

**CAPT. P. P. ECKERSLEY JOINS OUR STAFF.**

# Popular Wireless

Every Thursday  
PRICE  
3d.

No. 341. Vol. XVI.

INCORPORATING "WIRELESS"

September 21st, 1929.

## Special Exhibition Number



### THEN BUILD IT!

See it here!

### THE "P.W." FOUR

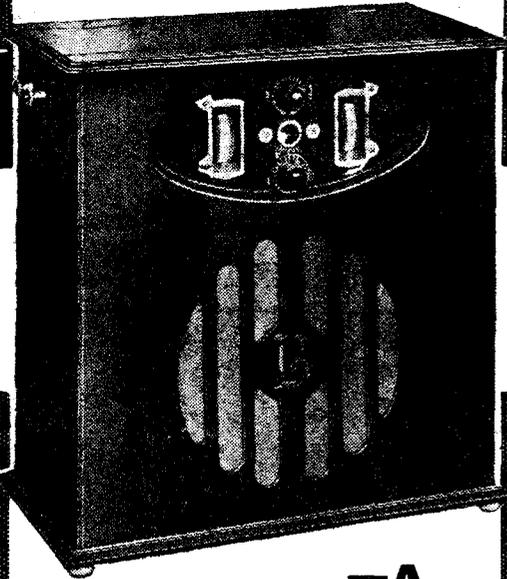


Build it yourself  
in an evening!

A real Musical  
Instrument!



**BUILD IT  
YOURSELF—**



**—A  
SET YOU'LL  
BE PROUD  
TO OWN!**



Gets Concerts  
from all Europe!

Works from your  
Electric Light!



**A**T last the standard of home-built Receivers has been raised to that of factory-built Sets—by the makers of the World's finest loud speaker. Look at this wonderful new Brown Receiver. A handsome Set—in rich mahogany or oak cabinet—it gives you concerts from all Europe! Amazingly selective—cuts out local station at will—the ideal Set for the new B.B.C. Regional Scheme which will put old Sets out-of-date. It is self-contained too—batteries,

accumulator and loud speaker contained in the cabinet. Or—if you prefer it—you can build it without the loud speaker—and either model can be made to work from your electric light. Finally, its tone is purer and its volume is greater than any previous home-built Set. And you can build it yourself—even if you have never made a Set before! Now—read on below, decide which model you will build and hear it at your Dealer's.

## 2 Models—Battery or Electric Mains Use.

Types "A." and "A.M."—As illustrated—with Brown Loud Speaker tested and assembled in cabinet. Type "A" has space for batteries and accumulator, complete kit of parts, less valves, batteries and accumulator, but including coils for 200-550 metres, price £12. Type "A.M.," as type "A." but for A.C. or D.C. Mains operation, price £20.

Types "B" and "B.M."—Similar types "A" and "A.M." but without loud speaker. Kit of parts for type "B," less valves, batteries and accumulator, but including coils for 200-550 metres, price £9. Type "B.M.," as type "B" but for A.C. or D.C. Mains operation, price £17.

Extra coils for 900-2,000 metres, 17/- extra.

**FREE!**

The four models of the wonderful Brown Receiver are more fully described in an illustrated Folder which you can obtain free from your Dealer or direct from—

S. G. Brown, Ltd.,  
Western Avenue,  
N. Acton, London, W.3

THE WONDERFUL NEW  
**Brown**

**You can pay  
as you listen!**

Any of the four types of the Brown Receiver can be obtained on easy monthly payments. Ask your Wireless Dealer for Folder giving full details of our "pay as you listen" system.

**RECEIVER**

# To get a higher gain per stage in your screen grid receiver

*Fit this new valve with its special*  
**CROSS-MESH screen**

**S**TILL longer range, greater clarity—these were the aims of the Marconi engineers in making this new screen grid valve. And already thousands of wireless owners are praising the wonderful results it brings them, the unrivalled efficiency, the faultless reproduction from even very distant stations.

The gain per stage is higher, the control easier, more stable. For the special cross-mesh construction makes a very notable improvement in the screening and lowers the inter-electrode capacity.

To get the very best out of your set fit Marconi screen grid valves—made by the famous engineers who design the great transmitting valves used in most of the chief broadcasting stations of the world.

Types S.215 for 2 volts, S.410 for 4 volts and S.610 for 6 volts cost 22/6 each. Type S Point 8 for A.C. mains operation costs 25/-. Ask any dealer for them. If you do not know of a dealer near you, write to the Marconiphone Company Limited, 210-212 Tottenham Court Road, London, W.1.

SEE THE MARCONIPHONE STANDS AT OLYMPIA. NOS. 79 to 84



## SPECIFICATIONS

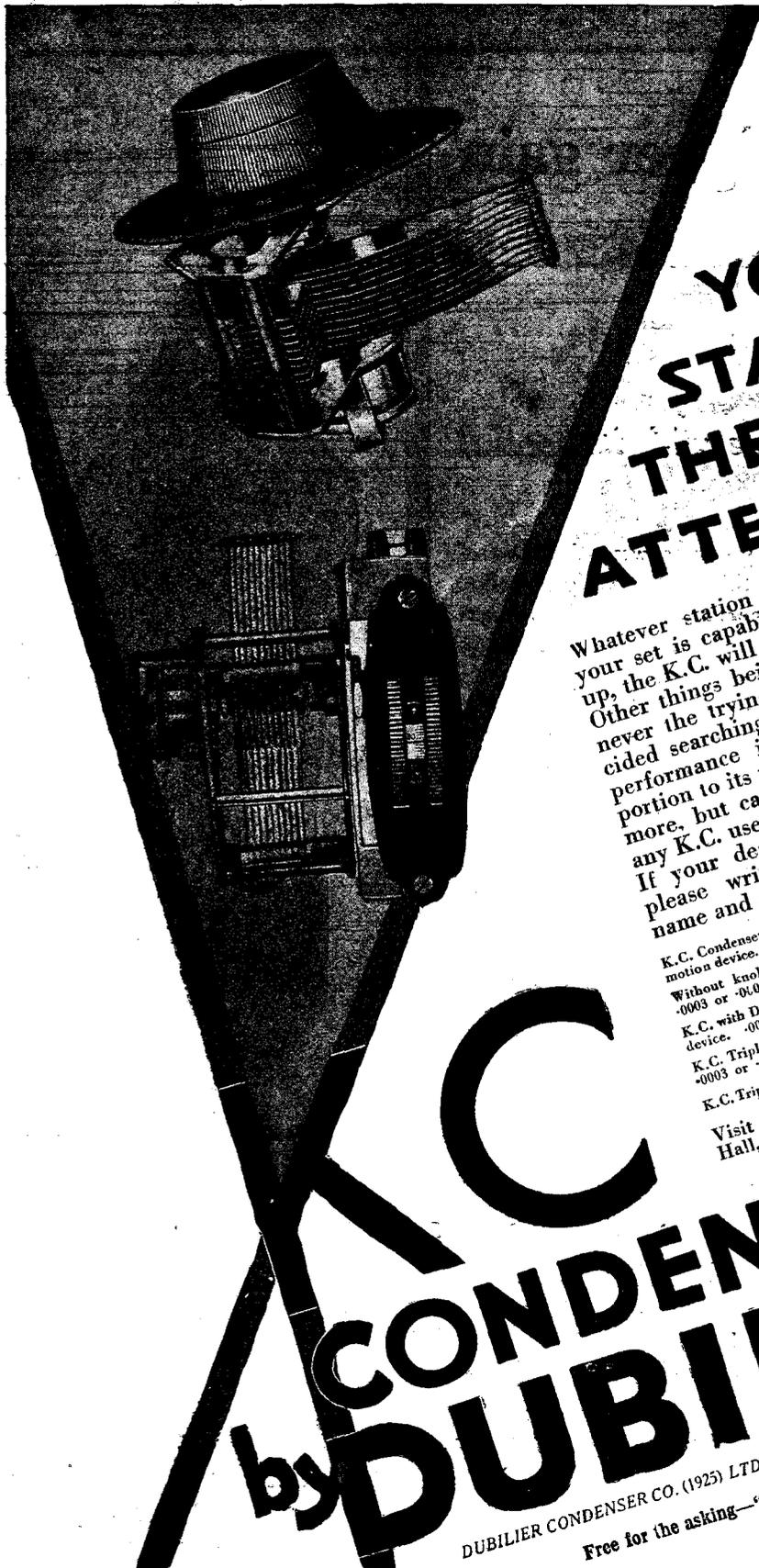
	S.215	S.410	S.610	S point 8
Filament volts . . .	2.0 max.	4.0 max.	6.0 max.	0.8 max.
Filament current . .	0.15 amp.	0.1 amp.	0.1 amp.	0.8 amp.
Anode volts . . . . .	100-150 max.	100-150 max.	150 max.	100-150 max.
Screen grid volts . .	60-90 max.	60-90 max.	60-90 max.	60-90 max.
*Amplification factor	170	180	210	160
*Impedance . . . . .	200,000 ohms.	200,000 ohms.	200,000 ohms.	200,000 ohms.
*Normal slope. . . . .	.85 Ma/v.	.9 Ma/v.	1.05 Ma/v.	0.8 Ma/v.

\* At Anode Volts 120, Screen Grid Volts 80, Grid Volts 0 to -1

*Longer range, easier control — improve your screen grid receiver by fitting this new valve*



# MARCONI Screen Grid VALVES



# YOUR STATION AT THE FIRST ATTEMPT

Whatever station you want, if your set is capable of picking it up, the K.C. will pick it out. Other things being equal, there's never the trying delay of undecided searching with a K.C. Its performance is out of all proportion to its price. You can pay more, but can't get more! Ask any K.C. user. If your dealer is out of stock, please write to us, giving his name and address.

- K.C. Condenser, with knob, dial and slow-motion device. -0003 or -0005 12/-
- Without knob, dial or slow-motion device. -0003 or -01.05 8/-
- K.C. with Drum Control and slow-motion device. -0003 or -0005 15/6
- K.C. Triple Condenser with Drum Control. -0003 or -0005 38/6
- K.C. Triple, Combination of -0003 and -0005 40/-

Visit our Stands Nos. 181 & 182, New Hall, Radio Exhibition, Olympia.

# by K.C. CONDENSERS DUBILIER

DUBILIER CONDENSER CO. (1925) LTD. Ducon Works, Victoria Road, North Acton, W.I.  
Free for the asking—"A Bit about a Battery." There's a copy for you at your dealers.



**THE VALVES WITH THE AMAZING PERFORMANCE**

Months of intensive research, exhaustive experiment—then—valves which astounded the experts who were asked to try them. Experts who have witnessed all the great epoch marking feats of Radio Science are enthusiastic.

Now—we offer them to you, knowing that, having tried them you will be as enthusiastic as the experts; as enthusiastic as we are ourselves. **Your dealer stocks them.**

Head Office Edison Radio Division and West-End Showrooms:  
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Showrooms in all the principal  
Towns.

Advt. of  
**The EDISON SWAN  
ELECTRIC Co., Ltd.**

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

2 Volt	
Types	Price
H210	- 10/6
HL210	- 10/6
L210	- 10/6
P220	- 12/6
P240	- 15/-
230 Pen.	- 25/-
215 S.G.	- 22/6
A.C. Mains	
Types	Price
AC/HL	- 15/-
AC/P	- 17/6
AC/PI	- 17/6
AC/SG	- 25/-

# MAZDA RADIO VALVES

4 and 6 Volt	
Types	Price
425 Pen.	- 25/-
P425	- 15/-
P625A	- 15/-
P625B	- 15/-
H607	- 10/6
HL607	- 10/6
PP3/425	- 30/-
P650	- 20/-
Rectifier	
Types	Price
UU60/250	22/6
U65/850	- 15/-
U30/250	- 15/-
U75/300	- 15/-

**FOR CLARITY OF REPRODUCTION**

WE ARE EXHIBITING AT  
THE NATIONAL RADIO  
EXHIBITION, OLYMPIA,  
SEPT. 23rd—OCT. 3rd.  
STAND NO. 110,  
GROUND FLOOR.



**WITH MELODY  
OUT OF THE  
MEDLEY**

**FIT**

They impart that reality of reproduction to the instruments of any band or musical programme—individually, and collectively, portraying the master touch of the Artists throughout the entire musical scale.

You must try one—when you will instantly agree that Telsens are the Transformers of this generation.

Try one now. They are entirely British. "Radiogrand" Model. "Ace" Model.

**12/6**

Ratios 5—1  
and 3—1

**8/6**

Ratios 5—1  
and 3—1

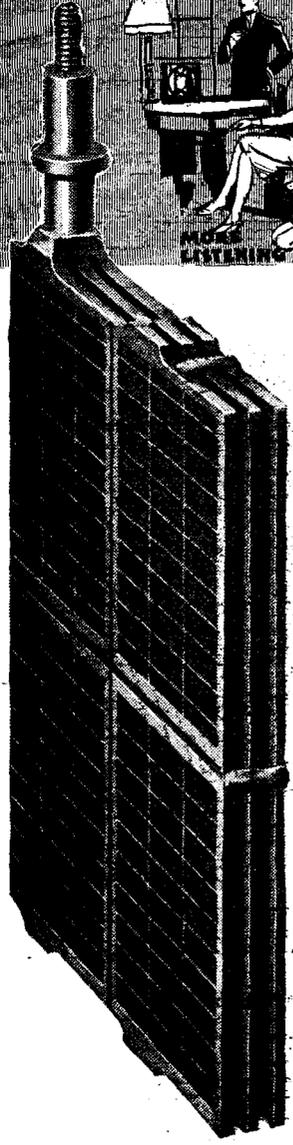
**TRANSFORMERS**

TELSEN ELECTRIC CO., LTD. HEAD OFFICES: MILLER STREET, BIRMINGHAM.

# MORE L.T.



## FOR THE SAME MONEY



Cut the cost of working your Set. Use Oldham "Faithful Service" Accumulators. Their Triple Girder-built plates hold their charge for long periods even when not in use. And because of their massive construction they will not buckle. They give you more L.T. for the same money.

### Oldham Triple "Girder-built" Plates cut the expense of frequent recharging.

They give more listening from every recharge. You save money. The Special Activation Process under which all Oldham Plates are made endows them with exceptionally long life. Sulphation is practically eliminated.

No other Accumulator possesses such wonderful advantages as the Oldham—Triple "Girder-built" plates—free all-metal carrier—seamless clear-glass non-leak container. Ask your dealer to show you an Oldham to-day.

#### O.V.D.

2-volt 10 amp. hrs. (actual)

5/6

#### I.V.D.

2-volt 20 amp. hrs. (actual), specially recommended for the Corsor Melody Maker

9/-

#### U.V.D.

2-volt 40 amp. hrs. (actual)

14/-



All fitted with free all-metal carriers.

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Birmingham Depot: 62 Moor Street  
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# OLDHAM

"Faithful Service"

## ACCUMULATORS

# The Sets for RESULTS

## "Best Way" TITAN SETS

BOOK NO. 350.

Profusely illustrated with full diagrams and instructions for building

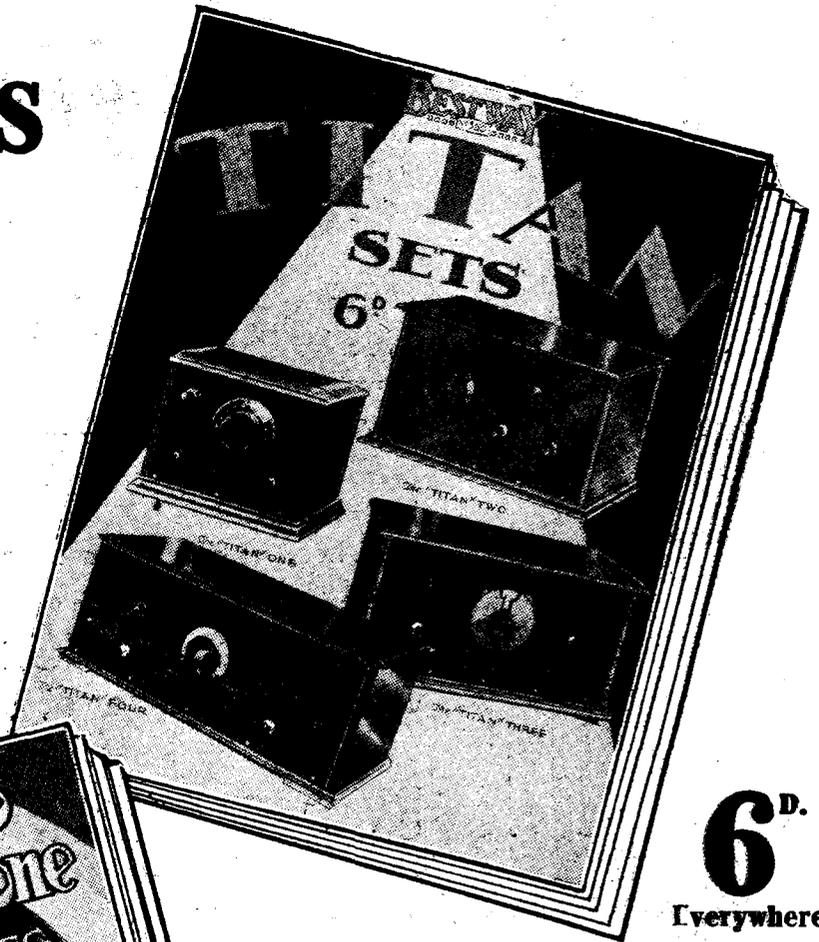
The Titan One

The Titan Two

The Titan Three

The Titan Four

The reader has the choice of anything from a simple one-valver to a de-luxe 4-valve set with built-in wave-trap and wonderful long-distance loud-speaker performance.



6<sup>D.</sup>

Everywhere.



6<sup>D.</sup>

Everywhere.

## "Best Way" RADIO-GRAMPHONE SETS

BOOK NO. 349.

Explains how to use your radio set as an Electric Gramophone. Here, for the first time, are given full details for the electrical reproduction of your favourite records; Gramophone Pick-ups and how to use them; Valves for your Radiogram Receiver; Operating your Electric Gramophone are explained in detail, and in addition there are complete instructions for making The "Best Way" RADIOGRAM FOUR — a splendid set designed for use with a pick-up as well as for Radio Reception.

# You can easily build them

# At Olympia!

## Call first at the Lotus Stand

Here's help for your next set. The very latest in transformers, condensers, chokes—every unit you need and all made in the most modern radio factory in Great Britain and carrying the Lotus guarantee.

Every one is a Lotus masterpiece of mechanical perfection, every one the very best of its kind that you can buy. Lotus components are all neat, strong and accurate and ready to give you perfect service.

Come and handle these new Lotus units and note their wonderful workmanship and low prices. You will find them very useful this season. Get to know them NOW!

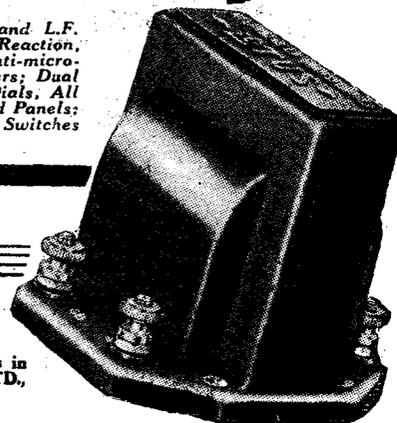
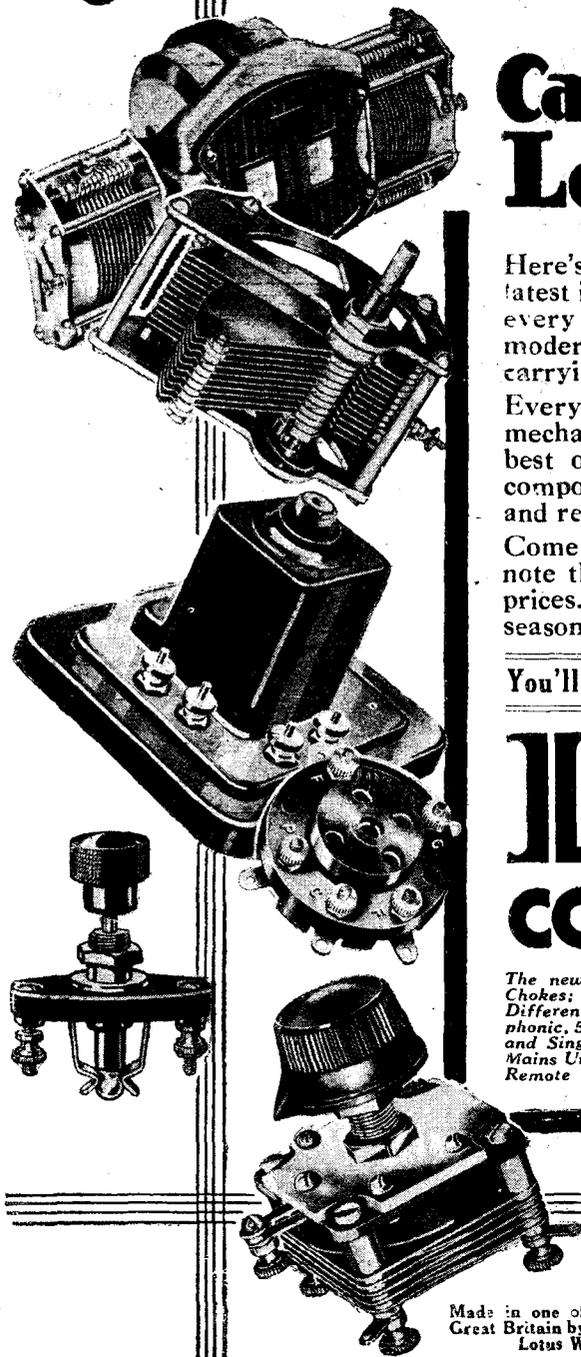
You'll be welcome at the Lotus Stand—No. 63

# LOTUS COMPONENTS

*The new Lotus range includes:—H.F. and L.F. Chokes; Power and L.F. Transformers; Reaction, Differential and Variable Condensers; Anti-microphonic, 5-pin and Rigid-type Valve Holders; Dual and Single Drum Dials, Flat Vernier Dials, All Mains Unit; Dual Wave Coils; Assembled Panels; Remote Controls; Coil Holders, Jacks, Switches and Plugs.*

Made in one of the most modern radio factories in Great Britain by GARNETT WHITELEY & CO. LTD., Lotus Works, Mill Lane, LIVERPOOL.

Send for literature.



# MODERN WIRELESS

## SPECIAL EXHIBITION NUMBER

In addition to  
A LONG ILLUSTRATED REVIEW  
OF THE RADIO EXHIBITION

the October issue of "Modern Wireless" contains a full description of four remarkable Research Department Receivers, viz.:—

The "Wave-Master" || The "M.W." DX  
The "Olympia" Three || The "Exhibition" Five

PRICE

1/-

*Special articles by*

SIR OLIVER LODGE, F.R.S.,  
CAPT. P. P. ECKERSLEY, M.I.E.E.,  
A. CORBETT-SMITH,  
VICTOR OLOF,  
etc., etc., etc.

