame aerial terminals on the receiver. I had no difficulty in securing powerful signals at my first attempt, and, although tuning was exceedingly sharp, it was just as easily accomplished as when working on the medium or long waves.

Try it—it will prove a revelation.

**S**OLDERING is now quite an easy and interesting job—thanks to Fluxite and the neat, compact little Fluxite soldering set. This contains a special "small-space" soldering iron with non-heating metal handle; pocket blow-lamp; Fluxite; solder, etc., and full instructions. It is simple to use and lasts for years in constant use. It costs only 7s. 6d. and is obtainable at all ironmongers and hardware stores. Fluxite is sold separately in tins at 8d., 1s. 4d., and 2s. 8d., and a new "Junior" size has just been placed on the market at 4d. per tin.

If any dealer who has sent a remittance in connection with the new "Hornet" two-valver does not find his name appearing in the Voltron announcement in this issue, he should communicate at once with Messrs. Voltron Electric Ltd., of Queensway, Ponders End, Middlesex. Unfortunately part of the Voltron mail received on April 29 is reported stolen, and this may account for the omission.

## WHEN SUBMITTING QUERIES . . . . .

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

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

The designing of apparatus or receivers cannot be undertaken.

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

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

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

Ask For

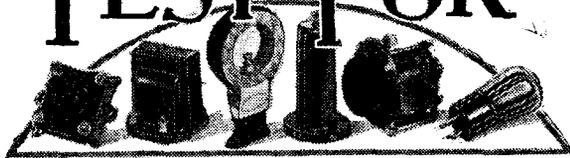
# BURTON

THE BASIS OF BEST RECEPTION

C.F. & H. BURTON · PROGRESS WORKS · WALSALL · ENGLAND · RADIO RECEIVERS & COMPONENTS

# WE TEST FOR YOU

A weekly review  
of new components



and test's of  
apparatus

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

## New Selfridge H.T. Battery

WE have just tested an H.T. battery marketed by the radio department of Messrs Selfridges. This battery is compact in size, measuring 9 in. by



One of the range of new Selfridge "Key" H.T. batteries

5 in. by 3 in. It delivers 99 volts when new and weighs 7 lb. It is very convenient for use in portable sets.

It was discharged at the standard rate of 7 milliamps, under which conditions it behaved very well, lasting for 260 hours. This is equivalent to capacity of 1,350 milliampere hours, a figure well in excess of the minimum which has been laid down from experience for standard-capacity batteries.

The battery sells at a price of 7s. 11d. and can be recommended.

## Telsen Differential Condenser

ONE of the neatest differential condensers we have tested lately is the Telsen product which has just been placed on the market. This device is assembled with the usual bakelised paper dielectric, and is housed between pressed fibre end-plates. Good 4BA terminals are provided, which, while not occupying much room, enable one to obtain a good grip and will undoubtedly facilitate the making of connections.

The device occupies a space on the panel of 2 in. by 1 1/2 in. overall, and is altogether an attractive job. The capacity is up to the stated figure.

## Konduktite Paper

MANY sets nowadays are mounted on a baseboard completely covered with metal foil. This assists in the screening necessary for high-frequency purposes, and forms a very convenient earthing plate. We have received this week a sample of Konduktite metallic paper, which is intended to be used for this purpose. It resembles a particularly robust brand of tea paper, but as far as we could gather from an inspection of the sample submitted it is made of a very thin sheet of foil backed with paper board about 20 mils thick—the thickness of an ordinary visiting card.

The sample supplied measured 8 in. by 4 in., and we checked the resistance from corner to corner, but were unable to obtain any measureable reading. It appears, therefore, to have a perfectly satisfactory conductivity and should be suitable for screening. The material appears to suffer from one disadvantage compared with an actual metal sheet, which is that we found it impossible to solder any connections thereto. However, it is possible to overcome this difficulty quite easily by inserting a soldering tag under a screw head and driving the screw home, and as we have said, we imagine that in other respects the material should behave perfectly satisfactorily. Its price is distinctly attractive, being only 2s. for a piece 30 in. square.

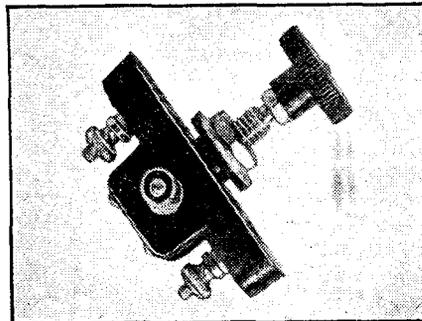
## New Busco Switch

WE have recently tested a push-pull switch known as the Busco. This combines a push-pull action with a knife-switch contact, and we were somewhat impressed with the sample in question. We have now received a three-point switch made by the same firm and operating on a similar principle.

The switch is rather the same in general construction as the original two-pole model. There is a plunger operated by the push-pull knob which carries a bridge piece at its extremity. The ends of this bridge piece are bent downwards, and when the plunger is pulled out the ends of this bridge piece are forced into two spring contacts.

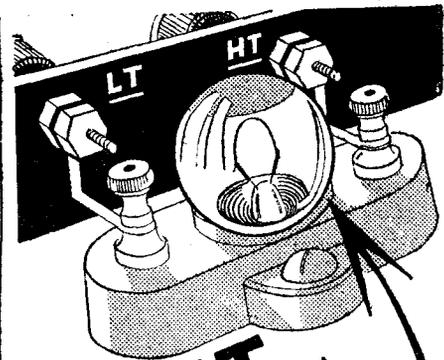
By the provision of an extra spring attached to this bridge piece, contact is now made to a third terminal carried on the side of the moulding, so that if the plunger is pulled out all three points are connected together.

We found that some force was required in order to pull the plunger into the position where the three contacts were connected



The Busco three-point switch

together, and the addition of the extra contact has made the action somewhat harder. However, there is no question that the contact is good, and being self-cleaning is likely to remain so.