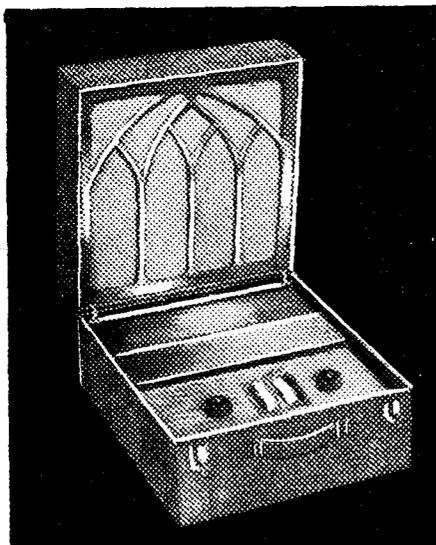
ON SALE  
NEXT  
WEEK

and a long, illustrated  
supplement,

"RADIO AND THE  
GRAMOPHONE"



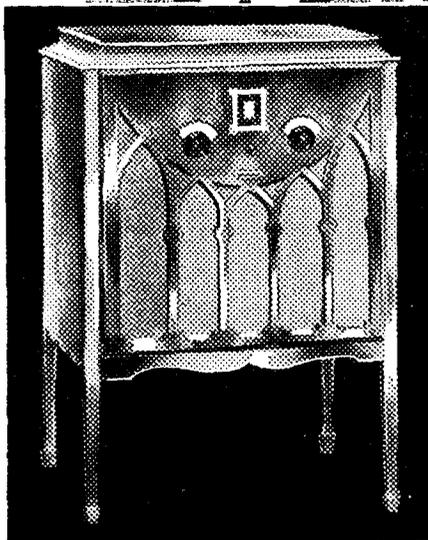
# THE NEW BURNDEPT TRIO



## THE NEW BURNDEPT SCREENED PORTABLE

The Wandering Minstrel widens his range and offers a better instrument at a lower price—the result of true economy and ripe experience. Four valves including screened grid—drum control calibrated direct into wave lengths—single switch for 225-530 and 900-2100 metres. Complete in suit case of imitation crocodile finished blue.

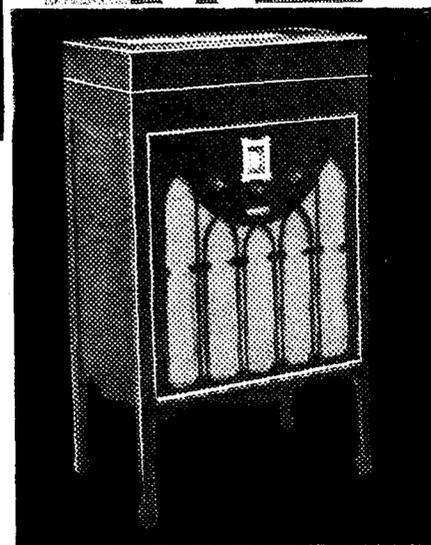
Priced at 19 gns. including royalty.



## THE NEW BURNDEPT A.C. SCREENED SEVEN

The very summit of radio perfection—in reception, reproduction and operation. Seven valves including 2 screened grid and 2 super power valves. Rotational frame aerial and a superb loud speaker in the one cabinet. **All current from the mains.** 100-240 volts, 40-100 cycles. Single switch covers 200 to 530 and 1050 to 1900 metres.

Price complete in oak 36 gns., in mahogany 37 gns. including royalty.



## THE NEW BURNDEPT A.C. ETHOGRAM

Combined self-contained Radio Gramophone, with all power from the mains for both radio and the electrically driven gramophone. The radio set is identical with the A.C. Screened Seven. The gramophone uses the new patent Burndept "Needle Armature" pick-up.

Prices complete, including royalty, 50 gns. oak. 51 gns. mahogany.

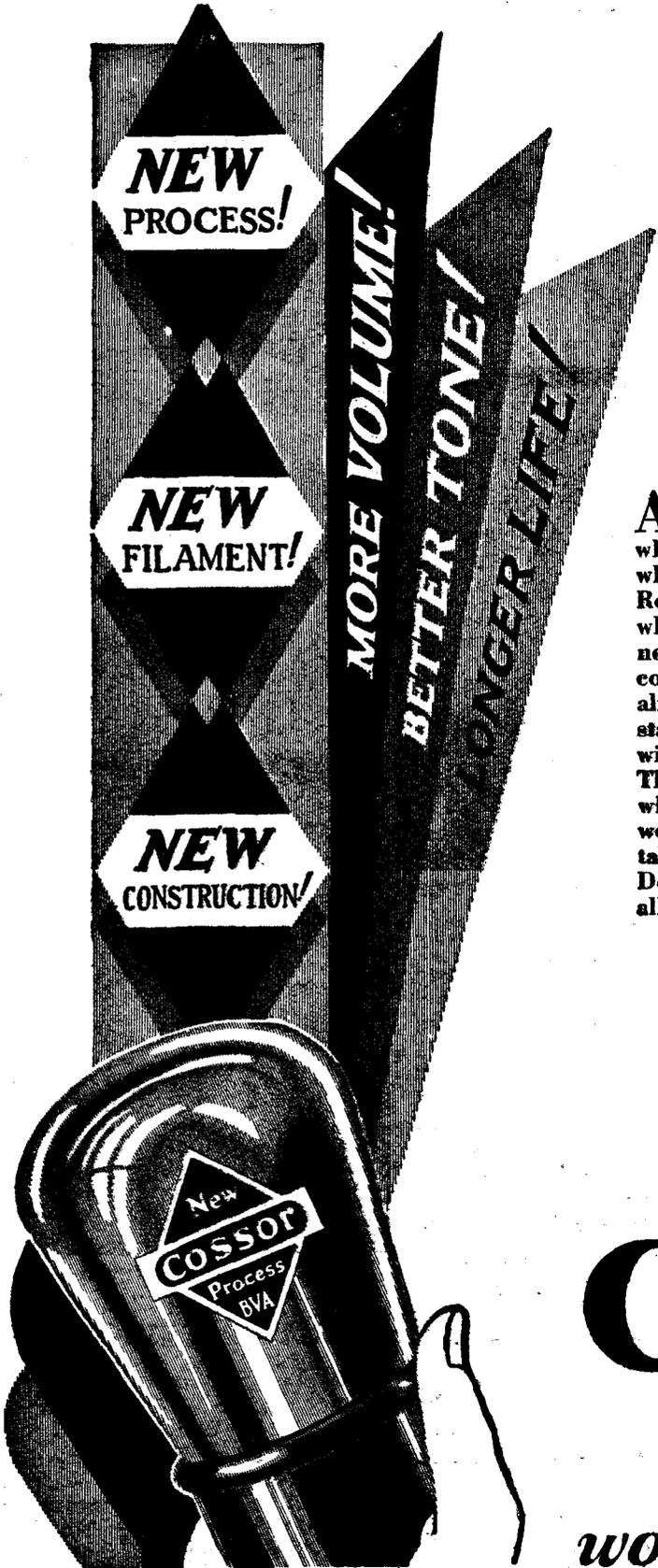
# Burndept

## PORTABLE AND ALL MAINS TRIUMPHS

See the new Burndept models at the RADIO EXHIBITION STANDS NO. 144-147.

Write for specifications and hire • purchase terms to:—

BURNDEPT WIRELESS (1928) LTD.,  
18 Eastnor House, Blackheath, S.E.3



**NEW  
PROCESS!**

**NEW  
FILAMENT!**

**NEW  
CONSTRUCTION!**

**MORE VOLUME!**

**BETTER TONE!**

**LONGER LIFE!**

# New Life for Old Sets!

**A** MILLION owners of Wireless Sets will welcome this New Cossor Valve which gives such sensational results. For when they fit the New Cossor their Receivers will perform even better than when they were new. Such exquisite sweetness of tone that is a revelation. Such colossal volume that the artiste seems almost to be in the room. Such range that stations hundreds of miles away come in with incredible ease.

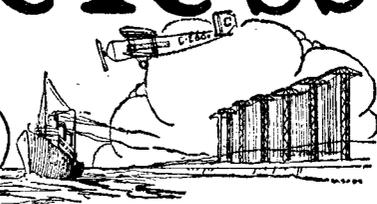
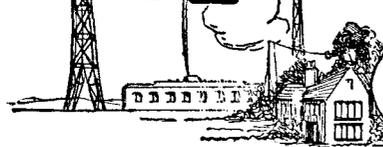
These are the results that anyone can expect when his Set is fitted throughout with these wonderful New Cossor Valves. But don't take our word for it. Ask your Wireless Dealer. He is demonstrating them daily in all the Sets he is selling.

**FREE** *An interesting 32-page booklet telling you all about the new Cossor filament—the new construction and the new high vacuum process. Ask your dealer for a copy.*

## The NEW COSSOR

*—it's a  
wonderful valve!*

# Popular Wireless



Scientific Adviser :  
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**RADIO TELEPATHY.**  
**PRIDE OF PLACE.**  
**SHAKING SHEIKS.**  
**LECLANCHE WORKING.**

**CHINA'S DEBUT.**  
**LARGE LOUD SPEAKERS.**  
**QUICK WORK.**  
**SHORT-WAVE MYSTERY.**

## RADIO NOTES & NEWS

### My Radio Return.

AT least once a year I must have a holiday from radio and all its works, for I do not favour the "busman's holiday." So I hid me to a port of Vectis a few weeks ago, and, as luck had it, there was no radio set in the hotel—to my surprise. I did not miss or even think of the B.B.C. I saw no portables, though there was one gramophone on the beach. I saw hardly more than a dozen aeriels. And on my return home I had a three hours' sessions with my set, which had quite lost its tongue, and then a friend called SOS, and I had a wrestle with a circuit such as never was on sea or land.

### "Radio" Telepathy Result.

THE most interesting facts about the result of the telepathy test mentioned in my notes for August 24th are as follow. The "telepathist" concentrated on three subjects:—(1) President Lincoln. (2) The number 397. (3) A simple drawing of a house. Some 2,000 letters were received, an analysis of which showed that over 55 per cent. of the writers correctly "saw" one subject. Of these most saw the house, and 40 per cent. the President. Only 2.5 per cent. "saw" all three objects. I will venture to draw no conclusion from these results.

### Byrd's Brazen Beacon.

THE unblushing effrontery with which the Americans claim Edison as the inventor of the incandescent electric lamp is well exemplified by the act of the Byrd Antarctic expedition in naming its airplane beacon "Edison" in honour of the fiftieth anniversary of his "invention" of the lamp. The light is at the top of a sixty-foot radio tower. Pity it cannot shed light on the real facts of Swan's work! But there's none so blind as those that see and won't admit it.

### Olymping We Will Go.

THOUGH you may forget the anniversary of your wedding-day or where you put the key of your trunk; though you may even forget the hour of closing, so that thy tongue shall cleave unto the roof of thy mouth; if thy right hand forget its cunning and if you, oh young feller! forget the telephone number of that girl you met at the seaside, let us not forget the Radio Show at Olympia and the "P.W." stand there. September 23rd to October 3rd:

11 a.m. to 10 p.m. Entrance 1s. 6d., except Tuesdays, when it is 2s. 6d. up to 5 p.m. Horrid fun, this show!

### Pride of Place.

MENTION of a telephone number reminds me of a little competition recently held by two non-Anglo-Saxon inhabitants of New York. It was observed by a Mr. Zzyk that a Mr. Zzyn had the proud position of last man in the New York Telephone Directory. Feeling that the honour of the Zzyks was at state he changed his name by Deed Poll to Zzyx in order to oust Mr. Zzyn. But his devilish ingenuity fell short of perfection, and it is now anticipated that Mr. Zzyn will change his name to Zzyz and thus vindicate his right to the coveted place. I wonder whether New York has a Mr. Zzzz, though!

### Shaking Up the Sheiks.

I READ that the French Resident-General in Morocco has persuaded the General-Director of Education there to organise broadcast radio teaching for the children

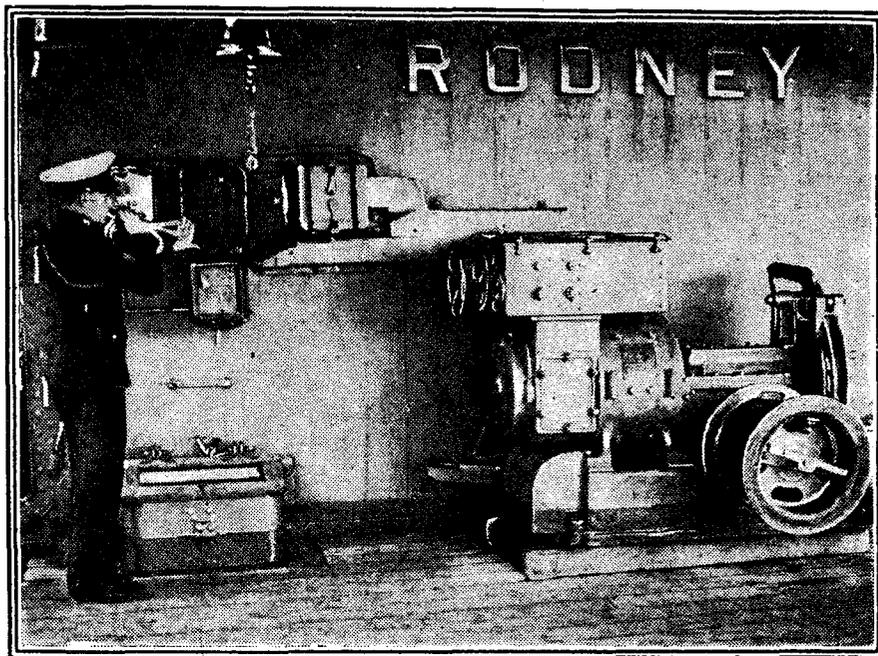
of colonists who live far from any school. This idea is excellent, but there is nothing to prevent the gentle native from eaves-dropping upon French culture, and so we may in time be hard put to it for a supply of really primitive sheiks such as have hitherto agitated the breasts of our flappers.

### Radio and the Blind.

WHILST attending the performance of a concert party at the seaside not long ago, I was struck with the great enjoyment displayed by a blind man who sat next to me. Seeing that he was a jovial and friendly sort of person, I made bold to ask him how it was that he appreciated so highly an item which to a very great extent was spectacular, and he explained that several years of listening-in to broadcast matter of many varieties had stimulated his imagination so much that he could "see" a show with his mind's eye, especially if a friend briefly described

(Continued on next page.)

### RODNEY'S RADIO REVEILLE.



Three hundred loud speakers—the biggest collection on any ship in the world—are fitted on H.M.S. "Rodney," and here the bugler is shown sounding a call which is re-broadcast simultaneously in every part of the ship.

## NOTES AND NEWS.

(Continued from previous page.)

its main features. This must be encouraging to all workers on behalf of the blind, and interesting to everybody.

### Berlin 'Bus Broadcasts.

THE "Morning Post" reports the latest threatened incursion of radio into the open air, namely, the proposal to equip Berlin 'buses with receivers. I like radio, but there are times and places in which I am not attuned to its delights, one being when I am in a 'bus. Possibly the Berliners are made of sterner stuff. I find the average 'bus-conductor sufficiently facetious for my requirements, and if he had broadcast matter on which to sharpen his wits I should be forced to bash him or be bashed.

### Leclanché Working.

THE idea of running the valves (L.T.) direct from Leclanchés rather than using these cells for charging accumulators seems to have been hit upon by a number of people. Two typical instances: G. J. R. (Newark) uses half-gallon cells and finds them quite O.K. This reader also uses small Leclanchés for his H.T. G. J. R. runs a super-het, and is quite happy in his independence of accumulators and mains.

### Some Practical Experiences.

D. P. (Manchester) works the filaments of a three-valver (S.G., Det. and Power) from two No. 222 "A.D." wet cells made by Le Carbone, Portslade, Sussex. His set works about five hours daily, during which the voltage drops only 0.1 on load, apparently in a gentle curve. He has replaced the elements once in eighteen months. The cells are neither cheap nor small, but they solve the problem for people who cannot get accumulators charged. By the way, G. J. R.'s cells come from Atlas Carbon & Battery Co., 56, Southwark Bridge Road, S.E.1.

### China Enters the Radio Field.

VERY ambitious plans are being made for an extensive programme of radio activity in China, according to an American report.

A prominent official, Dr. Tsa Tso, is making a survey of radio stations in the U.S.A., and is purchasing equipment for two short-wave stations in China. These will be the most powerful stations in Asia—at least they Tsa Tso!

### Large Loud Speakers.

THAT giant loud speaker at the Science Museum at Kensington, to which I referred the other week, is on the lines of one which the designer had previously built for his own private use. This gigantic effort is built on the roof of his house, mouth downwards, the sounds being transmitted to the room underneath, through a grating in the ceiling. If you're under that ceiling you're practically inside the instrument. In fact this speaker really does "put the lid on it!"

### High Power for Vatican Station.

REPORTS from Rome indicate that the Vatican wireless station, about which there has been much speculation, is to have a power of 20 kilowatts. This will place it fairly high among Europe's trans-

mitters, so far as brute strength goes. For telephony only short waves are to be used, the suggested wave-length being somewhere in the band between 15 and 45 metres.

### Manchester's Forthcoming Radio Exhibition.

NEARLY £200 is being offered to amateur set builders in the form of prizes at this year's Wireless Exhibition at Manchester. The show opens on October 16th, at the City Hall, Deansgate, Manchester, and visitors there will have the opportunity of hearing the competing sets receive the programmes from 2 Z Y.

This is the first time that the public has been invited to hear the handiwork of the competitors, and already great interest is being shown in the competition.

### Quick Work.

OCEAN stockbroking is now an accomplished fact, and all the big liners will sooner or later be fitted with radio tape-machines. Whilst the "Majestic" was on her way from New York to Southampton

## SHORT WAVES.

"Buy a wireless set for your car," runs an advertisement. This, of course, will allow the motorist to pick up pedestrians with even greater ease.

What radio component does a beauty parlour expert represent?  
A transformer.

Isn't it quaint that the town that sends out speeches by wireless to loud speakers, Daventry, should have for its M.P. the Speaker, who doesn't speak?—"Daily Mail."

A Gold Coast correspondent writes as follows: "Having heard of your loving-kindness torids all men, I am very bold gentleman and praying you despatch f.o.b. on reliable wireless receiver and assisting bits, such as batteries and insetera. In return, I will sending my likeness and faithfully reporting all heard here on receiver aforesaid and may God Almighty ever bless."

Mrs. Jones' neighbours have just nicknamed her baby daughter "2 L.O."—because they can hear her miles away.

Radio Salesman:  
"And now that she's hooked up, I'll show you how to 'tune' this radio."

Buyer:  
"I really don't see what you mean. For here I've bought a new machine. That hasn't even played a note. Nor made the faintest sound remote. So tell me, Mister, why and how it needs the slightest 'Tuning' now."

A South-Norwood reader writes to say he is delighted with the results obtained from his set. He says he can easily get forty stations—all at once.

A senile old farmer named Vaughan said: "I listen each night till the daughan: For they radio jokes Makes Oi laff till I chokes— For I heered 'em all 'fore I were baughan!"

the other day a brokerage message was handed in on board asking for a certain quotation. The reply to that was in the hands of the passenger concerned two-and-a-half minutes after he had handed in his request!

### Big Station for Bordeaux.

IT is only about twelve months ago that the French broadcasting authorities, becoming discontented with progress in France, announced a general gingering-up to begin forthwith. Already several changes

for the good have been made, and now I hear that the Bordeaux-Lafayette Station is hoisting its hose in an effort to beat all records. Instead of the present 1 kw., the new station now under construction is to have a power of 35 kw., so Toulouse and Radio Paris will have to look to their laurels.

### Two-Fold Transmissions.

THIS idea of a telegraph or telephone station sending out a simultaneous programme of music on a different wave-length has tickled the Dutch to death. The Bandoeng Station has already tried it, and the resulting reception in Holland was all that could be desired. Then Kootwyk had a go in the other direction, and again every note and every word was distinct—in fact, they say that nothing could be clearer than this double Dutch!

### Isn't That Nice?

THE Juan-les-Pins Station, situated near Nice, has never been picked up particularly well in this country. Apparently it hasn't been any too good at Nice, either, for it has now been decided to scrap it and build another station near by to work on greater power. Stronger on its pins, as you might say.

### Radio Odds and Ends.

APPARENTLY the experimental transmission of weather maps by the Fultograph system, recently terminated, has been a great success.

According to figures recently issued by the Postmaster-General, the number of British licences is now nearly three million.

A Soviet expedition is starting for Franz Josef Land, in the Arctic, to establish a wireless station there.

Preliminary plans have been made for a wireless exhibition to be held in Waverley Market, Edinburgh, from November 12th to 22nd next year.

The P.M.G. recently stated that the Beam Wireless services had up to March 31st earned £813,100, at a cost of £538,850.

### Algeria's New Station.

I HEAR that the new broadcasting station for Algeria is situated about 18 kilometres south of that place, and is to work upon a power of 12 kilowatts.

The programmes are to cater for the Arabs as well as the French, and it is hoped to broadcast some of the old "Grenadas," which are native songs imported hundreds of years ago from Spain by the Moors when expelled from there. So once again those ancient ballads will cross the blue Mediterranean—this time by radio. It's a queer world, my masters!

### Mysterious Short Waver.

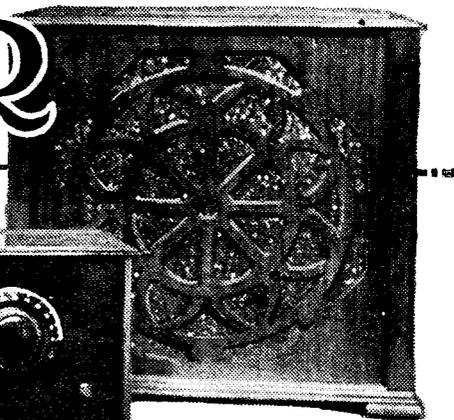
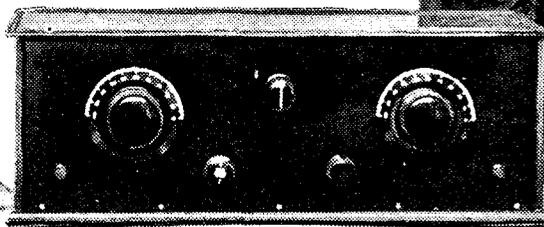
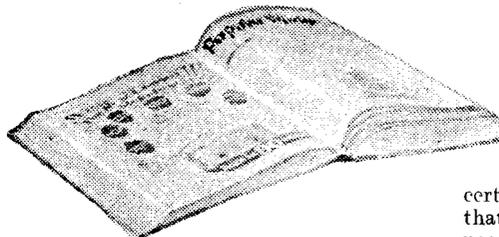
E. J. M. M. (Coatbridge) is mystified as to the identity of a station which he heard on September 1st, 10.0 to 10.30 p.m., working on about 24 or 25 metres. The operator said that it was 7.15 a.m., spoke like a Cockney living in America, and alleged, so E. J. M. M. thought, that "Milan" was calling. If I had heard that lot I should have gone on the water-wagon. The station was probably 2 ME (Pentland, Australia) testing with Rugby. Wave-length probably 28.8 metres.

ARIEL.

# The "P.W." FOUR

A remarkably powerful and up-to-date receiver of high selectivity.

Designed and Described by  
THE "P.W." RESEARCH AND CONSTRUCTION DEPARTMENT.



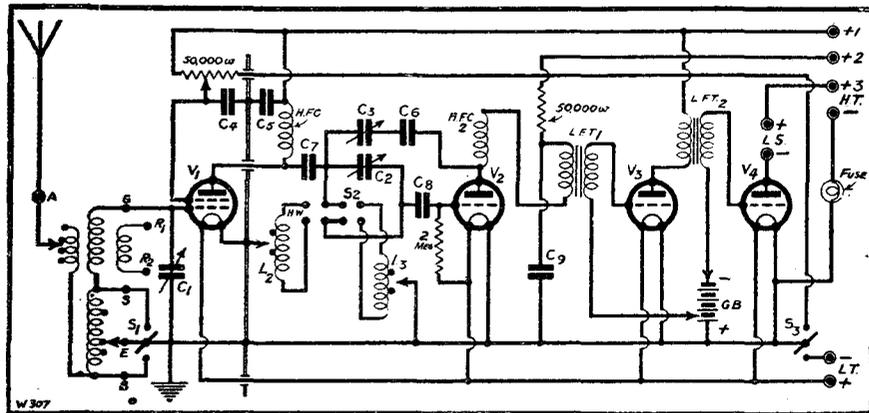
THERE is not much doubt about what is going to be the greatest need of this coming radio season. Greater selectivity is going to be the characteristic which all our long-distance sets must have. This problem of getting high selectivity and yet retaining all the good features

certain drawbacks when it is remembered that designs for the home constructor are necessarily produced under a severe limitation as to cost. Another which we have found to hold out considerable promise of success is a scheme applicable only to circuits incorporating two low-frequency stages.

The idea is this: In, say, a four-valve receiver with a single stage of H.F. design that H.F. stage so as to obtain high selec-

more to normal the overall amplification of the receiver. With the aid of modern methods for the stable use of two low-frequency transformers in cascade this becomes quite a practicable method.

**SEE THIS SET**  
on  
**STANDS 246 & 249**



of a thoroughly practical design is one upon which the "P.W." Research Department has expended a great deal of time all through this summer, and we believe that we have got the question pretty well mapped out by now. Not much of this work has been published, and indeed, the only result which has been seen so far has been the "Kuttemout" Two.

### Limitations of Cost.

Now, we have found that there are several methods of approaching this problem of greater selectivity, the first and most obvious one being to weaken the various couplings in the receiver which govern selectivity.

However, it has been our experience that if this method alone is employed the result is none too good in most cases, because by the time we have gained selectivity sufficient for our purpose the general performance of the set has fallen off more than we consider permissible.

Another and more promising method is the one on which we have spent most of our time, namely, the development of special circuits incorporating one or more additional tuned circuits over and above the number commonly employed in the past.

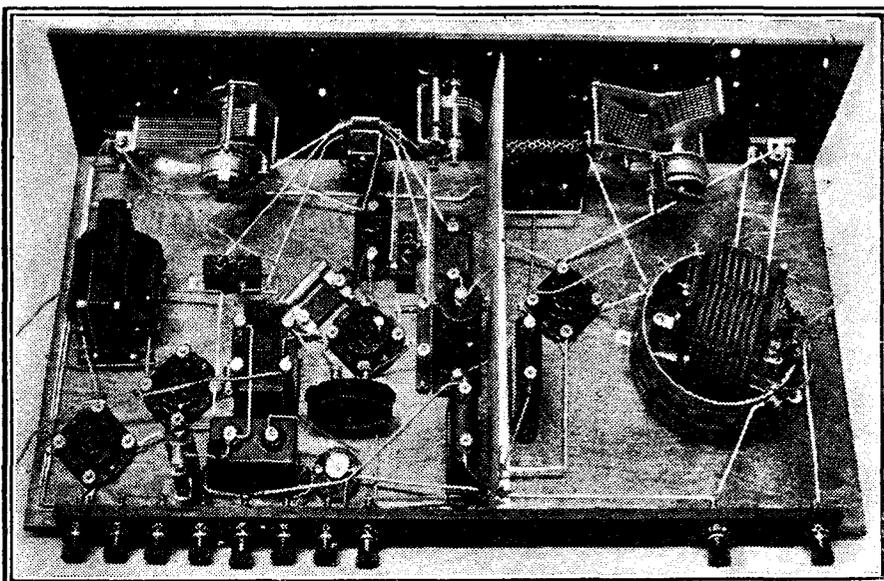
Good as this method is, giving a tremendous lift-up in selectivity, yet it has

tivity by using the weakened coupling method with its attendant drop in volume, and then add an extremely powerful low-frequency amplifying side to bring up once

The advantages of this method of gaining selectivity are fairly obvious. It adds scarcely at all to the cost of the finished receiver and again it does not make it appreciably more difficult to operate, since we still have only the two tuned circuits to which we have been accustomed.

We have been so impressed with the many attractions of this comparatively simple solution of the problem, in so far as it relates to the four-valve receiver, that we have decided to use it in the receiver which we are illustrating this week and which, of course, forms "P.W.'s" main contribution to the sets at the Olympia Exhibition. This receiver has been tested out in a great variety of ways, both under actual reception conditions and on our special artificial method of investigating selectivity questions, and it has given an

(Continued on next page.)



There is a good deal of wiring to be done, but a nicely spaced layout makes it quite easy.

# THE "P.W." FOUR.

(Continued from previous page.)

account of itself which we regard as more than satisfactory. As a matter of fact, it has really behaved exceptionally well, giving a degree of selectivity extremely

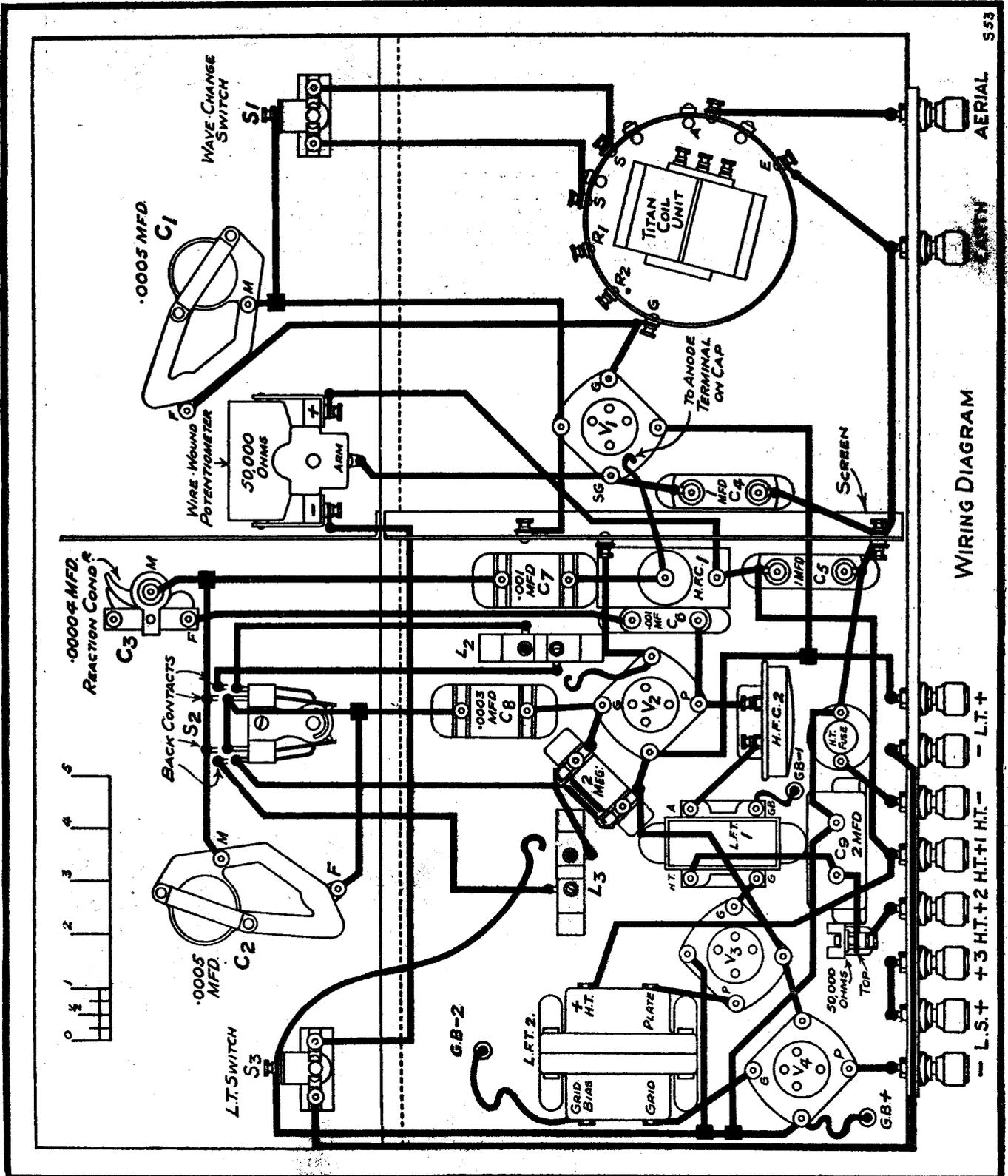
difficult to obtain with a single stage of screened-grid H.F., yet at the same time providing ample volume on distant stations with great ease of tuning.

For the benefit of those who like to know how their set works, and what gives it its special characteristics, we will just run briefly over the circuit and explain as simply as possible how it is put together. First of all, it is to be noted that among

the attractions of this receiver is the fact that it has wave-change arrangements, so you must be prepared to see a little switching.

Starting at the aerial end of the set, you will notice that a "Titan" coil of the standard type provides the tuned-grid circuit for the first valve and also the necessary aerial coupling arrangements. It is here that we find our first arrangement

(Continued on next page.)



## THE "P.W." FOUR.

(Continued from previous page.)

for getting selectivity by means of weakened coupling, for the "Titan" coil has an adjustment for aerial coupling which is capable of being varied over quite a wide range.

If you examine the coil unit you will find that there are upon it two flex leads, one coming away from the A terminal, and the other from the E terminal. The

### COMPONENTS AND MATERIALS REQUIRED.

- 1 Panel, 21 in. × 7 in. (Becol, Ripault, "Kay Ray," Resiston, Keystone, Trelleborg, etc.).
- 1 Cabinet, with baseboard 10 in. deep (Keystone, Raymond, Pickett, Cameo, Lock, Gilbert, Digby, Bond, etc.).
- 2 .0005-mfd. variable condensers (Dubilier, Lotus, Lissen, Igranic, Utility, J.B., Colvern, Gecophone, Raymond, Cydon, Formo, Ormond, Pye, Brandes, etc.).
- 1 .0001-mfd. reaction condenser (J.B., Lissen, Keystone, Cydon, Letus, Utility, Ormond, Formo, Raymond, Dubilier, Magnum, etc.).
- 2 3-point on-off switches, wave-change type (Ready Radio, Bulgin, Wearite, etc.).
- 1 Double-pole two-wayswitch (Wearite).
- 1 50,000-ohm. wire-wound potentiometer type resistance, panel mounting (Varley, Igranic, etc.).
- 4 Sprung valve holders (Benjamin, Igranic, Lotus, Magnum, Wearite, Pye, Precision, Bowyer-Lowe, Burndept, etc.).
- 1 Titan coil unit (Wearite, Paroussi, Ready Radio, Magnum, Keystone, Goltone, etc.).
- 2 1-mfd. condensers (Lissen, Dubilier, Ferranti, T.C.C., Hydra, Mullard, etc.).
- 1 2-mfd. condenser (T.C.C., etc.).
- 1 .001-mfd. fixed condenser (Dubilier, Lissen, Goltone, Clarke, T.C.C., Igranic, Mullard, Magnum, etc.).
- 1 .001-mfd. ditto (T.C.C., etc.) (Edge-wise-mounting type).
- 1 .0093-mfd. ditto (Dubilier, etc.).
- 1 2-meg. grid leak and holder (Ediswan, Igranic, Lissen, Dubilier, Mullard, Loewe, etc.).
- 2 Single-coil holders (Wearite, Lotus, Igranic, Magnum, Raymond, Keystone, etc.).
- 1 50,000-ohm resistance and holder (Cosmos, Ferranti, Lissen, Igranic, Dubilier, Mullard, Precision, etc.).
- 1 H.T. fuse (Magnum, Ready Radio, Igranic, etc.).
- 1 H.F. choke suitable for parallel-feed circuit (This is H.F.C. 1.) (Lewcos, R.I., Wearite, Varley, etc.).
- 1 H.F. choke (Igranic, Lissen, Dubilier, Bowyer-Lowe, Varley, Magnum, R.I., Raymond, Climax, Lewcos, Wearite, etc.).
- 2 L.F. transformers, low ratio. (R.I. "Hypermu" and Ferranti A.F.3 in set. A few other good makes are these: Varley, Lissen, Brown, Cossor, Philips, Igranic, Mullard, etc.).
- 1 Standard screen, 10 in. × 6 in. (Ready Radio, Paroussi, Keystone, Magnum, etc.).
- 1 Terminal strip, 19 in. × 2 in. × 1/4 in.
- 10 Terminals (Igranic, Eelex, Belling & Lee, Clix, etc.).

one from the A terminal can be attached to tappings upon the low-wave aerial winding by means of a plug-and-socket scheme, tapping clips, or other means chosen by the particular manufacturer, and by working on the 5- or 8-turn point we get the effect required in the present receiver. On the longer waves we manipulate the flex lead from the E terminal, which goes to a certain tapping point on the loading coil. Highest selectivity is obtained on the No. 25 tapping and this is the usual point for the present receiver.

The screened-grid H.F. valve is coupled to the detector by what is known as the parallel-feed system, the anode circuit of the valve containing a high-frequency choke, and a "feed" lead comes from the anode and passes through a fixed blocking condenser to the tuned grid circuit of the detector valve. To obtain the full magnification of the valve regardless of selectivity it is usual to employ quite tight coupling here, the feed lead often going direct on to the grid end of the detector circuit. In the present circuit we have included only a portion of the tuned-grid circuit in the parallel-feed arrangement, thereby obtaining a considerable increase in selectivity at the sacrifice of actual amplification. The sacrifice of actual amplification at this stage, as we have already explained, is fully made up at another point, as we shall see presently in greater detail.

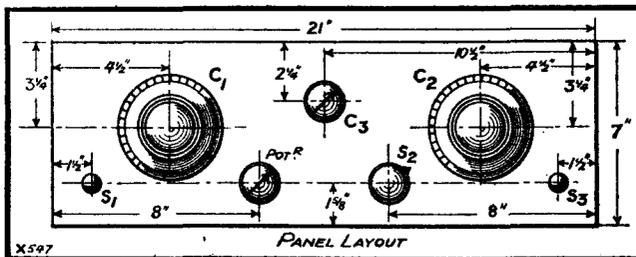
### Standard Coils.

We have found in practice that very suitable coupling effects for this circuit can be obtained with standard X coils, and one of these is used for each of the two main wave-length ranges. The whole of the coil is tuned in the normal manner, and just the X coupling portion is used for the parallel-feed effect, which we find is a very excellent combination of moderate amplification and high selectivity. This portion of the coil is also used for reaction purposes, so that only a single-coil unit is used in the intervalve circuit for each wave-range.

To get the desired wave-change switching in this circuit we have used two entirely separate coils, one for each wave-range,

and a complete change-over is effected from one to the other, so that the one not in use is cut completely out of circuit in so far as its two ends are concerned. The earthed tapping point remains connected up, but since this is "dead," it cannot do any harm.

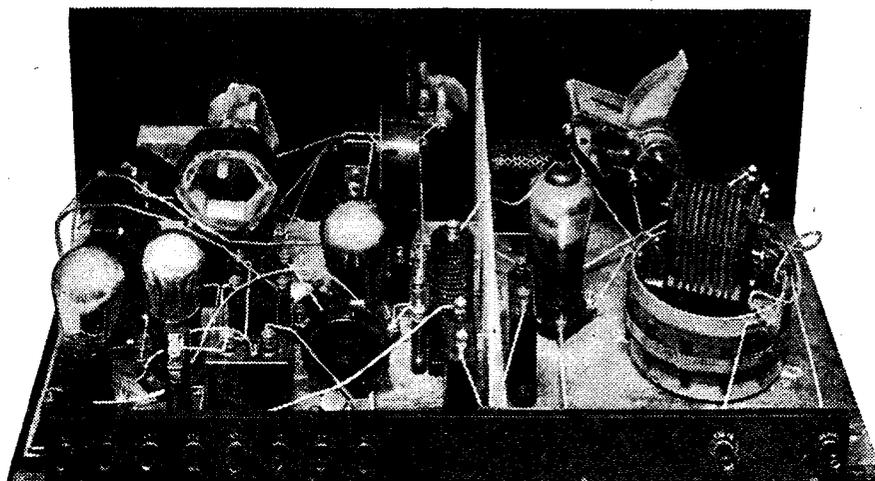
A double-pole change-over switch is



required, but by using one of the single-hole mounting type, we have avoided any awkward constructional work here. The two coils, you will notice, have been placed very carefully in the layout, so that interaction between the live and the dead one is prevented, and altogether we find this change-over scheme a very efficient one.

### Powerful but Stable.

Following upon the detector we find our powerful L.F. amplifying arrangement, which brings the overall magnification of the receiver well up to the proper standard for a modern four-valver of any type giving even moderate selectivity. Actually, we think it is slightly above that of the normal four-valve receiver, and, of course, in the present case we have as well the valuable feature of really good selectivity. There is nothing very magical about this L.F. side. It consists simply of two transformer-coupled stages, using two good modern high-amplification transformers, carefully arranged as to their layout to obtain stability, and with an accompanying anti-battery-coupling device for the detector valve. This latter consists of the usual series resistance in the H.T. lead to this valve, of any value from perhaps 30,000 to 60,000 ohms, and a 2-mfd. bypass condenser down to the L.T. circuit. If you like to be doubly sure of perfect stability, you can make this condenser one of 4-mfd. by adding another 2-mfd. in parallel, but the value actually given is quite enough for most practical purposes. We shall have more to say on these points next week.



The flex lead to the top of the S.G. valve is an important one. Keep it direct and well clear of all others.



A recent photographic portrait of Capt. P. P. Ekenley, M.I.E.E., who, on relinquishing the post of Chief Engineer of the British Broadcasting Corporation, joins the staffs of "Popular Wireless" and its contemporaries, "Modern Wireless" and "Wireless Constructor."



# Capt ECKERSLEY JOINS OUR STAFF

In this article some very important announcements of vital interest to all readers are made.

By THE EDITOR

I HAVE a very important announcement to make in this issue of POPULAR WIRELESS—an announcement which I feel sure will greatly interest all our readers. Captain P. P. Eckersley, whose resignation from his post as Chief Engineer of the B.B.C. will come into effect in a few weeks' time, has accepted an appointment on the staffs of POPULAR WIRELESS and its contemporaries "The Wireless Constructor" and "Modern Wireless," as Radio Consultant-in-Chief.

Negotiations with Captain Eckersley have been going on for some time now, but the other day the final points were settled and I am happy to state that, from October 1st, Captain Eckersley will definitely be a member of our staff.

### Exclusive Articles.

In addition to accepting the post of Chief Radio Consultant, arrangements have been made with Captain Eckersley for the exclusive publication of his articles in this journal and its contemporaries. This means that only in the "Big Three," i.e. POPULAR WIRELESS, "The Wireless Constructor" and "Modern Wireless," will, in future, be published technical articles from the pen of Captain Eckersley; with the exception, of course, of engineering papers which he will probably write from time to time for publication either in pamphlet form or in the journal of the Institution of Electrical Engineers and other Societies.

As well as contributing week by week a technical article to POPULAR WIRELESS, and month by month technical articles to "The Wireless Constructor" and "Modern Wireless," a special feature will shortly be inaugurated in POPULAR WIRELESS, to which I have given the general title of: "Captain Eckersley's Query Corner." This does not need a great deal of elaboration, for the title is practically self-explanatory. In brief, however, I might explain that

this weekly feature will consist of a selected number of readers' queries chosen from our correspondence by the chief of the Queries Department, together with Captain Eckersley's answers.

### Replies to Readers.

I want to make it clear, however, that readers who write direct to Captain Eckersley, forwarding radio problems, must not expect to have them answered. It is naturally impossible for Captain Eckersley to answer every reader's query, and it struck me as a fair way, and a generally interesting way, when I talked this feature over with Captain Eckersley, that our

begin cannot be given here, but I anticipate, if all goes well, that we shall be able to publish the first of Captain Eckersley's Query Corner features the first or second week in October, and from then straight on throughout the year and until further notice.

The technical staff of POPULAR WIRELESS will benefit by Captain Eckersley's long and varied experience in connection with all problems of wireless transmission and reception. Already we enjoy the unrivalled advantage of being in a position to consult our Scientific Adviser-in-Chief on radio problems which involve a knowledge of higher physics, and on more than one occasion we have found the advice and help of Sir Oliver Lodge of inestimable value.

## GOOD NEWS FOR READERS!

Every "P.W." reader benefits by the latest and greatest addition to our staff —no less than

**CAPT. P. P. ECKERSLEY,**  
The World's most Popular Radio Engineer!

Queries Department should select each week six of the most generally interesting queries received from readers, which should be passed on to Captain Eckersley for his personal attention.

### The Special Query Feature.

These queries will be selected with a view to providing all-round interest for readers. This is the first time Captain Eckersley has ever conducted a feature of this nature, and it will only be in POPULAR WIRELESS that readers will have the benefit of noting his comments and remarks on selected queries we have received from our readers. The exact date when this feature will

### To Assist Research Department.

In the more practical side of radio which the average radio constructor encounters, we anticipate that the advice we shall ask Captain Eckersley to give us from time to time on outstanding and knotty problems of radio in connection with our service bureau to readers, and his help and co-operation will be of the very highest practical assistance, and consequently readers will benefit in a way in which no other wireless journal in this country can assist them.

It has always been our aim constantly to improve our technical queries service and although to-day it necessitates a special staff of its own and by experience readers have learned to regard it as the soundest source of reliable and detailed information on all aspects of their hobby, we feel that the addition of Captain Eckersley to our staff again gives the prestige of the department a "lift" which will enhance its value and reputation in the eyes of our readers.

Incidentally, I should like to mention here (Continued on page 96.)

## LATEST BROADCASTING NEWS.

## THOSE TELEVISION BROADCASTS

THE FUTURE OF NEWCASTLE  
—BROOKMAN'S PARK: DATE  
OF THE FORMAL OPENING,  
Etc., Etc., Etc.

AS exclusively announced in POPULAR WIRELESS about a month ahead of any other paper, the Postmaster-General persuaded the B.B.C. to allow five periods of half an hour each outside programme time for experimental transmission of Baird television. It was made clear, however, that all the conditions laid down by the B.B.C. in the first place would have to be accepted. The Baird Company were inclined to reject the revised offer but on second thoughts decided to accept it, conditions and all.

The result is that there is to be experimental broadcasting of Baird Television from 2 L O from the 30th of September. It remains to be seen for how long the transmissions will go on. The B.B.C. is at liberty to close them down at any moment.

Herein is the end of a long and varied chapter of tumultuous relations between the Baird Company and the B.B.C. It would have been better if these broadcasting facilities had been provided earlier. In any event, late or early, it rests with the public to decide to what extent, if at all, television is to be incorporated in broadcasting.

And, of course, it is the B.B.C. that will interpret the wish of the public. This being so, and keeping in mind that the B.B.C. even now is accepting television experiments with extreme reluctance, there is a strong probability of fresh hostilities before the year is out.

## A Delius Festival.

The B.B.C. is actively promoting the Delius Festival, which will take place in London from October 12th to November 1st. All the most important and representative parts of the work of Delius are to be given under the conductorship of Sir Thomas Beecham. The B.B.C. will take advantage of this festival in order to introduce its new symphony season with a grand Delius concert, to be broadcast from the Queen's Hall, on October 18th.

## Opera Season Begins.

The new B.B.C. season of opera will open on September 23rd (5 G B); September 25th (2 L O) with Massenet's "Thaïs." The B.B.C. series this time is much more popular than any of its recent predecessors. The following are included: "Cavalleria Rusticana," "La Bohème," "Pelleas and Melisande," "Madame Butterfly," "Penelope," "Aida," and "Mignon."