**FIX IT HERE**

and rest assured that your valves are safe in the event of an accidental short circuit. Can be supplied in following ranges:

.06 amps.	(50 milliamps)
.1 "	(100 "
.15 "	(150 "
.2 "	(200 "

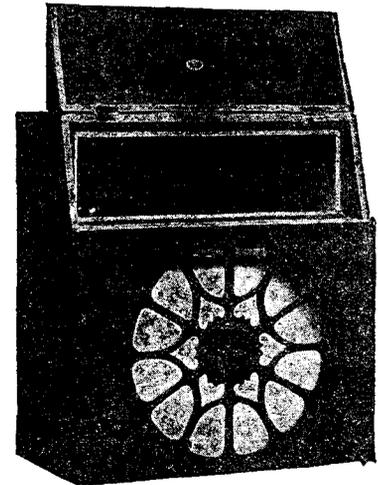
**COMPETA FUSES**

A FUSE FOR EVERY CIRCUIT

**6 EACH**

LOOK FOR THE TRADE MARK

A. F. BULGIN & Co. Ltd. 9-10-11, CURSITOR STREET, CHANCERY LANE, LONDON



## THE IDEAL CABINET

for Portable,  
Transportable or  
All-Mains Sets

OAK 52/6; MAHOGANY 58/-  
**LESS 10% If Purchased**  
before June 1

ONLY WHILE STOCKS LAST

Send Coupon for details

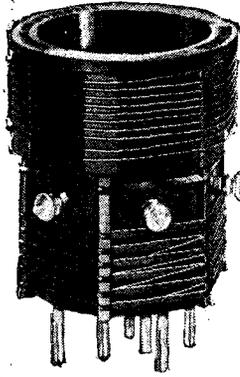
CARRINGTON  
MFG. CO., LTD.  
24 Matton Garden,  
London, E.C.1  
Phone: Hol 8202  
Factory:  
S. Croydon

Name \_\_\_\_\_

Address \_\_\_\_\_

A.W.9

# TUNEWELL



## THE CLARION COIL

**TUNEWELL CLARION COILS AERIAL or ANODE 7/9.** (6 pin base 2/-) **PANEL MOUNTING 10/6.** (3 pt. switch 1/3). **SHORT WAVES 3/11.**

Present-day conditions call for greatly increased selectivity. Modernise your unselective set with the new Tunewell Clarion Coil. It gives greatly improved range and sharper tuning to any straight or S.G. circuits.

Specified for the "Ultra Selective Straight 3," it is also suitable, and gives greatly improved results, with the "Mullard Master 3," "Favourite 3" and similar circuits.

TUNEWELL ALL-BRITISH SPAGHETTI RESISTANCES, 10,000 and 15,000 ohms, 1/-; 20,000, 25,000 and 30,000 ohms, 1/4. 40,000, 50,000 and 60,000 ohms, 1/6. *Send for Lists*

TURNER & CO., 54, Station Road, London, N.11.

### ELEX

## SOMETHING NEW! TESTING PRODS

Elex testing prods have now been improved. Ball points have been fitted to the existing pointed prods for greater ease in use. Recommended by all wireless papers. The ideal testing instrument for the wireless enthusiast, eliminating all danger of shock, burnt-out valves or displaced wires.

Obtainable in red and black, price 3/6 per pair  
Write for List No. 716.

**J. J. EASTICK & SONS,**  
118, Bunhill Row, London, E.C.1. Phone: Metropolitan 0314

## MAKE YOUR RADIO ALL-ELECTRIC

for **9/2** and 11 payments of 88, or Cash **£4 : 15 : 0**

**MAINS UNIT, Type G.B.1**  
(Westinghouse)

**H.T., G.B., and L.T.**  
IN ONE COMPLETE UNIT

1-7, DALTON STREET, **TANNOY** West Norwood S.E.27. **PRODUCTS**

NO MORE BATTERIES NO MORE BATTERIES

# BROADCAST TELEPHONY

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

Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)				
<b>GREAT BRITAIN</b>															
25.53	11,751	Chelmsford (G5SW)	15.0	294.1	1,020	Limoges (PTT)	0.5	416	721	Radio Maroc (Rabat)	10.0				
200	1,500	Leeds	0.16	307.6	975.2	Bordeaux (PTT)	11.0	1,250	240	Tunis Kasbah	0.6				
242	1,238	Belfast	1.2	317.3	945.4	Marseilles (PTT)	0.5	<b>NORWAY</b>							
261.3	1,148	London Nat.	68.0	327.2	917	Poste Parisien	1.2	235.5	1,275	Kristiansand	0.5				
288.5	1,040	Newcastle	1.2	327.5	919	Grenoble (PTT)	3.0	240	1,250	Stavanger	0.5				
288.5	1,040	Swansea	0.16	345.2	869	Strasbourg (PTT)	15.0	364	824	Berger	1.0				
288.5	1,040	Stoke-on-Trent	0.16	370	810.5	Radio LL (Paris)	0.5	366.2	819.2	Frederiksstad	0.7				
288.5	1,040	Sheffield	0.16	385	779	Radio Toulouse	3.0	453.2	662	Porsgrund	1.5				
288.5	1,040	Plymouth	0.16	447	771	Paris (PTT)	2.0	493.4	608	Trondheim	1.2				
288.5	1,040	Liverpool	0.16	466	644	Lyons (PTT)	2.3	587.1	511	Hamar	0.8				
288.5	1,040	Hull	0.16	1,445.7	207.5	Eiffel Tower	15.0	1,071	280	Oslo	75.0				
288.5	1,040	Edinburgh	0.4	1,725	174	Radio Paris	17.0	<b>POLAND</b>							
288.5	1,040	Dundee	0.16	1,725	174	Radio Paris	83.0	214.2	1,400	Warsaw (2)	14.0				
288.5	1,040	Bournemouth	1.2	(testing shortly)											
288.5	1,040	Bradford	0.16	<b>GERMANY</b>											
301	995	Aberdeen	1.2	31.38	9,560	Zeesen	15.0	234	1,283	Lodz	2.2				
300.9	968	Cardiff	1.2	217	1,382	Königsberg	1.7	312.8	959	Cracow	1.5				
356.3	843	London Reg.	70.0	219	1,369.7	Flensburg	0.6	335	896	Poznan	1.9				
376.4	797	Glasgow	1.2	227	1,319	Cologne	1.7	368.1	815	Wilno	20.0				
398.9	752	Midland Reg.	38.0	227	1,319	Münster	0.6	381	878	Lyov	21.0				
479.2	626	Manchester (temp)	1.2	227	1,319	Aachen	0.3	408	734	Katowice	16.0				
479.2	626	North Regional	70.0	232.2	1,292	Kiel	0.31	1,411.8	212.5	Warsaw	158.0				
1,554.4	193	Daventry (Nat.)	35.0	239	1,256	Nürnberg	2.3	<b>PORTUGAL</b>							
<b>AUSTRIA</b>															
218	1,373	Salzburg	0.6	246.4	1,217.2	Cassel	0.3	240	1,250	Oporto	0.25				
246	1,220	Linz	0.6	253.4	1,184	Gleitwitz	5.6	(Teatro Apollo) 0.25							
283	1,058	Innsbruck	0.6	259.3	1,157	Leipzig	2.3	234.7	1,053.6	Lisbon (C11AA)	0.25				
352	851	Graz	9.5	269.8	1,112	Bremen	0.3	<b>ROMANIA</b>							
453	666	Klagenfurt	0.6	276.5	1,085	Heilsberg	75.0	394	761	Bucharest	16.0				
517	581	Vienna	20.0	283.6	1,058	Magdeburg	0.6	<b>RUSSIA</b>							
also tuning on about 1,100 m.															
<b>BELGIUM</b>															
206	1,456	Antwerp	0.4	283.6	1,058	Berlin (E)	0.6	427	702.5	Khar'kov	4.0				
215.5	1,392	Chatelineau	0.25	283.6	1,058	Stettin	0.6	720	416.6	Moscow (PTT)	20.0				
216	1,391	Radio Conference Brussels	0.25	318.8	941	Dresden	0.3	800	375	Kiev	20.0				
245.1	1,223.7	Schaerbeck	0.5	325	923	Breslau	1.7	824	364	Sverdlovsk	25.0				
338.2	887	Brussels (No. 2)	20.0	360	833	Mühlacker	75.0	937.5	320	Kharkov (RV20)	25.0				
509	590	Brussels (No. 1)	20.0	372	809	Hamburg	1.7	1,000	300	Leningrad	100.0				
<b>BULGARIA</b>															
318.8	941	Sofia (Rodno Radio)	1.0	390	770	Frankfurt	1.7	1,060	283	Tiflis	15.0				
<b>CZECHO-SLOVAKIA</b>															
250	1,202	Prague	2.0	418	716	Berlin	1.7	1,103	272	Moscow Popoff	40.0				
263	1,139	Moravska-Ostrava	11.0	452.1	662	Danzig	0.2	1,200	250	Khar'kov (RV4)	25.0				
279	1,076	Bratislava	14.0	473	635	Langenberg	17.0	1,304	230	Moscow (Trades Unions)	165.0				
293	1,022	Kosice	2.5	533	563	Munich	1.7	1,380	217.5	Bakou	10.0				
341.7	878	Brunn (Brno)	22.0	559.7	536	Kaiserslautern	1.0	1,481	202.5	Moscow (Kom)	20.0				
487	617	Prague (Prah)	5.5	559.7	536	Augsburg	0.3	<b>SPAIN</b>							
487	617	Cesky Brod	75.0	566	539	Hanover	0.3	252	1,193	Barcelona	0.6				
(testing shortly)															
<b>DENMARK</b>															
281	1,067	Copenhagen	1.0	570	527	Freiburg	0.35	268	1,121	Valencia	8.0				
1,153	260	Kalundborg	10.0	1,635	183.5	Zeesen	35.0	349	860	Barcelona (EAJ1)	8.0				
<b>ESTONIA</b>															
296.1	1,013	Tallinn	0.7	1,635	183.5	Norddeich	10.0	366.9	817.7	Seville (EAJ5)	1.5				
465.8	641	Tartu	0.5	<b>HOLLAND</b>											
<b>FINLAND</b>															
221	1,355	Helsinki	15.0	31.28	9,599	Eindhoven (PCJ)	30.0	424	707	Madrid (EAJ7)	2.0				
291	1,031	Tampere	1.0	299	1,004	Hilversum	8.5	453	662.2	San Sebastian	0.6				
291	1,031	Vipuri	15.0	299	1,004	Radio Idzerda (The Hague)	3.0	<b>SWEDEN</b>							
690	434	Pori	1.5	1,060	283	Scheveningen-Haven	5.0	230.3	1,304	Malmö	0.75				
1,796	167	Lahti	54.0	1,875	160	Huizen	8.5	257	1,166	Hörby	15.0				
<b>FRANCE</b>															
219.3	1,368	Beziers	0.6	550	545	Budapest	23.0	307.1	977	Falun	0.65				
222.9	1,346	Fécamp	1.0	<b>HUNGARY</b>											
235.1	1,275	Nîmes	1.0	550	545	Budapest	23.0	322	932	Göteborg	15.0				
237.2	1,263	Bordeaux-Sud-Ouest	2.0	<b>ICELAND</b>											
249	1,205	Juan-les-Pins	0.5	1,200	250	Reykjavik	21.0	436	689	Stockholm	75.0				
256	1,172	Toulouse (PTT)	1.0	<b>IRISH FREE STATE</b>											
265	1,130	Lille (PTT)	15.0	224.4	1,337	Cork (IFS)	1.5	542	554	Sundsväl	15.0				
272	1,103	Reunnes	1.2	413	725	Dublin (2RN)	1.5	770	389	Ostersund	0.75				
285.4	1,051	Montpellier	2.0	<b>ITALY</b>											
287.1	1,045.1	Radio Lyons	0.5	25.4 and 80	Rome (3RO)	9.0	1,229.5	244	Boden	0.75					
<b>LATVIA</b>															
525	572	Riga	13.0	296.3	1,012.2	Turin (Torino)	8.5	1,352	221.0	Motala	40.0				
<b>LITHUANIA</b>															
1,985	155	Kaunas	7.0	312.8	959	Genoa (Genova)*	1.5	<b>SWITZERLAND</b>							
<b>NORTH AFRICA</b>															
363.4	825.3	Algiers (PTT)	13.0	332	905	Naples (Napoli)	1.7	244.1	1,229	Basle	0.65				
<b>PORTUGAL</b>															
240	1,250	Oporto	0.25	441	680	Rome (Roma)	75.0	245.0	1,229	Berne	1.1				
<b>ROMANIA</b>															
394	761	Bucharest	16.0	453	662	Bolzano (IBZ)	0.2	403.5	743	Söthens	25.0				
<b>RUSSIA</b>															
427	702.5	Khar'kov	4.0	501	590	Milan (Milano)	8.5	450.2	653	Beromuenster	60.0				
720	416.6	Moscow (PTT)	20.0	*testing on 525 m.											
800	375	Kiev	20.0	<b>LATVIA</b>											
824	364	Sverdlovsk	25.0	525	572	Riga	13.0	<b>LITHUANIA</b>							
937.5	320	Kharkov (RV20)	25.0	<b>NORTH AFRICA</b>											
1,000	300	Leningrad	100.0	525	572	Riga	13.0	1,985	155	Kaunas	7.0				
1,060	283	Tiflis	15.0	<b>PORTUGAL</b>											
1,103	272	Moscow Popoff	40.0	240	1,250	Oporto	0.25	<b>ROMANIA</b>							
1,200	250	Khar'kov (RV4)	25.0	<b>RUSSIA</b>											
1,304	230	Moscow (Trades Unions)	165.0	394	761	Bucharest	16.0	<b>RUSSIA</b>							
1,380	217.5	Bakou	10.0	<b>RUSSIA</b>											
1,481	202.5	Moscow (Kom)	20.0	427	702.5	Khar'kov	4.0	472	702.5	Khar'kov	4.0				
<b>SPAIN</b>															
252	1,193	Barcelona	0.6	720	416.6	Moscow (PTT)	20.0	800	375	Kiev	20.0				
268	1,121	Valencia	8.0	824	364	Sverdlovsk	25.0	937.5	320	Kharkov (RV20)	25.0				
349	860	Barcelona (EAJ1)	8.0	1,000	300	Leningrad	100.0	1,060	283	Tiflis	15.0				
366.9	817.7	Seville (EAJ5)	1.5	1,103	272	Moscow Popoff	40.0	1,200	250	Khar'kov (RV4)	25.0				
424	707	Madrid (EAJ7)	2.0	1,200	250	Khar'kov (RV4)	25.0	1,304	230	Moscow (Trades Unions)	165.0				
453	662.2	San Sebastian	0.6	1,380	217.5	Bakou	10.0	1,481	202.5	Moscow (Kom)	20.0				
<b>SWEDEN</b>															
230.3	1,304	Malmö	0.75	252	1,193	Barcelona	0.6	268	1,121	Valencia	8.0				
257	1,166	Hörby	15.0	349	860	Barcelona (EAJ1)	8.0	366.9	817.7	Seville (EAJ5)	1.5				
307.1	977	Falun	0.65	424	707	Madrid (EAJ7)	2.0	453	662.2	San Sebastian	0.6				
322	932	Göteborg	15.0	<b>SWITZERLAND</b>											
436	689	Stockholm	75.0	244.1	1,229	Basle	0.65	245.0	1,229	Berne	1.1				
542	554	Sundsväl	15.0	403.5	743	Söthens	25.0	450.2	653	Beromuenster	60.0				
770	389	Ostersund	0.75	450.2	653	Beromuenster	60.0	680	442	Lausanne	0.6				
1,229.5	244	Boden	0.75	760	395	Geneva	1.5	760	395	Geneva	1.5				
1,352	221.0	Motala	40.0	<b>TURKEY</b>											
<b>SWITZERLAND</b>															
244.1	1,229	Basle	0.65	1,216.2	246.6	Istanbul	5.0	1,533	195	Ankara	7.0				
245.0	1,229	Berne	1.1	<b>YUGOSLAVIA</b>											