## Bolton Civic Week.

Next week is Bolton's Civic Week. On Sunday, September 22nd, Civic Service will be relayed by B.B.C. stations of the North Region from the Albert Hall, Bolton, the address being given by Canon Elsee, and the singing by the Bolton Civic Choir. On

Tuesday, September 24th, a Gala Concert will be relayed by the same stations, also from the Albert Hall. At this concert, the Northern Wireless Orchestra, under the direction of T. H. Morrison, will be supported by the Bolton Choral Union, conducted by Thomas Booth, with Alan Brooks (bass).

## Future of Newcastle.

There has been a good deal of alarm in Newcastle recently because of persistent rumours that the station there is about to be closed down for good. What is actually to happen is as follows: At the end of October, Newcastle will go on the national common wave shared by the relay stations (238.5 M). This will involve the suspension, for the time being, of all programme work at Newcastle. The B.B.C. is definite, however, that when the North Regional twin-wave transmitter at Slaithwaite is working next autumn, Newcastle will have its entity

restored by means of an exclusive wave. It will be permanently the north-east outpost of the B.B.C. in England.

## Brookman's Park: Formal Opening.

It is understood that the B.B.C. will arrange a formal opening for Brookman's Park just as soon as the place is tidied up and the second wave is ready to function. There will be a little "trying on the dog" in the form of preliminary fade-in experiments at odd times, in the hope that when the great occasion does arrive, most listeners in the service area of the new station will be able to receive on and separate both waves.

The earliest date for the formal opening is in December; but the event may not be staged this side of February. If his public engagements permit it, it is likely that the Prime Minister will attend, accompanied by many dignitaries including, of course, the Lord Mayor of London.

The Earl of Clarendon and Mrs. Philip Snowden, supported by the other Governors of the B.B.C., and Sir John Reith, will receive the guests. It is thought improbable that the presence of Royalty will be sought for this occasion. Suggestions of this kind are being made in connection with the formal opening of Broadcasting House, in Portland Place, in February or March, 1932.

## Motspur Park

It has become a cause of bitter complaint at Savoy Hill that, after spending much money and effort in providing a sports ground for the staff at Motspur Park, the B.B.C. will not let anyone get near it at times when games are possible.

Whoever is responsible should remember that all work and no play makes Jack a dull boy. . . .

## AN UNCLE FROM AMERICA.



"Uncle Robert," one of America's most famous announcers, is here shown in London. His lectures to children on the dangers of traffic dodging have won the gratitude of thousands of parents in the U.S.A.

## TECHNICAL NOTES.

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

## THE PROPERTIES OF ELECTRICITY

MINIATURE SOLAR SYSTEMS—ELECTRON STREAMS, Etc.

DISCOVERIES and developments follow one another with such rapidity in radio science that we are apt to forget that progress is being made in other departments of science at a rate which really is equally astonishing. I am thinking more particularly of the investigations which are being carried on at Cambridge and elsewhere into the nature and properties of electricity and matter. A very interesting article on this subject appeared in "Modern Wireless" just recently.

It seems only a short while back that we were taught to regard the electron as the ultimate unit of matter. Matter consisted of molecules, which in turn were composed of atoms, whilst the atom was a miniature solar system comprising an aggregation of negative electrons and positive protons. Since the atom as a whole was normally uncharged electrically, it was presumed

that the total negative charge of the electrons was equal to the total positive charge of the protons.

## Electron Streams.

Occasionally an electron may escape from an atom, leaving the atom therefore positively charged, and there appears to be no doubt that under certain conditions—as in a highly evacuated vessel—streams of electrons may be produced, these electrons being entirely free from any atoms of associated matter.

This was the state of scientific knowledge which obtained for some considerable time, although continual efforts were being made to discover the nature of the electron itself, and in particular to find out whether the electron was composed of still smaller particles.

(Continued on page 100)



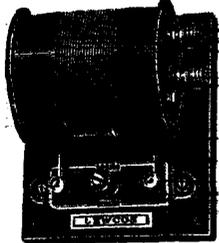
# The RADIO EXHIBITION

**AMALGAMATED PRESS, LTD.**  
Stands Nos. 246 and 249.

No Reader of "P.W." should fail to pay a visit to these stalls, where POPULAR WIRELESS and its contemporaries MODERN WIRELESS and THE WIRELESS CONSTRUCTOR are making special efforts to help and interest visitors.

The opportunity should be taken to get those knotty little points settled once and for all which are so difficult to deal with by correspondence, for there will be technical experts in attendance all the time whose sole duty and pleasure will be to discuss radio difficulties with readers.

There will also be the original models of such famous sets as the "Titan" Three, on view for all to see and examine. The "P.W." Four which is described in this issue is also there. Visit stands 246 and 249 early, for they are sure to attract crowds of people.



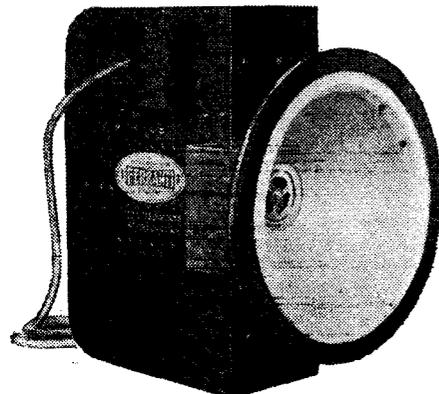
A wave-trap designed in accordance with the "P.W." specification is shown by the London Electric Wire and Smiths Co. Ltd.

ished circuits, so that they are making a special feature of inductances for home-assembly sets. They also specialise in ebonite skeleton formers having very low losses.

R. and J. are prominently displaying a wave-trap covering the broadcast band which is said to be more than usually efficient.

**BEDFORD ELECTRICAL AND RADIO CO., LTD.**  
Stand No. 45.

The main exhibits on this stand are the well-known Peerless portable five-valve receiver, and the Peerless four-valve screened-grid receiver. The suitcase model five is of particular interest in that the chassis and panels are pressed in one piece from sheet metal. There is only one tuning control and the set is fitted with an unspillable accumulator. The circuit employed comprises two H.F.'s, detector and two L.F.'s. The Peerless four-valver has one S.G. H.F. valve and is of the transportable variety.



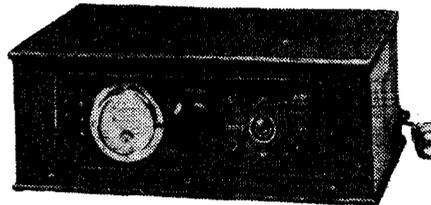
One of the most interesting of the new productions shown at Olympia is the Ferranti moving-coil loud speaker.

**This year more firms than ever are exhibiting at Olympia and visitors are assured of a most interesting show. As this stand-to-stand view of the exhibits indicates there are many new and fascinating radio sets and accessories being displayed. Also "P.W." readers are cordially invited to visit the "P.W." Stands, Nos. 246 and 249.**

**BELLING & LEE, LTD.**  
Stands Nos. 263 and 264.

A remarkably fascinating display of terminals, plug sockets, wander plugs and other such articles. They are small in size but mighty useful. There is no set made that cannot use, with advantage, one or other of these Belling-Lee products.

Of particular interest is a fuse adaptor for inserting in any Belling-Lee wander plug, plug and socket, or spade and pin terminal. Other interesting items are the Belling-Lee radio legs (these are adjustable)



Mains Unit enthusiasts should make a point of visiting stands 8, 9, 10 and 11, where E. K. Cole, Ltd., are displaying a fine range of mains sets and units.

and collapsible stands or supports for converting a table set into a pedestal model at a trifling expenditure. Constructors would be well advised to linger over these stands, so that they can legislate for the inclusion of some of these ingenious items in their future sets.

**BENJAMIN ELECTRIC, LTD.**  
Stand No. 31.

The well-known Benjamin Clearer-tone, an anti-microphonic valve holder with one piece springing, is featured on this stand. It is stated that over three million of this particular model have been sold.

Other Benjamin devices on view are, a five-pin valve holder for use with the new five-pin mains valves, and a Clearer-tone valve holder with a pentode fitment (in this a special connector is provided for attachment to the extra pin on the pentode valve). Then there is a turntable for portable sets, having a ball-bearing movement, and hinged to enable the set to maintain a true level on the most uneven ground.

**BIRD & SONS, LTD., SYDNEY S.**  
Stand No. 155.

Those excellent pieces of radio engineering, Cydon condensers, are to be seen at this stand. An essentially modern note is struck with the Synchronatone twin and triple condensers. These have thumb controls and the drum drives are arranged so that they can be operated independently or collectively.

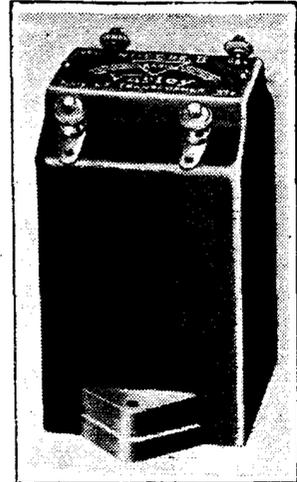
The famous Log Mid Line condensers are also on view, as well as reaction condensers, dual condensers, and short-wave condensers. Constructors also will have an opportunity of seeing double-spaced transmitting condensers.

**BOWYER-LOWE CO., LTD.**  
Stands Nos. 130 and 131.

Most of our readers will be familiar with Bowyer-Lowe productions, which are, for the most part, fine standard types of components and good sets which withstand the keenest criticism.

**BRITISH EBONITE CO., LTD.**  
Stand No. 21.

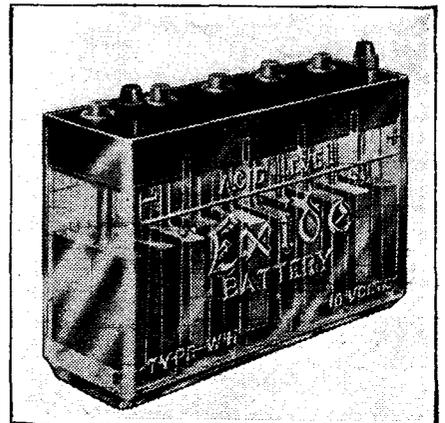
Eleven different types of Becol low-loss formers ranging in size from 1 in. outside diameter to 4 in.



This is the "Ni-Cor" II L.F. Transformer, which the Varley people are prominently featuring on their stands.

outside diameter can be inspected on this stand together with ebonite sheet, polished and mahogany panels, low-loss formers, rods, sheetings and mouldings of various sizes and descriptions.

(Continued on next page.)



One of the many different types of accumulators included in the completely comprehensive display of Chloride Electrical Storage Co. products.

# THE RADIO EXHIBITION.

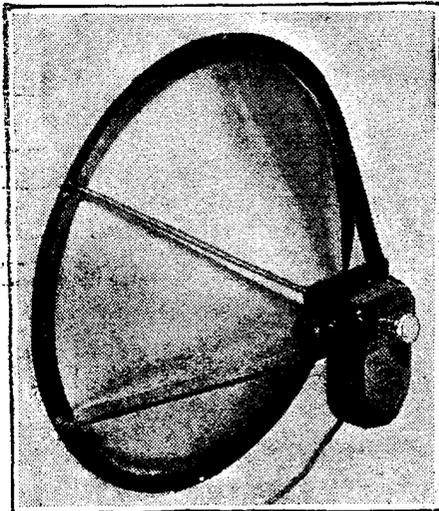
(Continued from previous page.)

## BRITISH RADIO GRAMOPHONE CO., LTD.

Stands Nos. 156 and 157.  
By arrangement with the Peto Scott Co., Ltd., this firm is exhibiting a fine range of Keystone components. Also, of special note, are combined radio and electrical gramophone outfits. These are stands that every visitor will want to linger over.

## BRITISH THOMSON-HOUSTON CO., LTD.

Stands Nos. 150 and 151.  
An entirely new pick-up and adaptor for fitting to any standard gramophone is one of the special features of the display arranged by the B.T.-H. Company,



The famous Brown "Vee" Unit and Chassis can be seen at Stands 212, 214, and 215.

which is now, with Metro-Vicks, allied to the Ediswan Electric Co., Ltd.  
There is also a new cone loud speaker and an entirely new speech microphone.

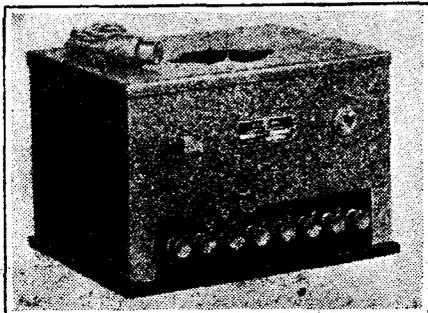
Of course, the famous R.K. loud speakers are on view. Another special item is a four-valve set which is a modern modification of the B.T.-H. 1928 five-valve outfit which achieved such popularity last year. Telephone receivers, transformers, and other components are also laid out to attract the eyes of the discriminating constructor.

## BROWN BROS., LTD.

Stands Nos. 34 and 35.  
Brown Bros. are, of course, factors, so that their stands are in themselves a small exhibition, comprising a representative collection of all that is modern in radio practice. Mains and battery-operated receiving sets, mains units, loud speakers, and all types of radio components are on view.

## BROWN, LTD., S. G.

Stands Nos. 213, 214 and 215.  
Make a note of these stand numbers, for the Brown people have some exceptionally interesting exhibits. The Brown screened-grid receivers types A and AM and B and BM are all there for the constructor to examine. These are kit receivers and the complete sets of parts with assembly details are now available at most attractive prices.  
There is a new model Brown moving-coil loud speaker that deserves at least a few minutes of a



One of the fine Metro-Vick Mains Units, which is a special feature of the display on the Metro-Vick Supplies stands.

visitor's valuable time. Then again there is the range of the Brown Duplex loud speakers which are most notable contributions to the art. And it must not be forgotten that the famous Brown VEE unit is prominently placed together with a Brown electrical pick-up and a host of other fine productions.

## BROWNE WIRELESS CO. (Gt. BRITAIN), LTD.

Stand No. 148.  
A British L.F. transformer of good quality at a price below the 10s. mark is one of the interesting items to be seen at this stand. Slow-motion dials, complete sets, valve holders, and other useful and attractive radio gear complete this show. Visitors will no doubt pay tribute to the excellent bakelite mouldings which accompany many of the Brownie productions.

## BULGIN & CO., A. F., LTD.

Stands Nos. 295 and 296.  
A very fine array of ingenious devices. The Bulgin people probably have more novelties on view than most other exhibitors. For the greater part they are small items, but for that they are none the less important and useful.

Switches figure strongly, while there are useful plug and jack devices, fuses, resistances, and radio meters for various purposes. There is an automatic indicating control which merits particular attention. It is a relay which combines the unique features of a remote control and signalling device.

## BURGOYNE WIRELESS, LTD.

Stands Nos. 50 and 51.  
Here are to be seen the Burgoyne screened-grid four receiver, a portable set using a pentode in the last stage and a four-valve all-mains transportable set utilising indirectly-heated mains valves for use with A.C.

## BURNDIPT WIRELESS (1928), LTD.

Stands Nos. 144, 145, 146 and 147.  
Here is being shown for the first time a new needle armature gramophone pick-up. This pick-up is de-

## DEMONSTRATION ROOMS.

This year visitors to Olympia will be able to hear a number of the sets and loud speakers in operation. Demonstration rooms have been secured by certain firms, the full list of these being as follows:

Name of Exhibitor	Room
Baker, A. (Selhurst Radio)	L
Bowyer-Lowe Co., Ltd.	W
British Radio Gramophone Co., Ltd.	G
British Thomson-Houston Co., Ltd.	U
Browne Wireless Co. of Great Britain, Ltd.	X
Celestion, Ltd.	C
Columbia Graphophone Co., Ltd.	N
Cosser, A. C., Ltd.	J
Dubilier Condenser Co. (1925), Ltd.	R
Ediswan Bell, Ltd.	S
General Electric Co., Ltd.	K
Graham Amphion, Ltd.	E
Igramic Electric Co., Ltd.	PL
Kolster-Brandes, Ltd.	H
M.P.A. Wireless, Ltd.	O
Marconi Wireless Co., Ltd.	D
Mullard Wireless Service Co., Ltd.	T
Ormond Engineering Co., Ltd.	M
Perfectavox, Ltd.	V
Phillips Radio	A
Pye Radio, Ltd.	B
Reproduction, Ltd.	Q
Rooke Bros., Ltd.	P
Ultra Electric, Ltd.	F
Universal Gramophone & Radio Co., Ltd.	I

signed on an entirely new principle and is quite different from any other pick-up on the market. All mechanical resonance has been eliminated by doing away with the armature, thus bringing the resonance frequency outside the audible range.

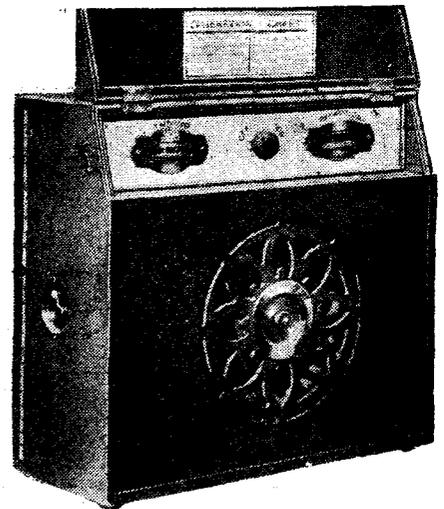
"Ethogram" radio-gramophones are to be seen as well as the Burndipt Universal screened five, a new superlative five-valve aerial receiver. And, of course, the new Burndipt screened portable receiver is there as well as the new A.C. screened seven, an A.C. mains model receiver. This instrument represents the type of receiver that is said to be entirely new to the British market inasmuch as it goes all out for an expensive specification, yet can be sold at a reasonable price in quantity production.

## BURNE-JONES & CO., LTD.

Stand No. 125.  
Prominence is here given to a range of A.C. mains receivers, radio-gramophones, portable receivers, a short-wave receiver, a short-wave converter, and a comprehensive range of components. The short-wave converter is one of the commercial developments of the famous "Antipodes Adaptor," a "P.W." production due to Mr. Kelsey which seems to have set the whole world a fashion. Among the smaller items on this stand is the Magnafilter, a selectivity device which should prove of interest in view of the inception of the new London Regional station.

## CARRINGTON MFG. CO., LTD.

Stands Nos. 270 and 271.  
Camco cabinets are attractively laid out for inspection by constructors. Here set builders will be able

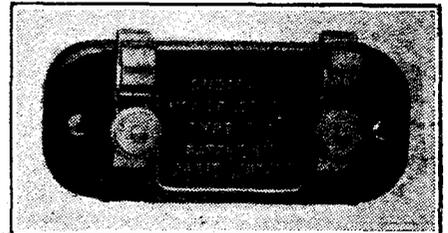


The Marconiphone people are showing this excellent portable as well as a most interesting range of new sets.

to see all types of cases for all kinds of sets. The Riverside Portable suitcase model is a Camco speciality which will cause a good many visitors to make notes re their next portables.

## CELESTION, LTD.

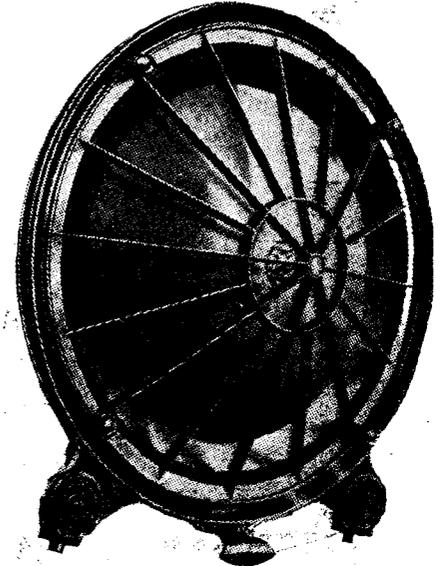
Stand Nos. 180 and 183.  
Here is to be seen a range of loud speakers which are quality productions. The Celestion people do not make cheap loud speakers but, nevertheless, they give you real value for money. Celestion has become almost a hallmark for loud-speaker design.



One of the most popular of all Dubilier products which, as the Dubilier stands reveal, include condensers for every conceivable radio purpose.

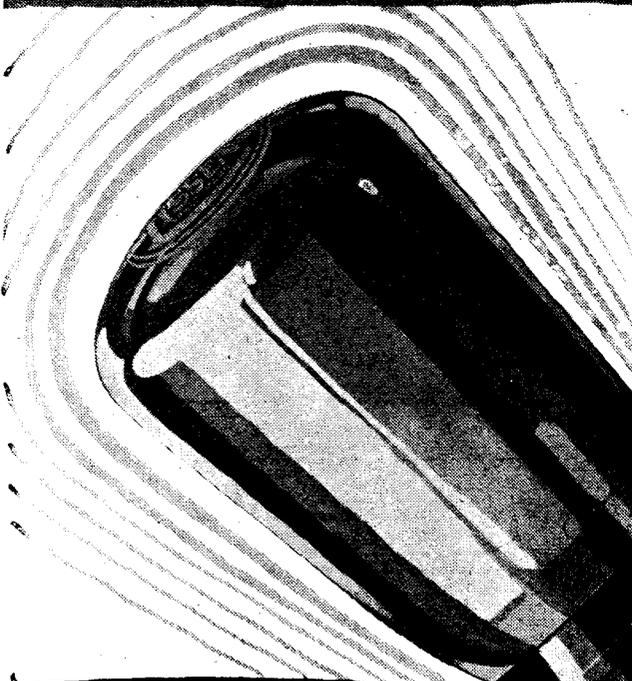
Visitors should make a note of the special diaphragm construction of the Celestion loud speakers, as this is one of their most interesting features. Celestion loud speakers are also notable for the first-class quality of their cabinet work. The Celestion people are showing, for the first time, a range of constructors' loud speakers for building into portables and cabinet sets.

(Continued on page 63.)



A Mullard Loud Speaker that is sure to attract the attention of crowds of visitors.

The Valve that **LISSEN** have been working on—now available



**FULL POWER  
AND PURITY**  
*because of*  
**TOTALLY  
CONTROLLED  
EMISSION**

**NEW PERFECTED AMALGAMATED FILAMENT—  
EMISSION SURFACE ACTUALLY ALLOYED TO FILAMENT**

**LISSEN HAVE SPENT A FORTUNE—**  
perfecting the Lissen Valve to give you music full of life, full of sparkle, song that is full of melody, and speech that reflects the personality of the speaker. You'll hear more in your radio when you put Lissen New Process Valves in your set ; because the Lissen Extended Grid controls every electron emitted from the filament, and so reproduces with more detail and definition than was possible before.

It gives you *volume* full and pure, *tone* natural and true. And the emissive surface of the filament is actually amalgamated to it, so that emission never falls off.

*What you want from radio is reality—fit Lissen New Process Valves, and then hear your radio talk to you, sing to you, play to you—the real thing all the time.*

LISSEN LIMITED, 8 16, Friars Lane, Richmond, Surrey.  
(Managing Director: T. N. COLE.)

**NEXT TIME  
TRY**

**LISSEN**  
**NEW PROCESS**  
**VALVES**

Most good radio dealers now stock the following types:—

**TYPES & PRICES**

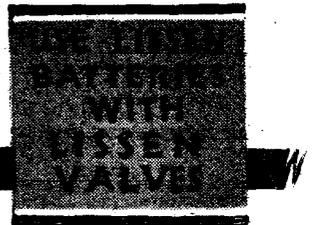
**H.210.** R.C. and H.F., 10/6

**H.L.210.** General Purpose, 10/6

**L.210.** L.F. Amplifier, 1st stage, 10/6

**P.220.** Power Valve, 12/6

All other types available shortly.