# Postcard Radio Literature

## GET THESE CATALOGUES FREE

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

### Changing Your Mains

HAVE you D.C. mains users ever thought how easy it is nowadays to change the supply to A.C. so that you can work a standard A.C.-operated set? If not then write through my free Catalogue Service to Wates for a copy of a folder describing a new converter (costing well under £10) which changes standard D.C. supplies to an A.C. supply at 220-volts 50 cycles. This is a good idea. **242**

### Buy a New H.T.

Is a new H.T. battery needed? Then if so pick out a new suitable type in the new Grosvenor folder. There are standard, popular and super-power batteries from which to choose and grid-bias batteries in three separate types. **243**

### Triotron Speakers

Triotron speaker units are well-known to all home-constructors, but I confess that until I received the latest booklet I did not realise what a wide range of completely-assembled Triotron speakers is available. Models are made which will suit any furnishing scheme, and I advise you to get this. **244**

### Build your Own Parts

When you have built that new set why not turn your attention to the construction of a good-looking cabinet to go with it? Messrs. Charles A. Osborn will send you, free, a catalogue describing dozens of types of console cabinet, which, if desired, can be supplied as a kit of parts. **245**

### Something New

I see that the Silvertown Co. are placing on the market a new dry cell to be known as the Condor. This certainly appears to be something quite new. **246**

### Fluxite for Amateurs

If you want to make a good job of soldering the connections of your set then you must have a good flux, such as Fluxite. I hear that a new size tin of Fluxite specially for radio amateur use has just been produced, this being known as Junior Fluxite. **247**

### The Columbia 332

If you want a moderate priced all-electric set housed in a well-made console-type cabinet, then see the new folder describing the Columbia 332, which is an entirely new model. **OBSERVER. 248**

# Easy Terms FIRST IN 1924 FIRST IN 1931

## CENTURY SUPER

Kits of parts as specified by "Amateur Wireless."

**KIT "A"** Less Valves, Cabinet and Frame Aerial. With 9/9 order  
Cash Price **£5 6s. 6d.** 11/7 order  
Balance by 11 monthly payments of 9/9.

**KIT "B"** As above but with Frame Aerial. With 16/9 order  
Cash Price **£6 6s. 6d.** 18/7 order  
Balance by 11 monthly payments of 11/7.

**KIT "C"** With Valves but less Cabinet and Frame Aerial. With 20/- order  
Cash Price **£9 2s. 6d.** 10/2 order  
Balance by 11 monthly payments of 10/9.

**KIT "B"** As above but with Frame Aerial. With 18/7 order  
Cash Price **£10 2s. 6d.** 20/- order  
Balance by 11 monthly payments of 18/7.

**KIT "C"** Complete with Valves, Cabinet and Frame Aerial. With 10/2 order  
Cash Price **£10 17s. 6d.** 10/2 order  
Balance by 11 monthly payments of 20/-.

**SPECIFIED ACCESSORIES** With 10/2 order  
Consisting of 6 Mullard Valves, Handsome Polished Oak Cabinet (complete), and Frame Aerial ready wound. 10/2 order  
Cash Price **£5 11s. 0d.**

Balance by 11 monthly payments of 19/2.  
Note.—Further details and quotations sent on application.

## 1931 ETHER SEARCHER (Battery Model) As Specified

**KIT "A"** Less Valves and Cabinet. With 10/6 order  
Cash Price **£5 14s. 6d.** 14/1 order  
Balance in 11 monthly payments of 10/6.

**KIT "B"** With Valves, less Cabinet. With 14/1 order  
Cash Price **£7 13s. 6d.** 16/- order  
Balance in 11 monthly payments of 14/1.

**KIT "C"** Complete with Valves and Cabinet. With 16/- order  
Cash Price **£8 14s. 6d.** 16/- order  
Balance in 11 monthly payments of 16/-.

Details of accessories will be sent on application.

## SELECTION FROM OUR CATALOGUE

**COSSOR EMPIRE MELODY MAKER** With 10/- order  
KIT, 1931 model, S.G., Detector and Power. Cash Price **£6 17s. 6d.**

Balance in 11 monthly payments of 12/9 order  
**1931 OSRAM MUSIC MAGNET KIT.** With 23/6 order  
2 S.G., detector and power. Cash Price **£11 15s. 0d.**

Balance in 12 monthly payments of 18/6 order  
**MULLARD 1931 ORGOLA THREE-VALVE KIT,** S.G., detector, and power. With 14/8 order  
Cash Price **£8 0s. 0d.**

Balance in 11 monthly payments of 14 8 order  
**ATLAS A.C. ELIMINATOR TYPE A.C. 244.** 3 Tappings, S.G., Detector and Power. With 5/6 order  
Output 120 volts at 20 m/a. Cash price **£2 19s. 6d.**

Balance in 11 monthly payments of 5 6. order  
**REGENTONE COMBINED UNIT MODEL W5A** H.T. Eliminator and Trickle Charger for A.C. Mains. Cash price **£4 15s.** 8/8 order  
Balance in 11 monthly payments of 8 8.

**LAMPLUGH OR FARRAND INDUCTOR SPEAKER** for perfect reproduction. Unit and Chassis complete, ready mounted. With 6/5 order  
Cash price **£3 10s.**

Balance in 11 monthly payments of 6 5. order  
**ULTRA MOVING COIL D.C. CHASSIS** With 5/6 order  
with tapped input transformer for Pentode or Power Valves, 200,250 volts. Cash price **£2 19s. 6d.**

Balance in 11 monthly payments of 5 6. order  
**EKCO 3F.20 H.T. ELIMINATOR.** 20 With 7/4 order  
m.a. Tappings for S.G., 60 volts and 120/150 volts. For A.C. Mains. Cash price **£3 19s. 6d.**

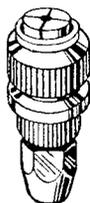
Balance in 11 monthly payments of 7 4. order  
**EXIDE 120-volt Type W.H., H.T. ACCUMULATOR,** in crates. With 8/6 order  
Cash price **£4 13s.**

Balance in 11 monthly payments of 8 6 order

Every make of Radio Set or Accessory can be supplied on Easy Terms. Send for our free 96 page Illustrated Catalogue, and let us know your Radio requirements. Quotation by return.

# New Times Sales Co

56 LUDGATE HILL, LONDON, E.C.4  
(Established 1924) Telephone: CENTRAL 2716



# Don't Waste Energy!

Get every atom of energy from your Unit—make your speaker more sensitive to distant stations—Vastly improve Tone and Volume by cutting out that annoying 'chatter' and 'buzz.' Tonax, the properly designed chuck, improves your Cone Speaker 100 per cent.

## TONAX

PATENTED CHUCK is easily fitted to any unit.

Single Cone Type, 1/-

Double Cone Type, 1/6

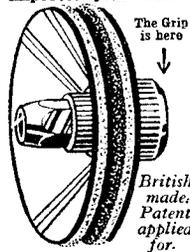
From all Dealers or Post

& Packing Free, 2d. extra.

Write Dept. A,

GARRATT STORES,

193 Garratt Lane, S.W.18



The Grip is here

British made. Patent applied for.

## REPAIRS

to any make of L.F. Transformer, Headphones or Loud-speaker (except Blue Spot) dispatched in **48 Hours—TWELVE MONTHS' GUARANTEE** with each repair. 4/- post free. Cash with order.

Terms to Trade.

### TRANSFORMER REPAIR CO.

Dept. S, 953 GARRATT LANE, LONDON, S.W.17

## OUR BLUEPRINT SERVICE

Constructors of receivers described in this journal should make full use of our Blueprint Service and avoid all risk of failure.



## HEAVY DUTY!

Benjamin Rotary switches are not toys. Their sturdy self-cleaning ball contacts enable you to control with equal efficiency either wave changing or all mains gear. They improve with use and will outlast your set. Read about them and the circuits in which they can be used in List No. 1142, free on request

The BENJAMIN ELECTRIC LTD.

Tariff Road, Tottenham, N.17.

Tottenham 1580

1/9

# BENJAMIN

## TAYLEX WET H.T. BATTERIES

New Prices: Jars 1/3. Sacs 1/2. Zincs 1 0d. Sample doz. 18 Volts complete with bands and electrolyte 4/11 post 9d. Sample unit 6d. Illus. booklet free. Bargain list free. **AMPLIFIERS, 30/- 3 VALVE ALL-STATION SET £5. A. TAYLOR, 57, Studley Road, Stockwell, LONDON.**

**PREPAID ADVERTISEMENTS**

Advertisements under this head are charged **THREEPENCE PER WORD**, minimum charge **THREE SHILLINGS. DEPOSIT SYSTEM**  
As the Publishers cannot accept responsibility for the bona fides of advertisers in this publication, they have introduced a system of deposit which it is recommended should be adopted by readers when dealing with persons with whom they are unacquainted. It is here explained.  
Intending purchasers should forward to the Publishers the amount of the purchase money of the article advertised. This will be acknowledged to both the Depositor and the Vendor, whose names and addresses must necessarily be given. The deposit is retained until advice is received of the completion of the purchase, or of the article having been returned to and accepted by the Vendor. In addition to the amount of the Deposit, a Fee of 6d. for sums of £1 and under, and 1s. for amounts in excess of £1, to cover postage, etc., must be remitted at the same time. In cases of persons not resident within the United Kingdom, double fees are charged.  
The amount of the Deposit and Fee must be remitted by Postal Order or Registered Letter (Cheques cannot be accepted), addressed to

"AMATEUR WIRELESS" ADVERTISEMENT DEPARTMENT,  
58/61 FETTER LANE, LONDON, E.C.4

**PHOENIX THREE-VALVE** kits complete with cabinet, £1/7/6. Ditto with valves, £2/15/-. Ditto with H.T. and L.T. batteries and speaker, £4/10/8. H.P. terms on kit: 5/- deposit, 2/7 per week.—Phoenix, 314 High Road, Lee, S.E.13.