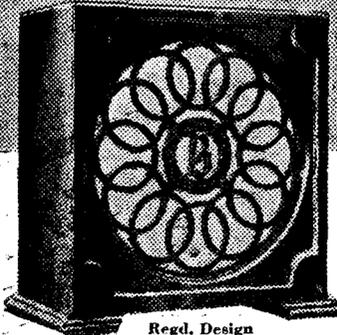
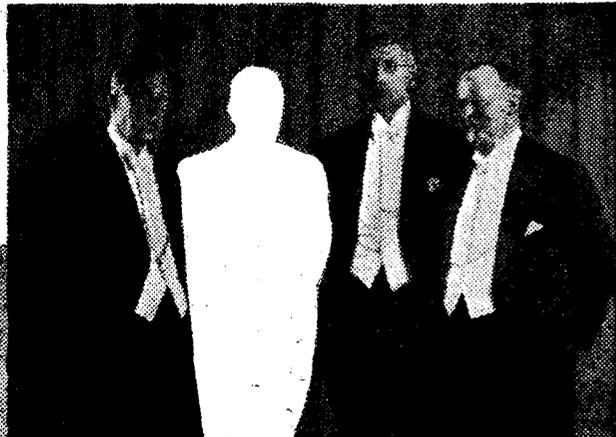


# FOUND!

# THE MISSING TENOR



The Westminster Singers



Regd. Design

BY THE  
WONDERFUL  
NEW

**T**HERE is now a loud speaker that does not cheat you of half the broadcast! In its reproduction the tenor is no longer missing. It gives you notes you've never heard before. It reveals instruments that have hitherto been silent. In short, it gives you the broadcast in your home as it is played in the studio. It is the new Brown Duplex Loud Speaker.

Because it incorporates entirely new features in design—the wonderful "Vee" Movement and the Duplex Cone—this latest Brown triumph sets a new standard in Radio reproduction. Its tone is sweeter and more mellow. Its volume is richer and more magnificent. Its appearance is finer and more handsome. Ask any Wireless Dealer!

**IN THREE MODELS:**

*Design as illustrated. Mahogany or Oak.*

V10 £5 10s. 0d. V12 £7 10s. 0d. V15 £12 10s. 0d.

*Also obtainable by easy payments, ask your Dealer for particulars.*

See them at the  
NATIONAL RADIO  
EXHIBITION  
Olympia—Sept. 23 to  
Oct. 3. Stands 213-4-5

# Brown

## DUPLEX LOUD SPEAKER

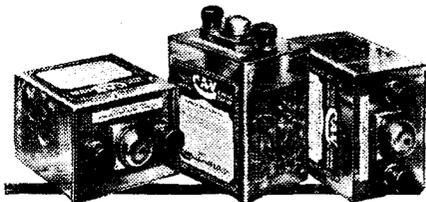
# THE RADIO EXHIBITION.

(Continued from page 60.)

## CHLORIDE ELECTRICAL STORAGE CO., LTD.

Stand Nos. 172 and 175.

A full range of Exide batteries for high and low-tension wireless purposes is included in the Chloride Electrical Storage Co.'s exhibit, which occupies a central position on the ground floor. Unspillable



A group of C.A.V. Non-Spillable Accumulators which, as this photo shows, can be placed in any position.

Exide batteries are displayed in an even better range than last year, and it is said that they now offer the widest variety of types and sizes obtainable.

There are also Exide high-tension batteries which include an entirely new H.T. battery of large capacity suitable for big multi-valve sets. New features of Exide batteries are non-interchangeable red and blue terminals and octagonal positive terminals which easily can be distinguished in the dark from the round negative terminal. Wire carriers are now supplied free with all Exide cells in glass containers. A selection of loose plates, separators, and other loose parts can all be seen in this notable display of Exide products.

## CLEARTRON (1927), LTD.

Stand No. 22.

This firm is exhibiting the well-known Cleartron valves which, in view of their low prices, are most attractive propositions. This year a Cleartron S.G. valve is shown.

## CLIMAX RADIO ELECTRIC, LTD.

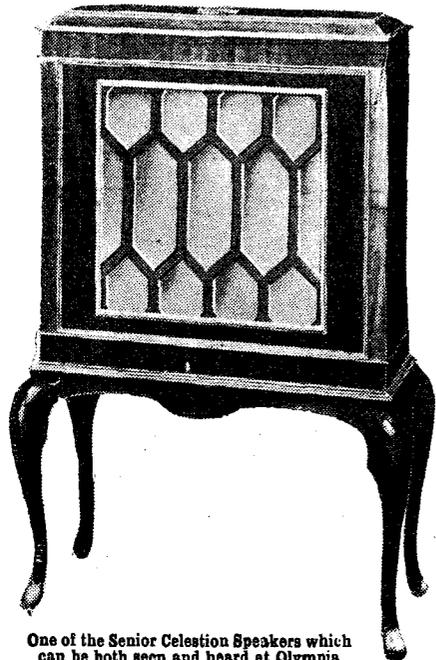
Stands Nos. 91 and 92.

Mains units and components for the construction of main sets are shown at these stands.

## COLE, LTD., E. K.

Stands Nos. 8, 9, 10 and 11.

No one who has the power mains laid on to their house should miss these stands. Here are to be seen mains-operated receivers and mains units to suit all pockets and all purposes. The Ekco electric S.G.P. 3



One of the Senior Celestion Speakers which can be both seen and heard at Olympia.

for D.C. and A.C. mains incorporates practically every conceivable modern refinement, although the price is only 20 guineas. Provision is made for the attachment of a gramophone pick-up, wave-changing is available by means of a panel switch and, in fact, the whole thing is quite an achievement.

Some fine mains units are to be seen, including one that gives you H.T., L.T. and G.B. from the mains, and thus eliminates all batteries. Westinghouse metal rectification is embodied in most of the A.C. models.

## COLVERN, LTD.

Stand No. 99.

Here are to be seen Colvern dual selector coils, dual range coils, six-pin interchangeable inductances, ultra short-wave inductances, transmitting coils, and formers of all kinds. There are also models illustrating methods of receiver construction to provide an interesting and informative display. Screening boxes, screens for coils, and panels are among the many other exhibits together with some fine screened-grid receivers.

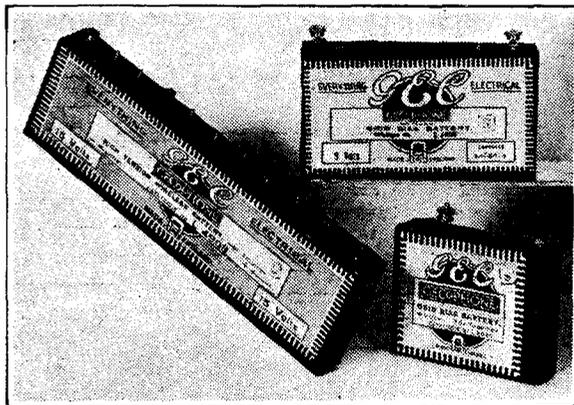
## COSSOR, LTD., A. C.

Stands Nos. 173, 174, 188 and 78.

Every owner or prospective owner of a valve set will, as a matter of course, pay a visit to these stands, and they will not be disappointed, for the Cossor people have a most attractive display of both old and new lines.

It will be remembered that last year Messrs. Cossor created quite a stir by their wide distribution of handy catalogue carrying bags. The distinctive colours of these bags were a mass display in the exhibition itself, and they could be seen in the hands of departing visitors in practically every main road in London every day the exhibition was in progress.

And you can be sure that the Cossor people are equally enterprising on this occasion, although we



The G.E.C. display is a most comprehensive one and, among other items, a range of G.B. batteries is shown.

For fear we cannot give away the secrets of their activities in this direction at this juncture. The Cossor people have a fine range of valves on show, including 2-volters, which will appeal strongly to the economists. Indeed, the performances of their latest 2-volters are far superior to those of any 6-volters of two or three years ago.

## D.X. COILS, LTD.

Stand No. 262.

A range of plug-in and other coils is shown.

## DAYZITE, LTD.

Stand No. 7.

A motor generator set for giving both H.T. and L.T. direct from the mains and the Musikon combined radio and gramophone outfit are special features of this exhibit.

## DONOTONE (Regd.) LOUDSPEAKER, THE

Stand Nos. 268 and 269.

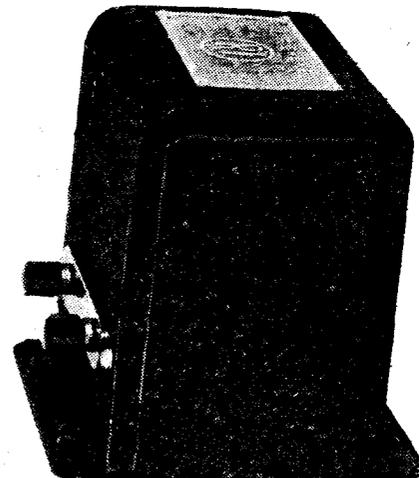
On these stands visitors will be able to inspect one of the most novel loudspeakers available. Extraordinarily good results are achieved and the Donotones are, in every way, notable exhibits.

## DUBILIER CONDENSER CO. (1925), LTD.

Stand Nos. 181 and 182.

The Dubilier people are, of course, famous for their condensers, and what radio receiver, or for that matter, broadcasting transmitter, does not use something bearing that well-known name? Of especial interest to radio-set constructors is the K.C. drum-controlled condenser, which is a first-class example of modern radio engineering. Visitors should note the wonderfully clean lines of this component which, in every detail, bears the stamp of scientifically organised manufacturing.

The Dubilier people are also showing electrolytic condensers, and it is interesting to compare the sizes of these with the ordinary types when remembering that the electrolytic variety will have a capacity of the order of 1,000 or more mfd. The Westminster portable radio-gramophone is also on view, and this is quite a unique instrument. It combines the advantages of a portable radio receiver with those of a



Radio Instruments, Ltd., are concentrating on mains units and sets, and chokes and transformers. Above is their famous 28 14 L.F. Choke, which is very well worth a close inspection.

portable gramophone, electrical with the additional advantage of having identical reproduction for the gramophone.

There is an indicator lamp on the front of the instrument which indicates when the valves are switched on and, incidentally, this lights up Big Ben which figures in an artistic silhouette arrangement. There are also H.T. eliminators for A.C. or D.C. mains, and a fine range of mains and battery-operated sets. Dubilier H.T. and G.B. batteries are also exhibited, and you can be sure that the Ducon aerial adaptor has its place.

## DUNHAM, C. S.

Stands Nos. 47 and 48.

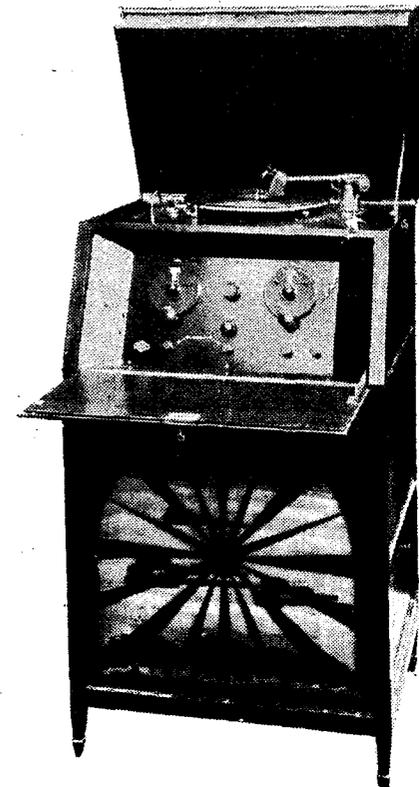
Particular prominence is given to the Dunham portable five, a special set which is made in rexine lizard skin finish, or if desired, in a leather suitcase without extra charge. It has only one tuning dial, and its weight is a mere twenty-five pounds. A balanced armature cone loud speaker figures in this set which, altogether, undoubtedly merits attention. The Dunham people are also showing mains units, and there is, too, a three-valve all-mains set.

## DYSON & CO. (WORKS), LTD.

Stand No. 1.

Here are to be seen Airmax coils and chokes, Godwinex productions, and a combined radio-

(Continued on next page.)



An Igranic "Radio-Gram" outfit, which is an important exhibit on the stand of the Igranic Electric Co., Ltd.

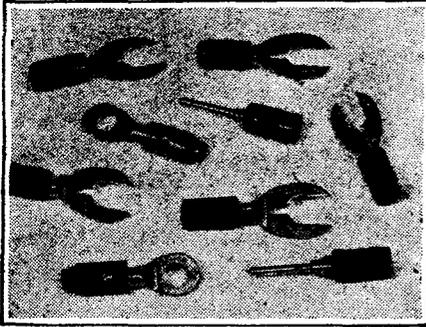
# THE RADIO EXHIBITION.

(Continued from previous page.)

gramophone three-valve set which embodies a new type Airmax tuning unit.

## EAGLE ENGINEERING CO., LTD. Stand No. 77.

A radio-gramophone comprising novel features is one of the main items shown here. It consists of a



A group of "Clix" devices representative of those being exhibited by Lectro Linx, Ltd.

walnut cabinet into which is fitted a motor, pick-up and volume control, space being provided into which to slide a Warwick portable receiver. When the portable set is required outdoors or upstairs it can be removed from the cabinet and used separately.

## EASTICK & SONS, LTD., J. J. Stands Nos. 272 and 273.

Wireless components and accessories of all types and makes, in addition to a full range of Ealex products, to which one stand will be mainly devoted, are here laid out in such a way that the constructor will be bound to tarry awhile. Among the new lines exhibited are the

Flex insulated plugs and sockets, which are designed mainly for use with mains apparatus.

## EDISON-BELL, LTD. Stand No. 116.

The Edison-Bell people are showing a radio-gram set of a distinctively attractive character. Both S.G. and pentode figure in the outfit and the frame aerial, which is fitted at the back of the cabinet, can be adjusted in regard to its position by means of a control situated between the needle bowls. Among the radio components exhibited are valve holders, H.F. chokes, and a Midget type reaction condenser.

## EDISON-SWAN ELECTRIC CO., LTD. Stands Nos. 153 and 149.

The Edison exhibit is strengthened by the inclusion of certain B.T.-H. and Metro-Vick productions. These include the already famous B.F.-H. pick-up and the B.T.-H. gramophone motor, B.T.-H. cone loud speakers, transformers, and the well-known R.K. reproducer outfit, are also included.

The Edison transportable receiver, an entirely new A.C. mains model, and an entirely new Edison three-valve all-mains receiver are on view. Accumulators and dry batteries, a whole horde of Metro-Vick items, such as battery eliminators, chargers, power components, and various other accessories contribute to one of the most fascinating displays in the whole exhibition.

## EPOCH RADIO MANUFACTURING CO. Stand No. 213.

A trickle-charger having novel features, a large range of mains transformers and chokes, and moving-coil loud speakers are to be seen at this stand.

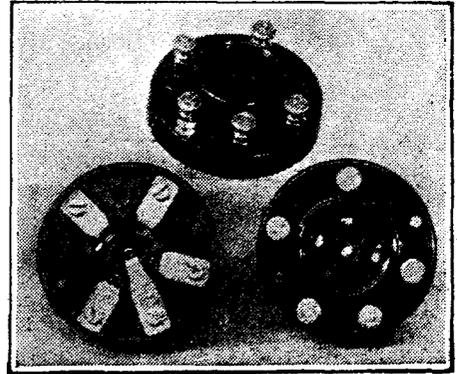
## EVER READY CO. (GT. BRITAIN), LTD. Stands Nos. 139 and 142.

Famous for its remarkably reliable dry batteries, readers will not have to guess hard at what is to be seen on the Ever Ready stands. But as well as dry batteries for H.T. and G.B. purposes, the Ever Ready people have a fine range of accumulators, both for L.T. and H.T. types, and these are very well worth

while examining. Ever Ready testing instruments are also on view, and these include voltmeters covering all normal ranges.

## FALK, STADELMANN & CO., LTD. Stand No. 279.

These people have considerably augmented their range of Piescophone sets, which now include new models of screened-grid receivers for both battery and mains operation. These sets are prominently displayed together with a new long-range screened-four suitcase model portable, and a five-valve set, in both transportable and suitcase form. Re-designed and improved H.T. battery eliminators and an all-mains unit for A.C. are shown.



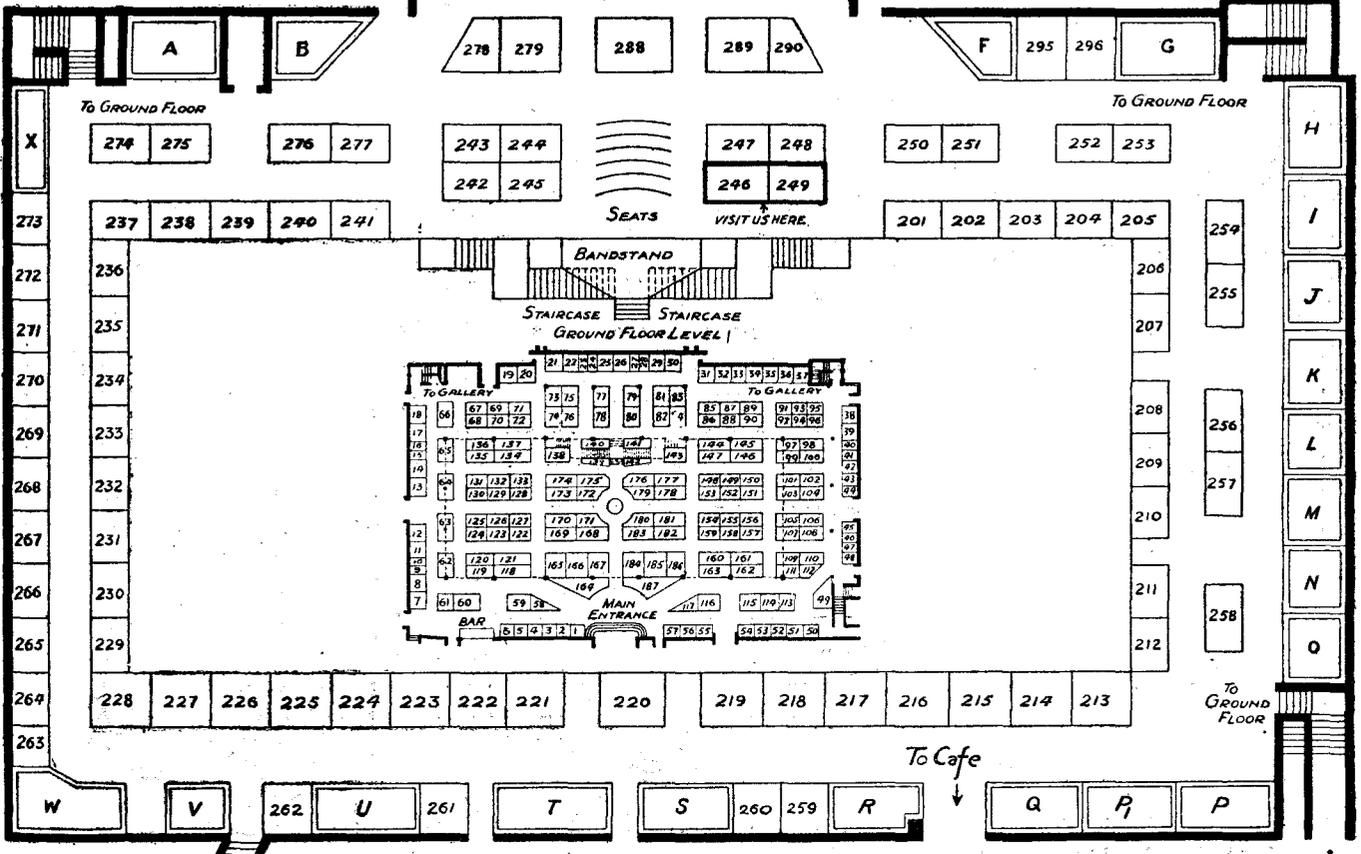
Whiteley Boneham and Co. Ltd., are showing their new five-socket valve holder, which will accommodate either ordinary valves or the new five-pin A.C. mains valves.

## FELLOWS MANUFACTURING CO., LTD. Stands Nos. 32 and 33.

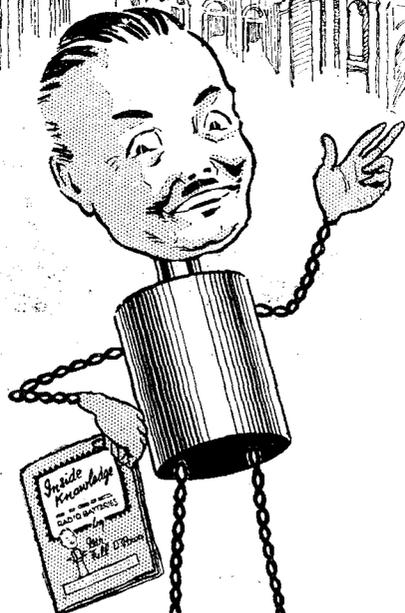
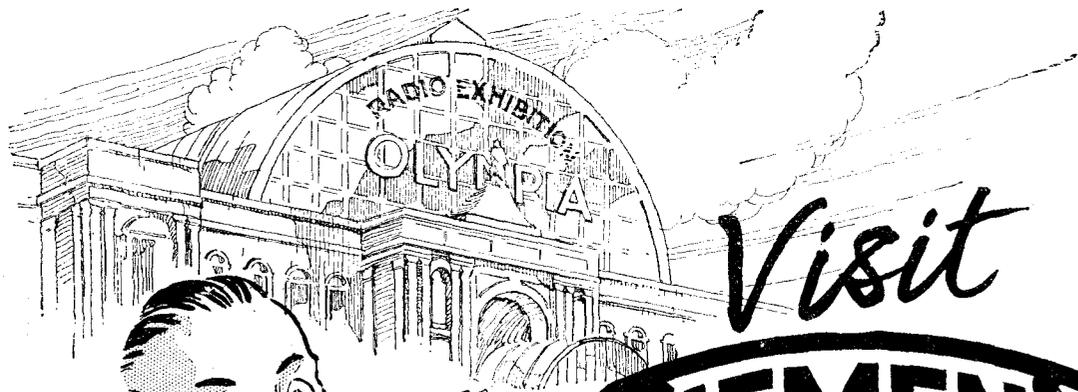
Here is a full range of the new model "Little Giant" sets, and two five-valve portables which will attract no little attention. H.T. and L.T. eliminators, L.T. home chargers, all-mains receiving sets, and a full range of accessories all figure on these stands.

## FERRANTI, LTD. Stands Nos. 74 and 76.

Everywhere there is radio the Ferranti transformers are known, for they are scientifically designed radio (Continued on page 66.)



The Gallery stands are shown around the outer portion of this drawing of Olympia, these stands comprising all those numbered above 200. Note the "P.W." stands Nos. 246 and 249, at which all "P.W." reader visitors are cordially invited to inspect "P.W." sets and discuss radio difficulties with members of the Technical Staff.



# Visit **SIEMENS** STAND NOS 69 & 71 MAIN HALL

Where you can inspect the full range of Siemens Batteries.