**CHARGE YOUR H.T. FROM YOUR L.T. AT HOME.** Wonderful discovery. Fox's Recharger will trickle-charge H.T. accumulators. Ratio, 1 amp. Set can be on or off safely. Fitted 2 minutes. Guaranteed, 6/6 (diagram only, 1/6).—Fox, 188 Camberwell Grove, S.E.5.

**A.C. H.T. ELIMINATORS**, from 6/-, or 12 monthly payments of 6/-. A.C. H.T. Eliminator Kits from 43/- to 62/6; cash or monthly terms. Cabinet Speakers, 12/6 each, worth double. Cash or C.O.D.—Servwell Wireless Supplies (Dept. M.O.), 74 Gough Street, London, E.14.

**MOORSIDE EDGE.**—Special device to cut out new station within three degrees. Results guaranteed or money returned. Price 5/6, postage 3d, extra.—Wainwrights, Wireless Engineers, Wakefield Road, Ossett. Telephone 16.

**TRICKLE CHARGERS**, A.C. mains for 2- and 4-volt accumulators, 0.5 amp., no upkeep, 18/6, carriage paid.—A. Benoit, 4 Manor Gardens, Gunnersbury Avenue, London, W.3.

**"BROOKMANS 4."**—Coils and other components selling half-price.—"Chauffeur," Southbar, Rentréur.

**PHILIPS 4-VALVE ALL-MAINS RECEIVER**, type 2511, very little used, £26; also Philips, type 3002, H.T. Eliminator, used demonstration only, £4; Lissen 2-Valve All-mains A.C. Receiver, with Speaker, £7 10s.; B.T.H. Moving-coil Speaker, with 200-240-volt rectifier, £6.—Oakthorpe Motor Garage, Palmers Green, N.13. P.G. 2446.

**EXPERIMENTER'S SURPLUS**, brand new, unboxed, "Century Super" kit. Set 4 coils 39/-; 2 J.B. "Tiny" Condensers, 13/6; Colverstat, 4/-; Valves, 59/6, etc. Also Tallard Induction Motor, 12-in. turntable, auto stop, 36/-; several TGSC Coils, 7/- each; Epoch 15, 57/6; 30-henry 70 m/a Choke, 6/6; B.T.H. Motor, 42/6; A.C. Accumulator Charger, 14/-; Filament Transformer, 8/6; Mains Transformer, 15/6; 35/- J.B. Chassismount, 25/6; Pick-up, Condensers, etc. All new, most clear. Post free. C.O.D. or deposit.—Ransome, 6 Cyprus Avenue, N.3.

**BRUCE'S**, Mains Transformer and L.F. Choke Specialists. Regulation guaranteed nearly perfect. Supplied to leading Corporations and Manufacturers. Recommended by "Amateur Wireless." Type AB.64, 250-0-250 v. 60/80 m/a, 2-0-2 v. 1 amp., 2-0-2 v. 3 amp., 3-0-3 v. 1 amp. Price 25/6. Type AB.42, 300-0-300 v. 60/80 m/a, 2-0-2 v. 1 amp., 2-0-2 v. 3 amp., 2-0-2 v. 1 amp. Price 27/6. Write for test report.—Bruce's, Transformer Dept., Dawson Street, Bury, Lancs.

**ENGINEERS**, we offer you the finest and most complete book on Engineering Careers ever compiled, absolutely free of charge. This book contains 180 pages of invaluable information and advice. It also contains details of B.S.E., A.M.I.C.E., A.M.I.Mech.E., A.M.I.E.E., A.M.I.A.E., A.M.I.Struct.E., M.R.San.I., L.I.O.B., F.S.I., G.P.O., C. & G., etc. Exams, outlines home-study courses in all branches of Civil, Mechanical, Electrical, Motor, Wireless, Aeronautical, and Talkie Engineering, and explains the unique advantages of our special Appointments Department. We alone Guarantee "No pass—no fee." You owe it to yourself to read our handbook. Send to-day, stating branch or subject of most interest.—British Institute of Engineering Technology, 109 Shakespeare House, 29-31 Oxford Street, W.1.

**"CENTURY SUPER" KIT.** Advertiser suddenly requires money. Must sell Coils, J.B. Condensers, Valves, Colverstat, etc. What offers?—H., 54 Clifton Road Finchley, N.

**A MAGNIFICENT SET.**—The National and Regional Three, absolutely complete, including Tungstram valves, 2-volt accumulator, 100-volt H.T. battery, B.T.H. 45/- loud-speaker. Perfect reception from home and foreign stations. Guaranteed 12 months. Amazing value, £4, inclusive.—H. Panagakis, Radio Manufacturer, 91 Dale Street, Liverpool.

**AGENTS WANTED** to sell well-known H.T. Units, etc., for cash or easy terms. Prices are very competitive and good commission is offered.—Brookman Rapid Radio Service, 105 Spencer Street, Birmingham, Wireless and Cycle Factors. Specialists in Radio Cabinet Work.

**PHILIPS 12-GUINEA MOVING-COIL SPEAKER.** Approval, £6. List other bargains.—103 Cambridge Road, Southport.

**BANKRUPT BARGAINS.** List free, with 3-valve diagram, .0005 Variable, 2/6; Differential, 2/6; Midget, .0005 2/-; Transformers, 2/9; Sutra, 3/3; Telsen, A.C.E., 6/6; Radio grand, 9/6. Dual Coils, 5/-, S.M. Dials, 1/6. Tungstram-Triotron Valves, 4/6; power, 5/6. Triotron Speaker Units, 9/6; Ormonde, 10/6. Also Motor, Undy, etc. Three-valve Kits with cabinet, 35/-; Two-valve, 24/-. Get my price for anything first.—Butlin, 143b Preston Road, Brighton.

**BARGAINS.**—Shop-soiled and partly-used Components, Sets, Speakers, etc., all guaranteed perfect electrical condition. Supplied on seven days' approval against cash. Send list your inquiries.—Bostock & Stonnill, 1 Westbourne Terrace, S.E.23.

**ELECTRICAL ENGINEERS**, Wiremen, Accumulator Service Men.—The T.E.C. will train you at home for a better job; unsurpassed courses in electrical engineering, wiring, and battery charging; prospectus post free.—Technical Engineering College, Crown Chambers, Regent Street, London, S.W.1. Principal, W. S. Ibbetson, B.Sc., A.M.I.E.E.

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

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

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

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

**MIKES FOR HOME RECORDING**

Pulpit Pedestal, 12/6, Pedestal Broadcaster, as illustrated, 18/6, Microphones with handle, 15/-, powerful Public Address models 55/- and 65/-, Transformers 4/6, Couplers 15/-, Valve Amplifiers 55/-, for Band Repeater or Public Address work, Home Recorder for Gramo.



**ELECTRADIX RADIOS**  
218 Upper Thames Street, London, E.C.4  
CITY 0191.



**YOU CAN BUILD A £40 GRAMOPHONE WITH OUR SCALE DRAWINGS FOR 40/-**

Book of instructions 3d. Catalogue of Motors, Tonearms, Soundboxes, latest internal amplifiers, Gramophones and Cabinets Free. Cash or Terms.

W. BURT, 185 High St., Deptford.

**MAGNUM**  
ALL THAT IS BEST IN RADIO COMPONENTS SETS ETC.  
**BURNE-JONES & CO. LTD.**  
296, BORO' HIGH ST., LONDON S.W.1.

**KONDUCTITE**

(Prov. Patent 481731)  
**METALLIC PAPER**  
Konductite consists of a thin sheet of aluminium mounted on a comparatively stiff backing paper and has all the advantages of sheet metal. It is very easy to work with and infinitely superior to tin or copper foil. It is now specified in all leading circuits.  
For Covering Baseboards: Back of Panels: Linings of Cabinets and all Screening purposes  
In sheets measuring 30" x 20" 2/- Postage and packing 6d. extra  
Free sample on receipt of stamped addressed envelope  
**GRAMO-RADIO AMPLIFIERS LTD., 1a NEW LONDON ST., E.C.3**  
Phone: Royal 4399

**FULL-SIZE BLUEPRINTS**

When ordering, please send Postal Order, NOT STAMPS.

**CRYSTAL SET (6d.)**

- B.B.C. Crystal Set .. .. . AW28r
- ONE-VALVE SETS (1s. each)**
- One Control One .. .. . AW267
- Regional Ultra-selective One .. .. . AW278
- B.B.C. One .. .. . AW280
- Hartley One .. .. . WM198

**TWO-VALVE SETS (1s. each)**

- Talisman Two (D, Trans) .. .. . AW194
- No-battery A.C. Mains Two (D, Trans) .. .. . AW230
- No-battery Gramo-radio 2 (D, Trans) .. .. . AW238
- 1930 Talisman 2 (D, Trans) .. .. . AW239
- Searcher Two (D, Trans) .. .. . AW245
- Arrow Two (D, Trans) .. .. . AW249
- Forty-five-shilling Two (D, Trans) .. .. . AW250
- Searcher Short-wave 2 (D, Trans) .. .. . AW259
- Challenge Two (D, Trans) .. .. . AW261
- Loftin-White Two (C, Mains) .. .. . AW263
- Everybody's All-in 2 (D, Trans) .. .. . AW274
- Twenty-Shilling Two (D, Trans) .. .. . AW274
- Brookman's Two (D, Trans) .. .. . WM168
- Gleaner Two (D, Trans) .. .. . WM201
- Music Monitor (D, Trans) .. .. . WM208
- Merlin Two (A.C. Set) .. .. . WM213
- Five-Point Two (D, Trans) .. .. . WM220
- Brookman's A.C. Two (D, Trans) .. .. . WM225
- Aladdin Two (D, Trans) .. .. . WM231

**THREE-VALVE SETS (1s. each)**

- 1930 Clarion Three (SG, D, Trans) .. .. . AW223
- Beginner's Regional Three (D, 2LF) .. .. . AW233
- The "A.W." Exhibition 3 .. .. . AW247
- Push-Pull "Two" (D, Push-Pull) .. .. . AW270
- 1931 Ether Searcher (SG, D, Trans) .. .. . AW271
- 1931 Ether Searcher (A.C. model) .. .. . AW276
- Mains Unit .. .. . AW277
- Ultra-Selective Straight Three (SG, D, Trans) .. .. . AW282
- 1931 Ether Searcher (D.C. model) .. .. . AW284
- Mains Unit .. .. . AW285
- Fanfane Three (D, 2 Trans) .. .. . WM157
- Brookman's Three (SG, D, Trans) .. .. . WM161
- Brookman's Push-Pull Three (SG, D, Trans) 1/6 .. .. . WM170
- Inceptordyne (SG, D, Pentode) .. .. . WM179
- Music Marshal (D, 2 Trans) .. .. . WM190
- Concert Three (D, 2 Trans) .. .. . WM199
- De-Luxe Three (D, RC, Trans) .. .. . WM209
- Five-Point Three (SG, D, Trans) .. .. . WM212
- Falcon Three (A.C. Set) .. .. . WM217
- New Brookman's Three (SG, D, Trans) .. .. . WM218
- Five-point Short-wave (D, RC, Trans) .. .. . WM223
- Baitle-Board Three (D, RC, Trans) .. .. . WM226
- Plug-in Coil Three (D, 2 Trans) .. .. . WM233
- Regional Three (SG, D, Trans) .. .. . WM236
- Gramo-radio A.C. Three (SG, D, Trans) .. .. . WM237

**FOUR-VALVE SETS (1s. 6d. each)**

- Horizon Four (SG, D, 2 Trans) .. .. . AW237
- Challenge Radio Gramophone (SG, D, RC, Trans) .. .. . AW265
- Lodestone Four (HF, D, RC, Trans) .. .. . WM193
- Searcher Four (SG, D, RC, Trans) .. .. . WM194
- Regional Band-pass Four (SG, D, RC, Trans) .. .. . WM211
- Five-Point Four (SG, D, RC, Trans) .. .. . WM216
- Regional A.C. Four (SG, D, RC, Trans) .. .. . WM222
- Supertone Four (SG, D, Push-pull) .. .. . WM227
- Brookman's Three-Plus-One (SG, D, RC, Trans) .. .. . WM233