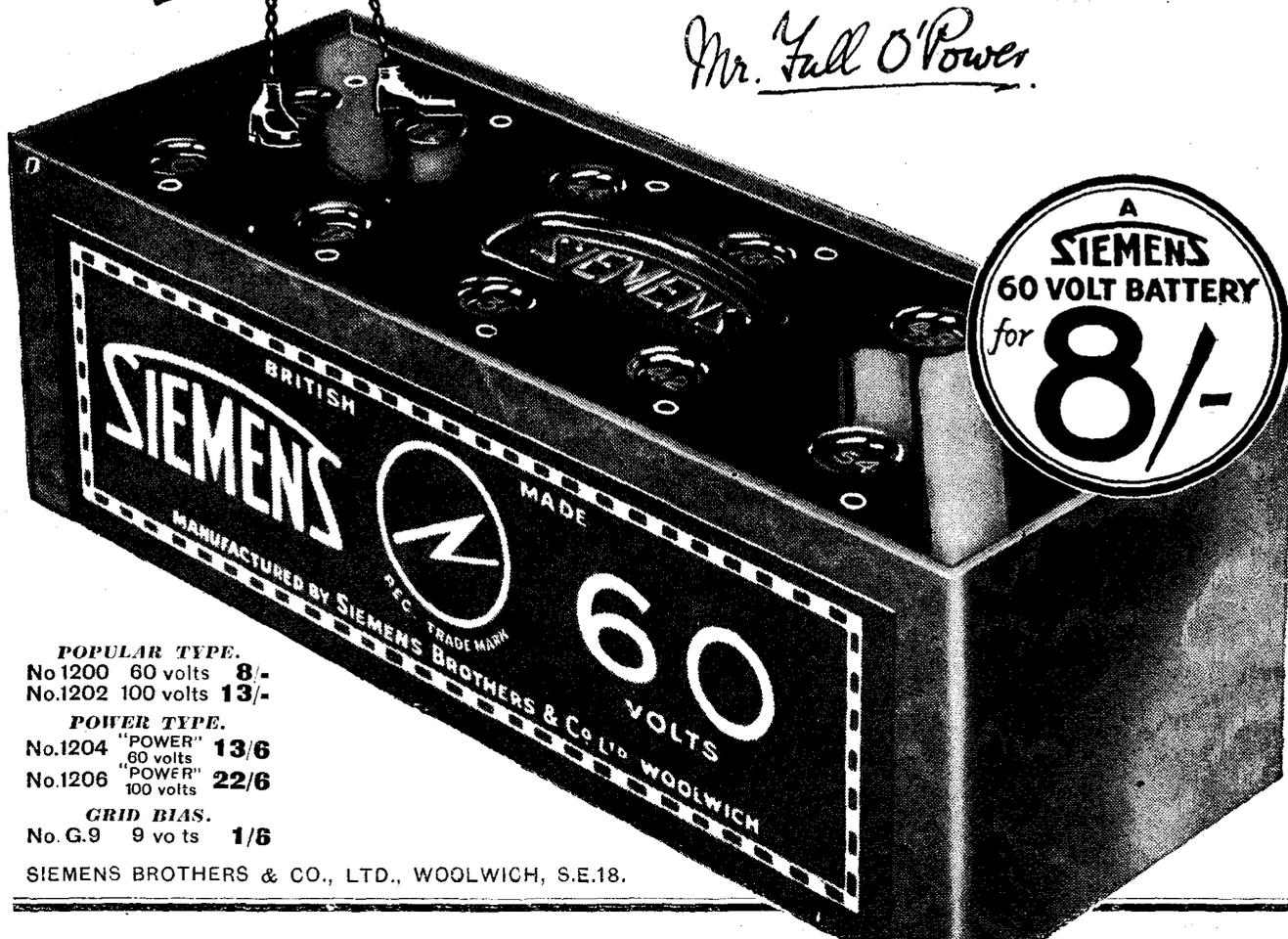
### Free Booklet.

Be sure to ask for a copy of the interesting booklet

*"Inside Knowledge"*

on the correct use of Radio Batteries, by

*Mr. Full O'Power.*



**POPULAR TYPE.**  
No.1200 60 volts **8/-**  
No.1202 100 volts **13/-**

**POWER TYPE.**  
No.1204 "POWER" **13/6**  
60 volts  
No.1206 "POWER" **22/6**  
100 volts

**GRID BIAS.**  
No. G.9 9 vo ts **1/6**

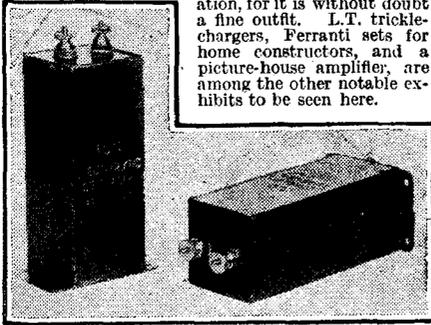
SIEMENS BROTHERS & CO., LTD., WOOLWICH, S.E.18.

## THE RADIO EXHIBITION.

(Continued from previous page.)

components. A Ferranti exhibit that has brought a colour to this show is a moving-coil loud speaker, a new production which was famous almost before it was on the market. There are two types, one for use with A.C. supply, incorporating a valve rectifier, and the other for D.C. mains. They are now available at competitive prices, and there are sure to be crowds of interested constructors inspecting these excellent instruments.

The Ferranti all-mains receiver, which is built around the well-known S.G.3 circuit, will undoubtedly be given close examination, for it is without doubt a fine outfit. L.T. trickle-chargers, Ferranti sets for home constructors, and a picture-house amplifier, are among the other notable exhibits to be seen here.



Two of the T.C.C. Electrolytic Condensers which are to be seen on stand No. 243. Visitors should note that the capacities of these compact devices run into thousands of mfd.

### FORMO COMPANY, THE.

Stand No. 72.

Among the new lines exhibited by these people are the 1930 Log Condensers, the dual gang condenser, the "Midget" reaction condenser, and vernier dials. These four component types supplement an excellent range of well-known products, and the constructor visitor will be interested to see a number of those handy little Formodensers which figure in so many modern sets.

Also short-wave enthusiasts should make a particular point of examining the short-wave condenser outfit shown by the Formo people, which is a variable condenser with an extended control having a compactly arranged screen.

### GAMAGE, LTD., A. W.

Stand No. 255.

Here is exhibited a new range of wireless sets which show a considerable improvement over last year's models. There is also a display of sets of all the well-known manufacturers. Short-wave enthusiasts and youthful wireless listeners are catered for by the attractive Morse practice outfits which are shown.

### GAMBRELL RADIO, LTD.

Stand No. 62.

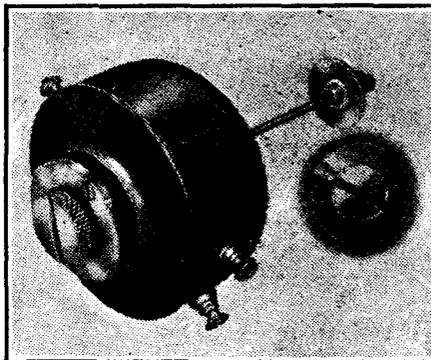
An all-electric radio-gramophone embodying new features and an all-electric transportable receiver are displayed on this stand. There are also Gambrell coils, Neutrovernier condensers, and other such items that are well worth an allotment of a visitor's time.

### GARNETT, WHITELEY & CO., LTD.

Stand No. 63.

The Garnett, Whiteley people recently moved into a new factory, which is said to be one of the most modern radio factories in Gt. Britain, and the practical results of this development are to be seen on Stand No. 63, which has a most fascinating array of radio gear.

H.F. and L.F. chokes, power and L.F. transformers,



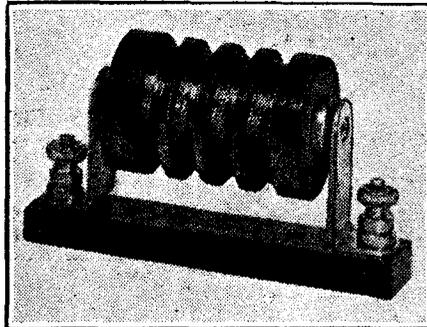
This is the Mark VI Unit which the M.P.A. people are showing.

variable condensers, dual and single drum-dials, assembled panels, including panels for the Mullard S.G.P., are laid out with famous Lotus components, such as the remote control outfit, Lotus coil holders, jacks, switches and plugs. There are no less than six new Lotus sets showing, including three-valve kits for constructors. This is undoubtedly a stand of more than ordinary interest.

### GENERAL ELECTRIC CO., LTD.

Stands Nos. 85, 86, 87, 88, 89 and 90.

Here indeed is a comprehensive display. On the G.E.C. stands there is everything that can be thought of for both amateur and listener. A remarkable



One of the smaller components exhibited by the Ready Radio Co., who are also showing a new loud-speaker.

range of valves is shown, including 2-, 4- and 6-volters for all purposes.

A fine group of receivers includes a two-valve A.C. mains unit embodying novel and useful features. For instance, the condenser dial is illuminated by means of a small lamp to show that the set is in operation.

High-frequency fans will view the Geophone short-wave receiver with interest, as it embodies a screened-grid H.F. stage. And as this set can also be used on the broadcast band, no doubt many ordinary listeners will be attracted by it. The Geophone four-valve screened-grid portable set is on view, as well as the new Geophone Hiflex L.F. transformer. This transformer has a core made of a new alloy, and it is interesting to note that its primary inductance when taken at 2.5 milliamperes D.C. is as much as 80 henries. Loud speakers and constructor kits are other items to be seen on these stands.

### GRAHAM & CO., LTD., R. F.

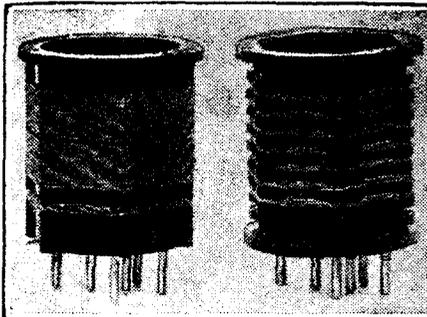
Stand No. 230.

Citex fire extinguishers, which are installed on all the stands at the exhibition, are a special feature of this exhibit.

### GRAHAM-AMPLION, LTD.

Stands Nos. 164 and 187.

This is the first radio exhibition at which Amplion radio sets have been on view. At the last show the



Two of the Colvern coils to be seen at Stand No. 99.

Amplion "Lion" Loud Speaker created quite a stir, and we predict that as much interest will be shown in the new Amplion sets. The Amplion standard mains operated receiver is a five-valve four-stage outfit, which really merits the adjective "magnificent," and the Amplion radio-gramophone and the Amplion cabinet radio will want to be seen before it can be fully appreciated.

Of course, the full range of Amplion loud speakers is well to the fore, and there is an Amplion trickle-charger and the Amplion Electrovox gramophone also displayed. And for the second year the "Lion" is strongly in evidence.

### GRAHAM-PARISH, LTD.

Stands Nos. 140 and 141.

As the result of extensive researches on solid dielectrics over a considerable period, the Graham-Parish people decided to market a variable condenser using bakelite as a dielectric, and the result was the "Microficient," which is a feature of their Olympia exhibit. There are also anode resistances, R.C. units, and other equally interesting gear.

### THE GRIPSO COMPANY.

Stand No. 227.

Here is a display of small wireless accessories, such as terminals, wander plugs, grid-leak holders, switches, etc.

### GROSVENOR BATTERY CO., LTD.

Stand No. 237.

A range of H.T. batteries and batteries specially designed for portable sets are shown at this stand, together with an ingenious pocket lamp which has no case.

### HALCYON WIRELESS CO., LTD.

Stands Nos. 168 and 171.

Portable set fans will be interested in these stands, where are shown the 1929-30 De Luxe Cabinet Five, and the 1929-30 Screened-Grid Four, two excellent examples of modern portable-set design.

### HARLIE BROS.

Stand No. 210.

The Harlie people are making a good show of their new Volustat, a component for which there are many



An interesting Gambrell Radio-Gram outfit, in which visitors will discover several novel features.

radio uses. It is a variable resistance of such a design that it has a flexible control over a wide resistance range.

### HART ACCUMULATOR CO., LTD.

Stand No. 228.

Accumulators for all radio purposes are exhibited. The Hart unspillable accumulator for portable sets, and an accumulator that can stand up to hard work in tropical countries are featured. Four types of H.T. accumulators are on view.

### IGRANIC ELECTRIC CO., LTD.

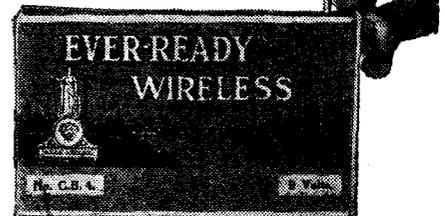
Stands Nos. 163 and 162.

These stands are packed with really interesting apparatus. For instance, there is the Igranic A.C. receiver, an entirely new Igranic production. It is an all-mains set using an S.G. and a pentode, in which there are many novel features. It is being shown in table cabinets and in handsome bureau cabinets the latter incorporating an electric gramophone.

The Igranic Neutrosonic Seven receiver is shown in its standard transportable form with combined battery box, frame aerial and loud speaker. It is also shown in new versions of table cabinets and bureau type cabinets, the latter also incorporating a frame aerial. Then there is the Igranic Universal receiver, a portable using two screened-grid valves, and having a very long range of reception. The Igranic screened-grid short-wave receiver is there to tempt short-wave fans, and there is a wide selection of mains units and parts.

Igranic radio components, including all kinds of coils, low-loss coils, variable condensers for transmission and reception, dials and dial illuminators, valve holders, wire-wound resistors, and

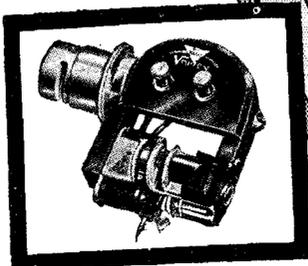
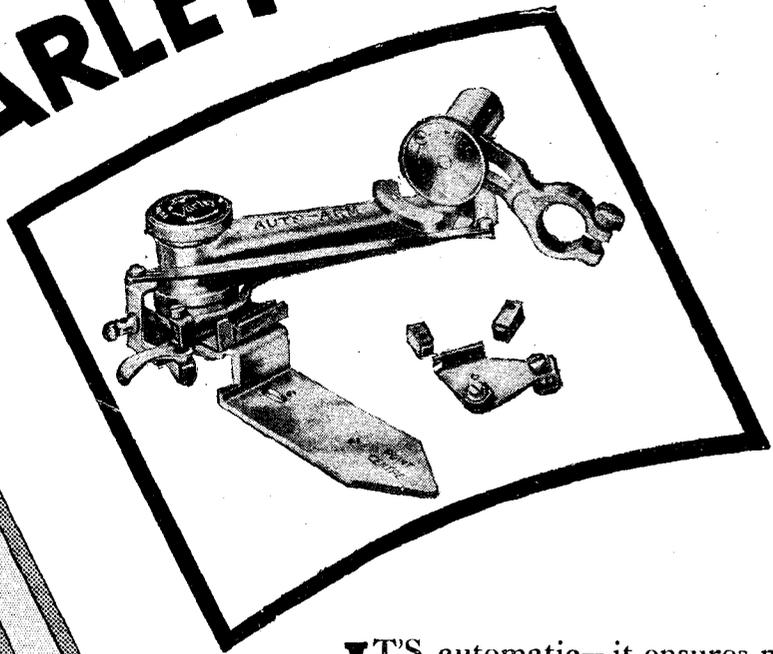
(Continued on next page.)



As well as dry batteries for all radio purposes the Ever Ready people are showing a fine range of accumulators.

# THE PERFECT GRAMOPHONE AUTO-ARM

## VARLEY MAKE IT



The Varley Compound Mass Suspension Pick-up incorporating many new improvements.  
Price now, only **37/6**

WE ARE EXHIBITING AT



THE NATIONAL RADIO EXHIBITION OLYMPIA (NEW) SEPT. 25-OCT. 5 11 AM - 10 PM ADMISSION 1/6 DAILY REGULAR SEAT 2/- OCT 1-10 3 PM 2/6

**STANDS 154 & 159**

**I**T'S automatic—it ensures perfect tracking—it is designed on really scientific lines with needle pressure adjustment—it takes any Pick-up—it plays no small part in reducing record wear, it can easily be fixed to any gramophone in a few minutes—it is beautifully finished—it's made by Varley.

That's why it is becoming so popular everywhere to-day.

You can buy it for **35/-**

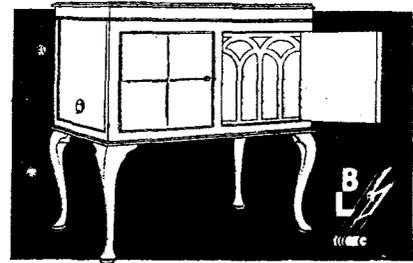


# Now See the Complete BOWYER-LOWE Range for 1929-1930

New models! Improved sets! Greater values! Receivers and components for every purpose, widely comprehensive in price, all backed by the Bowyer-Lowe reputation for highest technical efficiency.

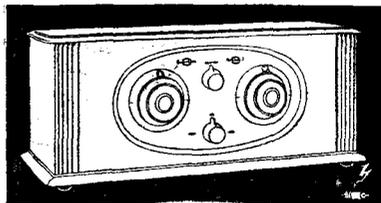
Ask your Wireless Dealer about the Bowyer-Lowe range of Sets and Components, or write to Headquarters for illustrated literature.

STAND NO. 130 & 131.



### RADIO-GRAMOPHONE

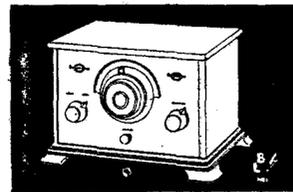
A combination of the famous Bowyer-Lowe Screened Vox Populi 3 and an Electrical Reproducing Gramophone. Gives perfect reproduction of radio and gramophone music. Prolongs life of records. List No. 374, Battery Model, £39  
Mains Model D.C. ... .. £56  
Mains Model A.C. ... .. £63  
Including valves and royalties.



£ 10  
including  
valves &  
royalties.

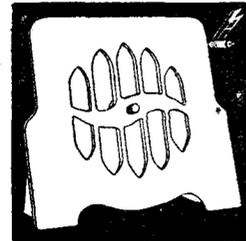
### THE PENTOVOX 3.

The finest set of its kind on the market, yet lowest in price. Using a screened grid H.F. valve and a Pentode amplifying valve, it is notable for purity, selectivity and volume. Wavelength ranges are 250/500 metres and 1,000/2,000 metres. Now improved in detail and appearance but reduced in price. List No. 362 ... £10 including valves and royalties.



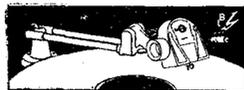
### PENTOVOX 2

A two-valve receiver using the Pentode valve. Wavelength ranges are 250/500 metres and 1,000/2,000 metres. No change of coils. List No. 329, £6.8s. Including valves and royalty.



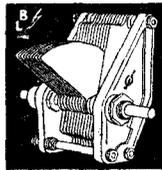
### JUNIOR CONE REPRODUCER

A thoroughly efficient speaker, giving clear and faithful reproduction, and selling at a very attractive price. List No. 375 ... 35/-



### GRAMOPHONE PICKUP

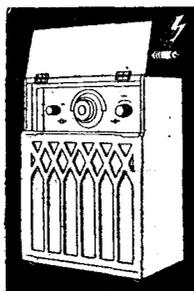
A scientific instrument giving an entirely new beauty to records. Absolute fidelity of reproduction obtained, the design being tested to give bass and treble their true values. List No. 364, 19/6. List No. 365, Special Track-arm for Pick-up, 10/-.



### UNIVERSAL LOG CONDENSER.

For panel mounting with dial or drum control. Very easily ganged. Single hole fixing.  
.0003 ... 5s. 9d.  
.0005 ... 6s. 0d.

All Bowyer-Lowe Sets and Loud Speakers can now be obtained on generous hire purchase terms.



### PORTABLE 5.

The latest addition to the Bowyer-Lowe range, this set establishes a new standard among portables. A wonderfully efficient production at a moderate price. List No. 363, £16. 16s. including valves & royalties.



In association with Recordaphones Ltd.

London Showrooms:

ASTOR HOUSE, ALDWYCH, W.C. 2

Head Office & Works:

Radio Works, Letchworth, Herts.

# THE RADIO EXHIBITION.

(Continued from previous page.)

dual impedance coupling units contribute towards this magnificent display.

## ITONIA GRAMOPHONES, LTD.

Stand No. 286.

This well-known firm of gramophone manufacturers is displaying a portable receiver, the Autocrat portable five. A range of radio gramophones is also shown, together with a display of the leading makes of radio receivers, accessories, etc.

## J. R. WIRELESS CO.

Stand No. 266.

Here can be examined those excellent little radio components which have forced their way into popularity by virtue of their real merits. Rheostats, chokes, condenser dials, and wave-traps form the main proportion of this exhibit.



One of the new Cossor valves which are among the most important exhibits at this year's show.

## JACKSON BROS., LTD.

Stand No. 97.

Here are to be seen those very popular J.B. condensers. Our recollections of these components go back some six or so years ago, and it is interesting to note how well they have kept abreast, if not ahead, of the times. The J.B. condenser was always a first-class production, and to-day, as visitors to Olympia will notice for themselves, they are still first-class examples of modern radio work. Particular note should be taken of the J.B. Special Short-Wave models which are made in S.L.F. types only and have phosphor-bronze ball bearings. The J.B. people are also showing some fine drum-drive thumb control gear.

## JEWEL PEN CO., LTD.

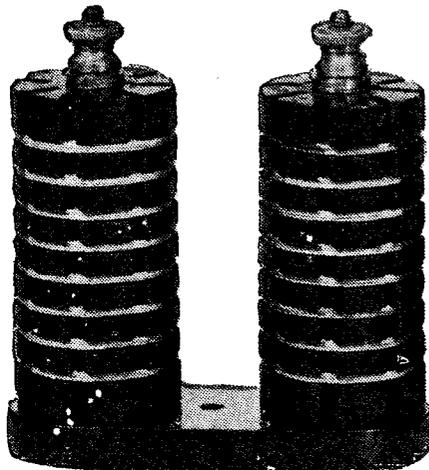
Stand No. 267.

The main business of the Jewel Pen Co. is the supply to the radio trade of turned and machined chromite parts, and there are, of course, some excellent samples of this class of work showing on the stand. Push-pull switches, coil mounts and coil holders, aerial and earth connectors figure among the other items displayed. There is also a permanent crystal detector which crystal users should make a point of examining.

## JUNIT MFG. CO., LTD.

Stand No. 207.

One of the most prominent features of this display is a soldering outfit of a distinctly novel and useful character. Every item is unique, even the soldering iron being quite different from any other that is obtainable. Its design is such that you can always ensure a clean timing point however dirty the heating wire.



The Climax Choke will attract the attention of many set builders.

## K.N. ELECTRICAL PRODUCTS, LTD.

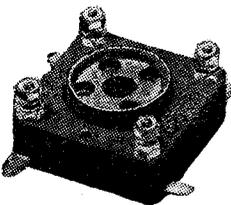
Stand No. 254.

All-electric wireless sets built into brass cases of antique finish, and in steel cases with crystalline finish are among the gear displayed at this stand. Additionally, there are portable wireless sets and loud speakers to be seen, and, of course, the famous K.N. electric soldering iron is prominently featured.

## KOLSTER-BRANDES, LTD.

Stands Nos. 176, 177, 178 and 179.

An interesting new accessory is a moving-coil loud speaker of novel design. And among the sets shown is a three-valve instrument having an attractive specification. Radio-gramophones, electric gramophones, and loud speakers form the larger proportion of this exhibit.



The Formo Valve Holder, one of the high-class components to be seen at Olympia.

## LAMPLUGH, LTD.

Stands Nos. 126 and 127.

Among the many new lines displayed by this firm is a range of popular standard low-priced receivers built on an entirely new method of chassis construction. The Silver Ghost radio gramophone is exhibited in two models, one a five-valve self-contained set, and the other a three-valve requiring good indoor or external aerial and earth. They are supplied for all-mains or battery operation, in either oak or mahogany cabinets. Portable sets, loud speakers, mains units, and various radio components are also being shown.



## LANGHAM RADIO, LTD.

Stand No. 59.

Portable sets and radio gramophones.

## LECTRO-LINX, LTD.

Stand No. 261.

Here is an array of all those ingenious Clix products that make for worryless wireless, including Clix terminals, spade terminals, hook terminals, ring terminals, panel terminals, wander plugs, multiplugs, terminal brackets, bushes, accumulator knobs, and so on.

This is a stall which will certainly engage the attention of every practical constructor.

## LEVER (TRIX), LTD., E. J.

Stands Nos. 211 and 212.

A large amount of quite new stuff is on view at these stands.

For instance, there is an electric radio-gramophone, a mains-driven outfit very well worth examination. Also there is a four-valve screened-grid portable and a two-valve portable designed for loud-speaker reception of the local station and, within reasonable distance, of 5 G.B. Although it only uses two valves it is completely self-contained and all batteries, loud speaker and frame aerial are accommodated in its structure. H.T. eliminators and a wide range of excellently produced components figure in this display.

## LISSEN, LTD.

Stands Nos. 184, 185, 186 and 232.

It is interesting to note that now the Lissen people have entered the field of valve manufacturing they make everything required for radio reception. The complete range of 2-volt valves is being demonstrated at Olympia, and will no doubt arouse considerable interest. An interesting portion of this display is devoted to a group of mouldings made in the Lissen workshops. Moulding tools made by the Lissen people are also exhibited.

Many amateurs will no doubt take the opportunity to examine at close quarters the new Lissen five-valve portable receiver as well as the Lissen screened-grid three set, and the complete range of radio gramophones and mains units. Among the new components shown are a heavy-duty output choke, wire-wound volume controls, turntables, and Lissen anti-microphonic valve holders.

## LOCK, LTD. W. & T.

Stands Nos. 202 and 203.

A full range of cabinets in oak and mahogany are on view, including the well-known American types of cabinets in various patterns. A new pedestal type cabinet for radio gramophones is also shown, as well as various home-constructors' cabinets.

## LOEWE RADIO CO., LTD.

Stand No. 291.

The Loewe people are only showing their local receiver, their multiple valves and their loud speaker,

but all three items are of such unusual interest that they are sure to attract considerable attention. The multiple valves alone warrant an exhibition display, and these must be examined at close quarters before their ingenious structure can be appreciated. The Loewe local receiver makes use of a multiple valve, and is a wonderfully compact instrument.

## LONDON ELECTRIC STORES, LTD.

Stands Nos. 293 and 294.

This firm are wholesalers, and they have endeavoured to make their stand representative of the best selling lines at the exhibition.

## LONDON ELECTRIC WIRE CO. & SMITHS, LTD.

Stand No. 64.

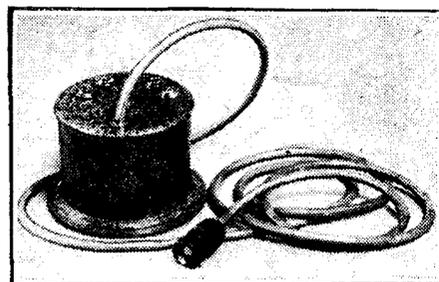
Every radio set uses at least one coil and a certain amount of wire, and at the Lewcos stand newcomers to radio will be able to make the close acquaintance of Glazite, that insulating connecting material which is so much better than ordinary bare wire for set wiring work.

An entirely new Lewcos production is shown, and this is a wave-trap which consists of an inductance coil and a variable condenser, and which can be used in any receiver which incorporates a standard six-pin unscreened coil. You simply place the wave-trap on top of the aerial coil and tune out the local in the ordinary way. No connections to the receiver are required. When the set is needed for the local station the wave-trap is removed. The various Lewcos coils are tastefully displayed, together with the various other Lewcos wires, battery leads, etc.

## LONDON RADIO MFG. CO., LTD.

Stand No. 112.

This exhibit includes the Orphean popular cabinet cone, and the Oriel Cabinette model loud speaker,



Lissen's have some fine Mains Units on view for the first time at Olympia.

which are notable for their reasonable prices and distinctive appearances. The Orphean cone drive unit is also displayed.

## M.P.A. WIRELESS, LTD.

Stand No. 165.

One of the chief exhibits here is a radio-gramophone, a handsome cabinet model which makes use of a screened-grid four-valve circuit. Another interesting exhibit is an all-electric screened-grid A.C. four, which employs indirectly-heated A.C. valves.

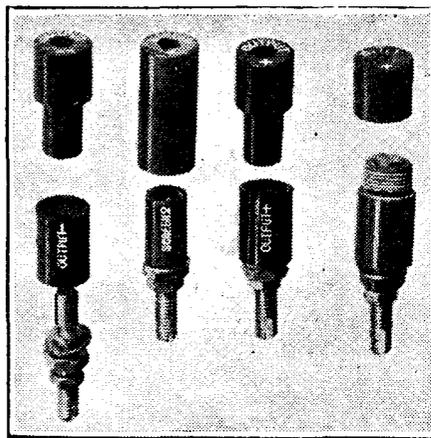
An M.P.A. moving-coil loud speaker embodying a permanent magnet is shown, and there are, of course, the M.P.A. popular plaques and popular cabinet loud speakers. Constructors will be interested in the M.P.A. switches, chokes and transformers which contribute to one of Olympia's most interesting stands.

## McMICHAEL, LTD., L.

Stands Nos. 101 and 103.

The chief features of this exhibit are portable receivers and the "Screened Dimic Three," in both mains and battery drive models.

(To be concluded).



Messrs. Belling-Lee have these novel and useful mains unit plugs and sockets on their stands.

# SHORT-WAVE NOTES.

By W. L. S.

I HAVE received an interesting letter from a reader in Walthamstow on the subject of my recent plea for amateur transmitters to pay more attention to the 160-metre wave-length band for local work. He endorses my remarks in every way and sums up the position as follows:

## 42-METRE BAND.

- (1) DX work is easy but unreliable.
- (2) Jamming is a veritable nightmare.
- (3) Low-power work is fatiguing, mainly due to the effect of point 2.
- (4) Short-distance work is nothing but a waste of good power.

## 160-METRE BAND.

- (1) DX work is difficult but not impossible, and communication in general is reliable.
- (2) Jamming is rare, if not absent.
- (3) There is abundant scope for low-power work.
- (4) A minimum of power is adequate for short-distance tests owing to the comparatively low attenuation of the ground wave.

I certainly agree with all these remarks, and am looking forward to the vastly improved conditions that are possible if only some of the London transmitters will see the sense of the suggestion and use the longer wave-length for their local tests and short private "chats."

Mr. H. W. Daly, of Ilford, qualifies for the "H.A.C." club with plenty to spare, and has some interesting work to report in the reception of W F A T (the Byrd Expedition). He apologises for his writing by stating that he was recently in brief (very brief!) contact with about 20,000 volts A.C., which was not pleasant.

## Best Coil Sizes.

I have devoted a great deal of time lately to comparative tests with all manner of different shapes and sizes of short-wave coils. It is a most thankless task, since there is absolutely no limit to the number of types one can make, and at first test they always appear to be working far, far better than anything one has struck before. When the enthusiasm of the moment has died down one generally discovers that they are about the same as the others after all!

It is difficult to give a definite preference to anything at all, but I should say that my leanings are rather in favour of a coil of not more than 2-in. diameter, consisting of two windings on the one former. The grid coil is slightly spaced, and the reaction coil is close wound with finer wire and tucked right inside the grid coil at the filament end. With such a coil as this it is possible to obtain a wonderfully good reaction control, and one that does not seriously affect the tuning of the main circuit as it is varied.

For aerial coupling I am now pretty well convinced that there is nothing to choose between inductive and capacitive methods, providing that which ever method one uses is carefully operated and adjusted so as to

be functioning in the best possible way. That is to say, the capacitive method, with the condenser set at the value which is proved to be the best for your particular aerial, will give results equal to those obtainable with loose inductive coupling when that has also been set to the appropriate position.

## A Valuable "Mush-Reducer."

Another point I have been tackling fairly comprehensively is a comparison of the various types of volume control suitable for short-wave work. I have hitherto been using the conventional high-resistance potentiometer across the transformer secondary, and have been quite satisfied with it. I have found, though, that a high-resistance leak (even of the carbon type) and, of course, variable, across the 'phones is preferable.

A "Clarostat" or "Bradleyohm" is admirable for the purpose if the value is correctly chosen. The minimum resistance should be capable of being cut down to 50 ohms or so. The effect of this is rather extraordinary, since it seems, when put into operation, to cut down the mush and interference in a manner out of all proportion with its effect on signals.

Apart from the aural benefit of the ordinary volume control (for it is easier to read a weak signal with weak jamming than a strong signal with strong jamming),

might be expected to be "dead" for a while now, they seem far from it. It is true that the consistent conditions of the spring and early summer have gone, but there are nights when the States and South America are received in England as well as they have ever been. On the night before I wrote these notes, for instance, four South American countries were logged in about two minutes, and this in spite of the fact that the States were fairly roaring in. Usually, of course, a night that is good for one is bad for the other.

Can anyone tell me definitely and accurately where the English end of the transatlantic 'phone operates? I am always listening to the American end on about 20 metres, but have never yet found the other end, although a friend was once able to fit in the other half of the conversation I had heard from the States, since by chance he had been listening to this end of it at the same time. But that was on an uncalibrated receiver which he pulled to pieces the next day, so that I am still in the dark. The transatlantic 'phone obviously has no degree of privacy since it has started using short waves, and although I suppose we are all prevented by our licences from divulging anything that we hear on it, suffice it to say that I derive an extraordinary amount of amusement from the "half-conversations" that are wafted across the Atlantic nowadays!

## Short-Wave Pictures.

Also, can anyone tell me of a short-wave station engaged with anything like regularity on picture transmission? There used to be a group of American stations in the 24-metre region, but I never hear them now. I am rather anxious to start up as a

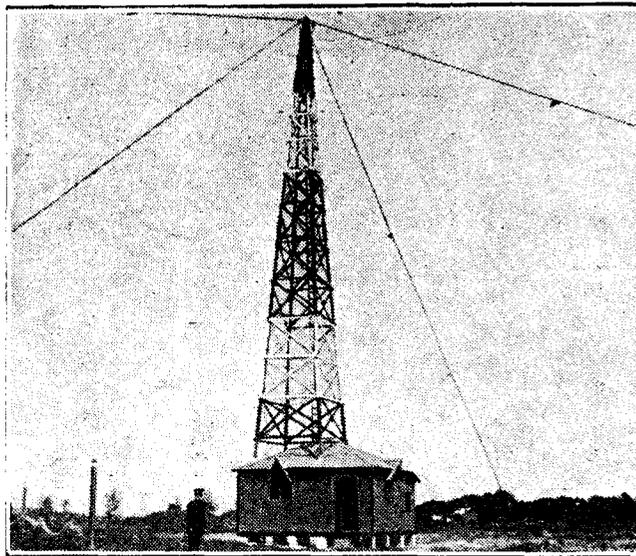
receiver of really "DX" pictures, but all the stations have obligingly stopped transmitting.

Have any of my fellow-sufferers noticed the extraordinary times at which the inhabitants will use their vacuum cleaners? My particular bugbear is a regular test that I have to carry out just before dinner on Sundays, and some enterprising neighbour invariably starts up a "vac" in the middle of it. I have also heard one in full blast after 10.30 p.m. on a weekday.

The modern types do not make anything like the din of the old crude affairs; my next-door neighbour's does not worry me seriously, yet on hearing a perfectly awful

row on short waves once, I took a walk down the road and heard the unmistakable sounds of a vacuum cleaner about fifteen houses down—a distance of some 130 yards! Clearly if short-wave broadcasting becomes universal there will be regulations about the efficient screening of such apparatus and the hours during which it may be used.

## AN AMERICAN AIR BEACON.



The first radio Beacon in the Eastern United States for guiding aircraft has been erected at Mitchell Field, New York.

the signals are, apparently, not seriously reduced in strength, while one can hear the "mush" fast fading away as the resistance is reduced.

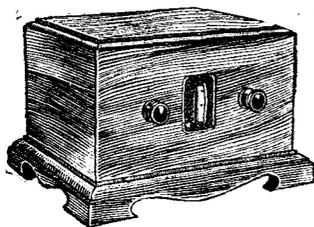
Regarding amateur long-distance work these days, conditions have remained extraordinarily good during the whole year, as compared with 1927 and 1928, and although I prophesied a little while ago that things

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				D.C.	A.C.		
Model P2	Detector and Pentode Valves	Cabinets of finest-grade Polished Walnut		£12-17-6	£12-17-6		
Model S.C.P.3	Screen Grid, Detector and Pentode Valves			£21-0-0	£21-0-0		
MODEL	Current Output	VOLTAGE TAPPINGS					
ALL-POWER UNITS							
	Milli-amps.	H.T. S.G. : 0-120 : 120/150 : POWER	G.B. Up to 21	L.T. D.C. Up to '6 amp. A.C. 2-6 volts from '3 amp. min. to 1 amp. max.	Completely electrify your Radio Set with no alteration whatsoever to Set, Wiring or Valves. Westinghouse Rectifier in all A.C. Models		
C 1. A	60					£9-15-0	£17-15-0
C 2. A	20	S.G. : 60 : 120/150	Up to 12	D.C. 2-6 volts from '2 amp. min. to '35 amp. max. A.C. 2-6 volts from '2 amp. min. to '5 amp. max.		£5-17-6	£10-17-6
H.T. UNITS							
1 F. 10		120		For 1 to 3 Valve Sets, or those not requiring more than 10 m.a. Westinghouse Rectifier in A.C. Models	17-6	---	
2 F. 10	10	60 and 120			£1-9-6	---	
2 A. 10		60 and 120			---	£3-10-0	
3 F. 20		S.G. : 60 : 120/150		For 1 to 5 Valve Sets, or those not requiring more than 20 m.a. Westinghouse Rectifier in A.C. Models	£1-17-6	£3-19-6	
1 V. 20	20	S.G. : 0-120 : 120/150			£2-10-0	£4-12-6	
4 T. 60		S.G. : 0-120 : 120/150 : POWER		For Multi-Valve Sets, or those not requiring more than 60 m.a. Valve Rectifier in A.C. Model : Philips 505 Westinghouse Rectifier in A.C. Model	£3-15-0	£7-5-0	
5 T. 60	60	S.G. : 0-120 : 0-120 : 120/150 : POWER			£4-15-0	£10-10-0	
RECTIFIER UNITS		REMARKS					
R. 20	20	For attaching to D.C. Units for use on A.C. Mains		Valve Rectifier : Philips 373 or 595	---	£3-7-6	
R. 60	60			Valve Rectifier : Philips 505	---	£5-0-0	
L.T. UNIT							
L.T. 1		2-5 Volts from '3 amp. min. to 1 amp. max.		Westinghouse Rectifier	---	£8-15-0	
TRICKLE CHARGER							
T. 500		Charges 2-, 4- or 6-volt ac. from A.C. mains at 1 amp.		Westinghouse Rectifier	---	£2-12-6	
ISOLATING TRANSFORMER							
I. Tr.		For isolating Loud Speaker or 'Phones from set where a Power Supply Unit is in use.				15s. Od.	

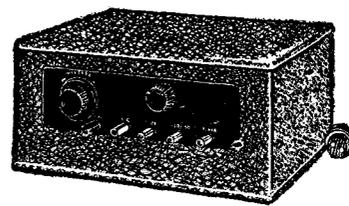


"EKCO-LECTRIC" RECEIVER. Model P2.  
£12-17-6 complete.

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RECEIVERS AND  
POWER SUPPLY UNITS



"EKCO" H.T. UNIT.  
A.C. Model 4T60.  
£7-5-0 complete.

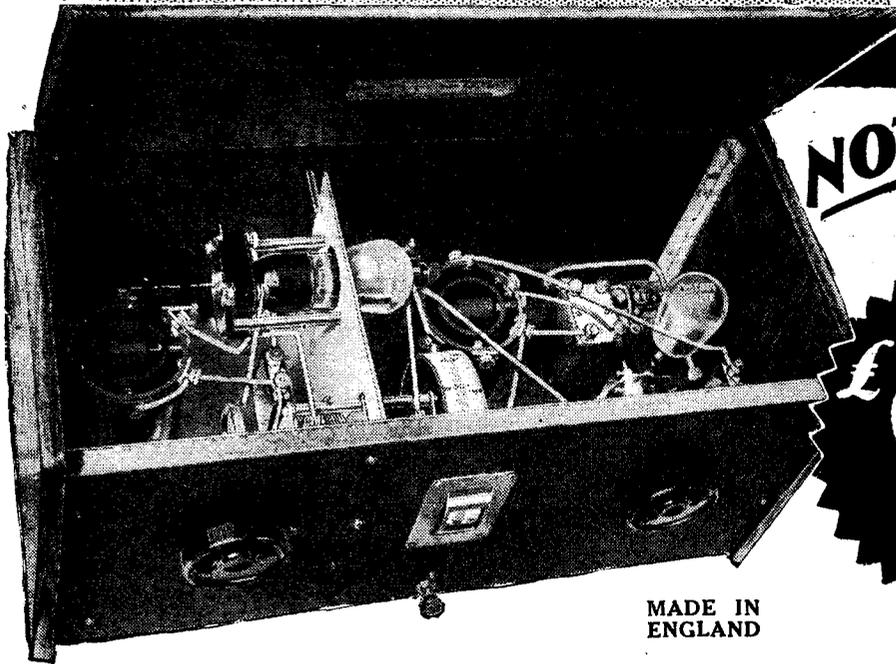
Announcement of E. K. COLE, Ltd., Dept. A, "EKCO," WORKS, LEIGH-ON-SEA

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in the **NEW**  
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ENGLAND**NOTE**

The polished,  
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cabinet supplied  
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Last Autumn the "OSRAM MUSIC MAGNET" was placed on the market to fill the demand for a really reliable constructor's 3-valve receiver at the lowest price, and proved the best set of the year. The success was amazing.

This year the NEW "OSRAM MUSIC MAGNET" possesses a number of noteworthy improvements, including a handsome polished heavy oak home constructor's cabinet, which makes it even better value than ever.

It is a product of The General Electric Co., Ltd., evolved and manufactured in the one organization. The reputation of the G.E.C. is behind it. **THIS IS YOUR GUARANTEE.**

1. Single Tuning Control
2. No changing of Coils
3. No soldering
4. The simplest to assemble
5. Widest possible choice of stations
6. No aerial oscillation

# Osram

## MUSIC MAGNET

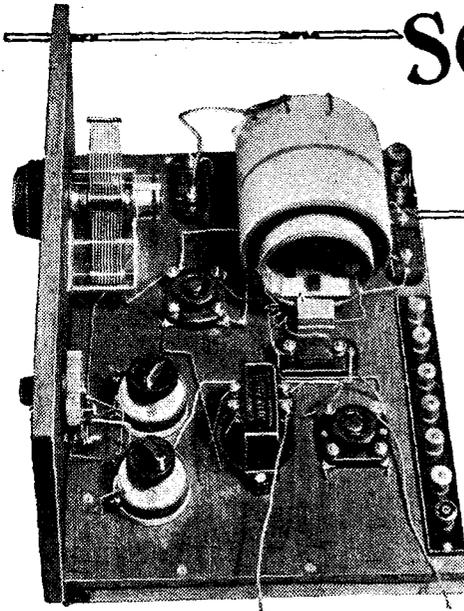
See the NEW "OSRAM MUSIC MAGNET"  
at OLYMPIA. G.E.C. Stand Nos. 85/90

SOLD  
BY ALL  
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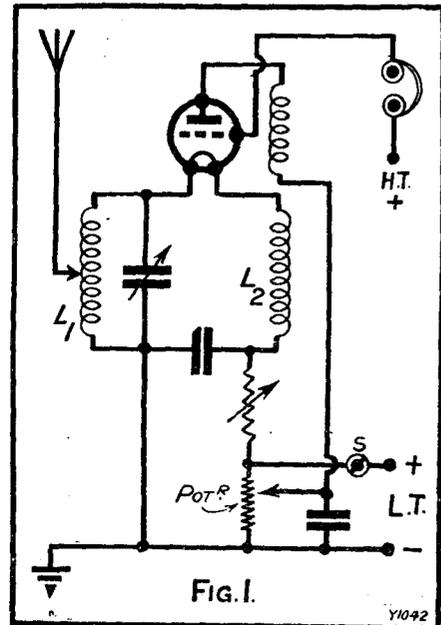
Write for  
**Instruction Chart**  
**SENT POST FREE**

This will tell you how to assemble the NEW "OSRAM MUSIC MAGNET." Gives details of stations received in areas up and down the country where stations have hitherto been difficult or impossible to tune-in. Send a **POST-CARD TO-DAY.**

# SOME NEW "FILADYNE" CIRCUITS



I HAVE always been of the opinion that we have not yet exhausted the possibilities of the Filadyne, that remarkably unorthodox and efficient detector circuit originated by Mr. Dowding, and to prove this I am going to describe some new circuits which I have recently been trying out experimentally. Those of you who have had some previous experience of Filadyne circuits will no doubt be interested in these



new applications of the scheme as they provide ample scope for experiment and development.

### Salient Points.

First of all in order to get a clear idea of things let us run over the salient points of the more or less standard Filadyne circuit of Fig. 1. Here we have two parallel filament coils forming the input circuit, with reaction from the anode-coil coupling controlled by the potentiometer, the L.F. output being taken from the grid.

Alternatively we can take reaction from a coil in the grid output circuit also control-

ling it by means of the potentiometer, but in either case we can consider the tuned filament coils as the input circuit, the grid as the output electrode, and the anode as a subsidiary electrode whereby we can control reaction. In this way we obtain a closer comparison with the orthodox detector circuit which makes it easier to follow the functioning of the circuits described below, the diagrams of which look rather fearsome at first glance.

### An Interesting Variation.

An interesting variation of the normal circuit is shown in Fig. 2, which is the Filadyne counterpart of the Hartley circuit. Here the filament coils are tapped at the centre where the filament current is applied, the free end of the input circuit being coupled to the output circuit through a small fixed condenser,  $C_2$ . The H.F. choke included in the grid lead diverts H.F. energy through  $C_2$  to the input circuit to produce reaction controlled by the potentiometer.

You will notice that in this circuit reaction is obtained from the grid and not from the anode as in Fig. 1. All attempts to produce reaction by coupling the input circuit to the anode proved unsuccessful.

With this circuit, reaction control is particularly smooth and selectivity somewhat improved. One practical advantage of the circuit, of course, is the absence of a separate reaction coil so that two centre-tapped plug-in coils can be used if desired.

### Selective and Stable.

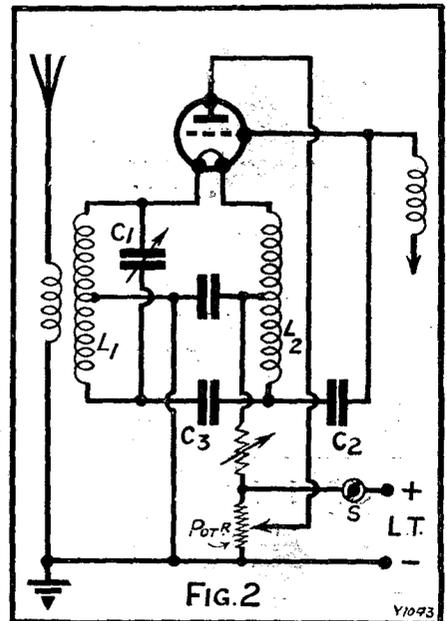
While experimenting with this circuit, I found that it was not necessary for both filament coils to be centre-tapped. Slightly better volume was obtained by using one centre-tapped and one plain coil, as in the circuit of Fig. 3, which is almost identical in operation with the circuit of Fig. 2.