**FIVE-VALVE SETS (1s. 6d. each)**

- James Quality Five (2SG, D, RC, Trans) .. .. . AW227
- Companion Portable (2HF, D, RC, Trans) .. .. . AW276
- 1930 Five (2HF, D, RC, Trans) .. .. . WM171
- Radio-Record Five (SG, D, Trans-parallel) .. .. . WM188
- Overseas Five (3SG, D, Trans) .. .. . WM191
- Regional A.C. Five (3SG, D, Trans) .. .. . WM221

**SIX-VALVE SETS (1s. 6d. each)**

- Century Super (Super-het) .. .. . AW287
- Hyperdyne Receiver .. .. . WM221
- Super 60 (Super-het) .. .. . WM229

**AMPLIFIERS (1s. each)**

- "A.W." Gramophone Amplifier .. .. . AW205
- Two-valve Amplifier .. .. . AW210
- Simple Gramophone Amplifier .. .. . AW257
- High Quality Amplifier for A.C. Mains .. .. . AW275
- 2-Watt Amplifier for A.C. Mains .. .. . AW283
- Radio-Record Amplifier (DC Mains) .. .. . WM183
- Selecto Amplifier (HF, Unit) .. .. . WM210

**PORTABLE SETS**

- Continental Portable (SG, D, Trans) .. .. . AW241 1/-
- Companion Portable (2HF, D, RC, Trans) .. .. . AW279 1/6
- Pedlar Portable Two (D, Trans) .. .. . WM105 1/-
- Pedlar Portable Three (D, 2 Trans) .. .. . WM197 1/-
- Super 60 Portable (Super-het) .. .. . WM238 1/6

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

Address letters:  
**Amateur Wireless Blueprints Dept., 58-61 Fetter Lane London, E.C.4.**

**DX THE STANDARD PLUG-IN COIL**  
Sold everywhere from 1/-  
**DX COILS Ltd, London, E.8**

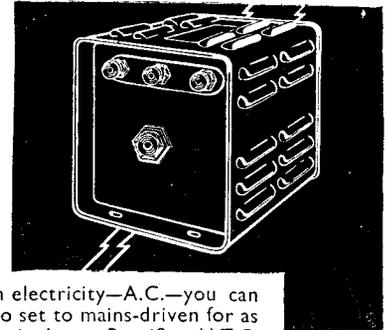
**Amateur Wireless** COUPON Available until Saturday MAY 16, 1931

MISUNDERSTOOD



MARKER: "Send up some more PLAYERS, please!"

HOW TO MAKE YOURS A MAINS SET  
FOR LESS THAN  
£3



If your house is supplied with electricity—A.C.—you can convert a battery-driven radio set to mains-driven for as little as £2.15, using the Westinghouse Rectifier H.T.5.

Fill in and post the coupon for our booklet, which describes the components required and gives diagrams of suitable circuits.



METAL RECTIFIERS

The Westinghouse Brake & Saxby Signal Co., Ltd., 82, York Road, King's Cross, London, N.1. Telephone: North 2415.

COUPON

Please send me, free of charge, your Booklet describing the Westinghouse Metal Rectifiers.

PLEASE WRITE IN BLOCK LETTERS

NAME.....

ADDRESS.....

A.W.

(A halfpenny stamp is sufficient postage if the envelope is unsealed)

Your enjoyment is perfect when listening to the WUFA

Whether listening to Radio or Record, real enjoyment depends entirely on perfect reproduction. The "Wu'fa" speaker gives pure and natural reproduction of every musical note and voice variation.

Read this "Press" extract:

"... Reproduction is practically that of a moving coil unit, except that the very heavy drumming associated with the moving coil is absent. Tone is beautifully deep and rotund, and volume is immense. ... the amplification obtained when using this unit is nearly that of an added L.F. valve."

The Public say:

"'Wu'fa' is the purest unit I have heard for 4 years." ... "Exceeded my expectations." ... "A great speaker at a small price." ... "I prefer a 'Wu'fa' ... reproduction is extraordinarily fine."

ASK YOUR DEALER TO DEMONSTRATE.

WUFA

60 Pole Super-Power Unit

Beware of Imitations. The Genuine "WUFA" has a Red Magnet.

404 UNIT ONLY 27/6  
Complete with Chassis

M. LICHTENBERG, 4 Gt. Queen St., London, W.C.2

Now a BRITISH GENERAL OUTPUT TRANSFORMER

To safeguard your loud-speaker and to improve its tone

You can do irreparable damage to your receiving set by allowing excessive H.T. current to pass through your loud-speaker. Guard against the risk by fitting a British General Output Transformer which provides FIVE RATIOS, offering a wide choice of matchings to give perfect tone and quality. Easy fixing. Full instructions supplied for every type of set and speaker.

As specified in the Simple Tone Changer described in this issue.

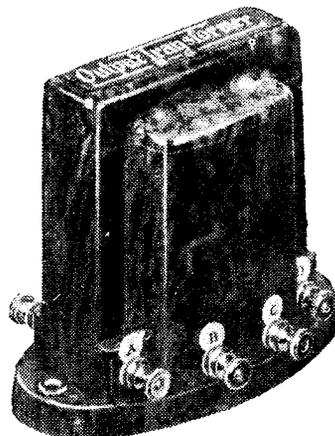
From all dealers or direct from the manufacturers

PRICE

9/6

BRITISH GENERAL MANUFACTURING Co. Ltd. BROCKLEY WORKS, LONDON, S.E.4

Telephone: Lee Green 5055-6



EVERYTHING

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

ELECTRICAL

# A NEW 2 VOLT GENERAL PURPOSE VALVE



## The **OSRAM H.L.2**

**T**HIS is an entirely new 2-volt general purpose valve. Its outstanding feature is its "mica bonded" electrode system wherein the electrodes are locked or bonded together in a mica template, making for absolute rigidity which gives consistency in characteristics between valve and valve, and freedom from microphonic or parasitic noises. The valve is, therefore, most suitable for use in Portable Receivers as a highly efficient Detector — or first stage Low Frequency Amplifier.

Its use is not confined to Portable Receivers, for its high amplification factor and relatively low impedance give the maximum stage gain in any 2-volt receiver.

### Characteristics

Filament volts - - 2.0  
 Filament current 0.1 amp.  
 Amplification Factor 27  
 Impedance - - 18,000  
 Max. Anode Volts 150  
 Mutual Conductance 1.5

**PRICE 8/6**

# Osram Valves

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

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