By carefully comparing the two diagrams you will see that in Fig. 3 the Hartley scheme is applied to one filament coil only, the other being a plain tuned coil in parallel with one half of the tapped coil. Both coils are mounted close together with the direction of their windings in opposition, and ordinary plug-in coils are quite satisfactory if you wish to use them. Using 60-turn coils for both  $L_1$  and  $L_2$ , the receiver covers the normal broadcast wave-band quite easily with a .0005-mfd. tuning condenser.

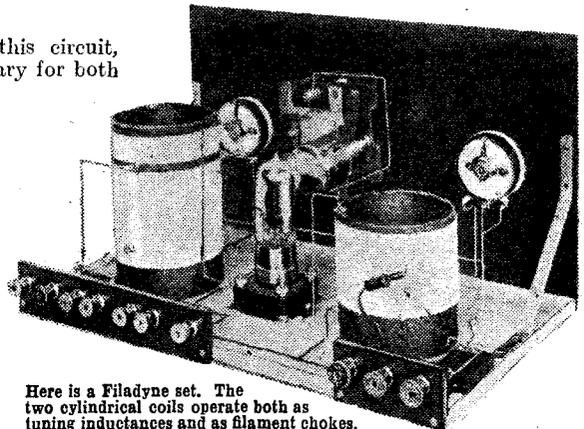
Interesting and novel variations of a principle unique in radio reception are described below.

By J. ENGLISH.

The fixed condenser,  $C_3$ , can have any capacity from .001-mfd. upwards, the larger the better; you are almost sure to have



by you an old component that can be used here. The capacity of the fixed reaction condenser, however, is more critical, about

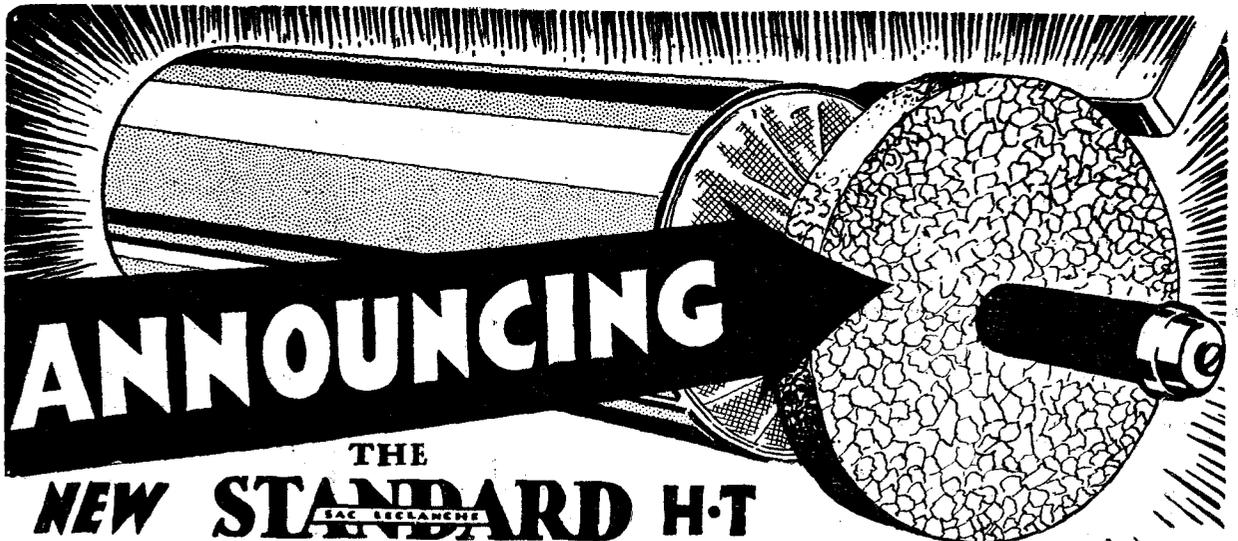


Here is a Filadyne set. The two cylindrical coils operate both as tuning inductances and as filament chokes.

.0001 mfd. being about the right value, while with some valves you can use an ordinary neutrodyne or balancing condenser.

In Fig. 3 you will notice that the aerial is tapped on to the plain coil,  $L_2$ , which gives a simple control of selectivity not so

(Continued on next page.)



# ANNOUNCING

## THE NEW STANDARD H.T. CARTRIDGE REFILLS

*You must learn about them before you buy another dry Battery*

Before you purchase another dry battery, seriously consider the STANDARD Wet H.T. first. Think of the cost of replacements you will save, and the wonderfully improved reception its "non-sagging" current ensures. Now the advent of the new Cartridge Sac is the final development. In every way you will find STANDARD Batteries a vast economy and a real boon. Simplicity itself to use and absolutely trouble-free, reliable, and efficient, they represent a wonderful example of what Scientific Research has accomplished in Wet battery design and

**CAN DEFINITELY COMPARE MOST FAVOURABLY WITH ANY OTHER FORM OF H.T. SUPPLY**

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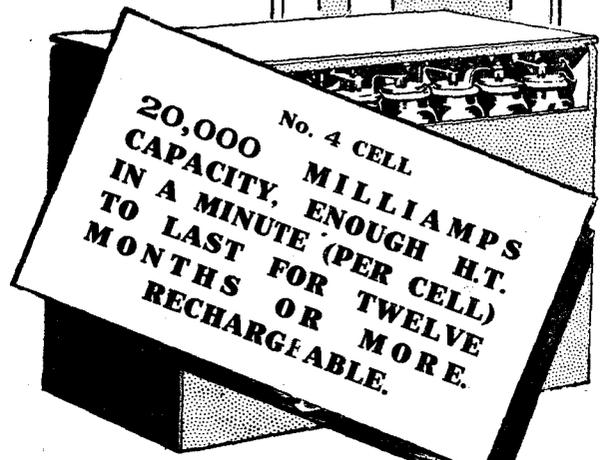
**STOCKISTS**  
Halford's Stores, Curry's Stores, and all Radio Dealers supply all models on Cash or Deferred Terms.

**DEFERRED TERMS, NO DEPOSIT, NO REFS.**

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Spare Cartridge 5d. Spare Cartridge 7d.

**ANY VOLTAGE OR CAPACITY SUPPLIED**  
The Cartridge is only supplied in No. 3 and 4 sizes. Cells No. 1 and 2 are manufactured as previously, complete with all accessories.  
Deferred Terms, 5 per cent extra. One-sixth down and balance in equal monthly payments. Batteries completely assembled in "Unibloc". Trays complete with lid in all voltages to suit all sets up to 144 volts and beyond. Battery occupies minimum space. Cells No. 3 and 4 will be found the most economical in the long run.

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Name .....

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## SOME NEW "FILADYNE" CIRCUITS.

(Continued from page 73.)

easily obtained with the circuit of Fig. 2. Like the true Hartley circuit, the Filadyne modification is rather susceptible to hand-capacity effects, but you can get over this trouble by using a slow-motion dial with an earthed screen between the control knob and the tuning condenser itself. With this modification the receiver is easy to tune, quite selective and stable.

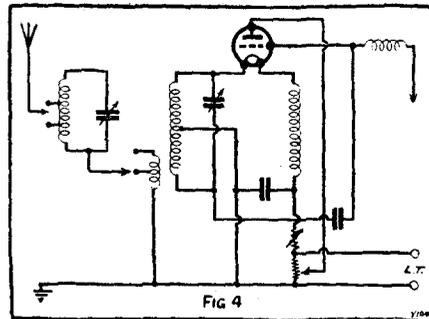
Now what will probably interest you more is the adaptation of the circuit of Fig. 3 to long-wave reception. Previously, this has not been altogether satisfactory with the normal Filadyne circuit, but the Hartley modification turns out to be particularly advantageous for long-wave operation.

### Good for Long Waves.

I have used a Gambrell E centre-tapped coil for  $L_1$  and a standard "M.W." loading-coil for  $L_2$ , when the receiver tunes well above 1,600 metres. You will find the tapings on the standard loading-coil  $L_2$  particularly convenient for varying the aerial coupling, the coil being wired up so that the terminal marked 0 goes to negative L.T. The two filament coils are, of course mounted close together and in opposition, as described above for medium-wave reception.

With the receiver thus modified for long-wave reception, full reaction was easily

There is one point in connection with filament current that is of importance when using this long-wave circuit. This is the slightly higher resistance of the long-wave coils to the filament current which has to pass through them to the valve filament. This extra resistance is not considerable with well-designed coils, but it has to be compensated by a readjustment of the rheostat when changing over from medium to long-wave reception. Most Filadyne valves take less than their normal rated



filament current under Filadyne conditions, so that there is ample margin on the rheostat to compensate for the extra resistance of the long-wave coils without increasing the voltage of the filament supply.

### Wave-trap Connections.

If you use the Filadyne as a one-valver or followed by L.F. stages, you may find that selectivity will not be adequate for the new conditions brought about by the Regional scheme, in spite of the fact that the Hartley modification is more selective than the ordinary one-valver receiver. In this case a useful circuit is that of Fig. 4, where we have a wave-trap inserted in the aerial circuit. This is quite an effective and simple way of increasing the selectivity of the receiver. The wave-trap coil is a No. 60X tuned to the wave-length of the station you wanted to cut out by a .0003-mfd. condenser, which can be of the compression type to economise space. The trap coil should be mounted at right-angles with and well-spaced from the other coils.

Before concluding this article, a few notes on valves may assist you to get the best results out of the various circuits I have already described.

### Valves for the Filadyne.

If you have had no previous experience of Filadyne receivers, use one of the valves specified below, setting the potentiometer about midway between positive and negative. Then with the proper H.T. voltage adjust the rheostat until the receiver oscillates. Too much filament current paralyses the valve, so that the rheostat must be adjusted slowly and carefully. Reaction is then controlled by adjusting the potentiometer setting, this having hardly any effect on the tuning, which is quite a valuable feature in long-distance reception. \* Some of the early dull-emitters, such as the D.E.R., D.E.3 and D.E.2 L.F. have proved to be very satisfactory Filadyne valves, so that if you have any of these old valves stored away, here is the chance to make good use of them. These valves require an H.T. voltage up to 30.

Modern valves, unfortunately, are in most cases unsatisfactory for the Filadyne scheme with the exception of the Dario super H.F. 2-

and 4-volt ranges, and others to be found among foreign manufactured valves. These types require an H.T. voltage between 15 and 21. Possibly there are other suitable modern valves, as I have not been able to test every one of the great number now on the market.

Here is a fine opportunity for some enterprising manufacturer to bring out a valve specially designed for the Filadyne scheme. When you do get the right valve, superlative results can be obtained, the receiver possessing several advantages over the ordinary one-valver.

## RADIO RECEPTION WRINKLES.

\* \* \*

Correct grid-bias effects a great saving of battery current.

\* \* \*

The exterior of an L.T. battery should be kept in good condition, but don't use a new duster for the job as acid, even in small quantities, is liable to burn holes in it.

\* \* \*

When joining up a potentiometer, remember that it must be wired on the far side of the on-off switch, or otherwise it may be taking a small current from the accumulator, even during the time that the set is not in use.

\* \* \*

If your reaction-controlling condenser is wired straight between the plate of the valve and the reaction coil, remember that a .001-mfd. fixed condenser connected in series with it will not hurt reaction results in any way, but it may save an expensive accident through condenser vanes shorting.

### WHERE SKILL SCORES.

\* \* \*

Long-distance results depend not only upon the set and the local conditions, aerial, and so forth, but very largely upon skill in handling the set.

\* \* \*

Both in short-wave and ordinary long-distance work, the chief factor in the successful handling of the set is in the correct use of reaction.

\* \* \*

Both sensitivity and tone may sometimes be improved by correct by-passing, obtained by wiring large fixed condensers between minus H.T. and the various plus H.T. terminals, or other parts of the set.

\* \* \*

Valves which have been in use for years are not necessarily still O.K. because their filaments are intact, as they may have lost their emission, and therefore their usefulness, long before the filament wire shows signs of "going."

### LONG-DISTANCE LISTENING.

\* \* \*

Important factors in long-distance reception are the correct H.T. voltages for detector and H.F. valves, and the most suitable value of grid leak.

\* \* \*

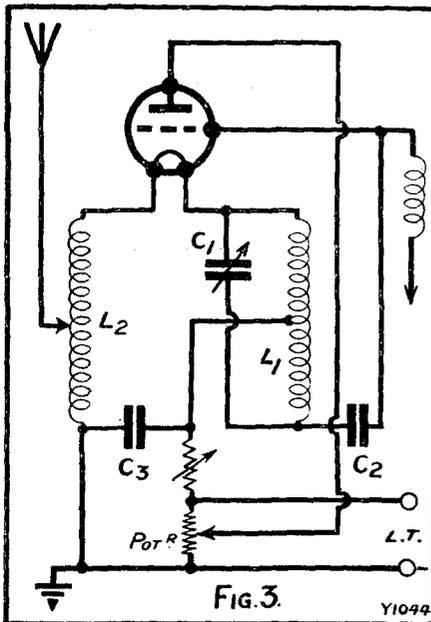
Usually for long-distance work the detector valve is the most important one in the set, and if different valves are available, they should all be given a trial in this position.

\* \* \*

Generally speaking you cannot expect an ordinary small dry cell to supply more than five or six milliamps for wireless purposes.

\* \* \*

A run-down H.T. battery is the commonest cause of howling and distortion on ordinary commercially-made receivers.



obtained without altering the capacity of  $C_2$ , control being quite as smooth as on normal wave-lengths. In tuning, very little hand-capacity variation was observed with an unscreened tuning condenser.

A rather interesting possibility of this circuit is that you can use it for medium-wave reception simply by replacing  $L_1$  by a No. 60 centre-tapped coil without altering the other filament coil. This scheme, however, does not give quite so much volume on the medium wave-band as the circuit with two 60-turn filament coils.

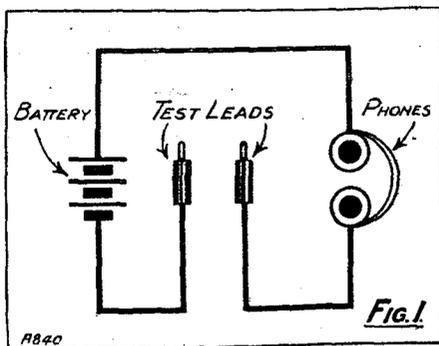
# TESTING FIXED CONDENSERS

A "dud" condenser can soon be spotted by the tests here described.  
By B. I. H. BLOKAM

THE radio enthusiast who does a considerable amount of experimental work or set construction, invariably accumulates a large number of component parts, the storage of which is doubtless a bone of contention in many a domestic circle.

Many of these parts are "dud," for one is loath to part with even these—the mica, the wire, or the iron "might come in useful some time." So they swell the pile.

Fixed condensers of various kinds accumulate with the rest, and when that job



turns up which requires a certain capacity, the "stock" is investigated to see what is on hand.

Usually, however, the good and the bad are hopelessly mixed up; and in order to save oneself much trouble and annoyance when the time comes to test out the completed receiver, it is essential to test any of the "stock" called upon for service, before fitting them into the set and wiring up.

With the simple arrangement to be described, it is such an easy matter to make a very reliable test, that the writer invariably tests all fixed condensers by this method, whether new or old, and the "stock" can be reviewed and tested periodically, the good condensers being marked "O.K."

## The Best Method.

The usual method adopted in order to test condensers, is to insert a flashlamp battery in series with a pair of headphones and to apply the lead from one side of the battery and from one side of the battery to the condenser (Fig. 1), a loud click denoting a "dead-short," whilst a faint click on the first contact denotes the charging up of the condenser, and consequently that it is "O.K."

With modern receivers employing relatively high anode voltages in the output stages, such a test is, however, inadequate, since the voltage applied across the condenser whilst testing, is only a fraction of the normal working potential it will be called upon to withstand; at any rate, so far as the H.T. by-pass condensers are concerned, and, of course, any others

which shunt the H.T. in various parts of the circuit.

The average receiver does not employ anode voltages exceeding 200 volts, and thus if the condensers are tested to this voltage, one may assume that they will most probably function satisfactorily under working conditions.

The usual mains supply voltage being 200 volts or over, those with mains available have the requisite testing voltage to hand, and it only remains (sorry!) to apply the test in such manner that all the lights in the street are not put out as a result, or one's personal researches in radio abruptly curtailed by electrocution!

Fig. 2 shows the simple arrangement required, which enables us to make the test with absolute dependability and comparative safety.

The condenser to be tested is connected in series with an ordinary electric lamp, which may be any lamp of similar voltage to those normally in use on the circuit. The writer has 200-volt 50-cycle A.C. mains, and uses a 75-watt lamp of the ½-watt type.

The results obtained will differ according to the capacity of the condenser on test, and whether the supply mains are D.C. or A.C.

## Peak Voltage.

A point in regard to A.C. mains should be remembered, this being that the actual voltage applied to the condenser, whilst testing will be higher than the rated voltage of the supply, the supply voltage being the root-mean-square (R.M.S.) or average voltage, which is less than the peak or maximum voltage, which latter the condenser is, of course, subjected to whilst testing.

The peak voltage is 1.4 times the R.M.S. value, and is therefore 280 volts in the case of a "200-volt" supply.

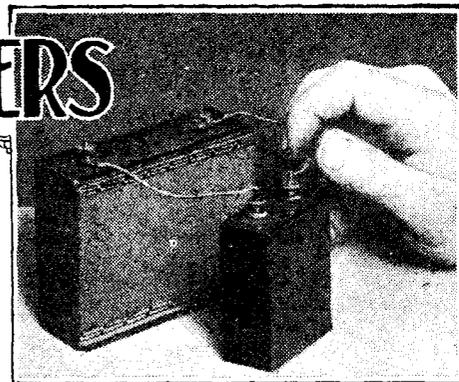
If the insulation of the condenser on test is broken down, it forms a "dead short" across the two test leads and, therefore, the lamp will light up to full brilliancy upon switching on the supply, whether the latter is A.C. or D.C.

With D.C. mains there will be no glow whatever in the lamp upon applying the test, if the condenser insulation is in order.

Lighting up of the lamp indicates short-circuiting of the insulation, and consequently the condenser is useless, unless repaired.

For A.C. mains the same remarks apply as for the test with D.C., so long as the condensers are of small capacity, and the mains frequency does not exceed the usual 50 or 60 cycles per second.

When, however, the test is applied to condensers of about 2 mfd. or larger, there will be a certain amount of glow in the lamp, even though the condenser insulation is in order. This is due to the fact that a condenser allows alternating current to pass through it, the amount of current passing depending upon the capa-



city of the condenser, and the frequency of alternation of the power supply connected across it.

With the 200-volt supply, and 75-watt lamp referred to previously, the writer found that a 4-mfd. condenser caused the lamp to light up to about ¼ full brilliancy.

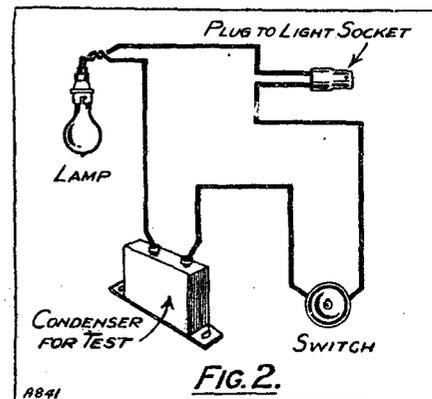
A "dead-shortened" condenser would, of course, light the lamp to full normal brilliancy, so there is little possibility of confusion.

## The Reservoir Charge.

It is essential, for safety, that the test be controlled by means of a switch as shown, so that the condenser can be connected up all ready before switching on the current, thus obviating the holding of the wires whilst testing, and consequent risk of shock.

It is extremely important to remember that a condenser having good insulation acts as a "reservoir," and holds a charge for a considerable time after test, the voltage existing across the two terminals being practically that of the applied test voltage, whether A.C. or D.C. In the case of condensers of ½ mfd. or more, the amount of energy is very considerable, and fully capable of causing severe shock if the terminals are touched before the condenser is discharged. Don't do it!

After applying the test voltage, immediately switch off the current supply, and

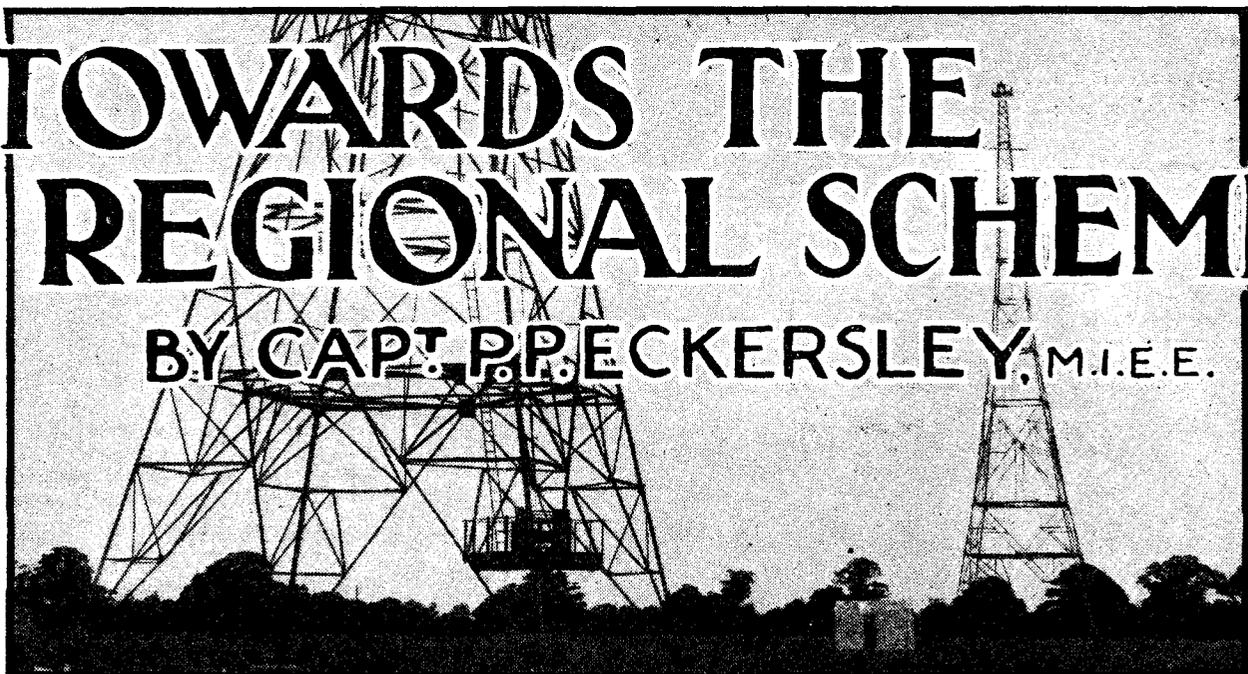


before attempting to touch the condenser, discharge it by "shorting" the two terminals together with a screwdriver.

The fat blue spark accompanied by a sharp "crack" which occurs when a 3- or 4-mfd. condenser is thus relieved of its charge is rather awe inspiring, and once heard and seen conveys the "safety first" rule indelibly, as far as condensers are concerned, anyway!

# TOWARDS THE REGIONAL SCHEME

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



THE Regional Scheme has received too much publicity for the actual concrete amount of work completed. One cannot blame the B.B.C. too much; they could reasonably have expected to receive the necessary permissions to start building before these were actually forthcoming. But we are on the eve of the second instalment of our scheme—the London Station is due to open this “fall”—and almost simultaneously I am due to leave the B.B.C. as its Chief Engineer. I would like to make it plain that the two events are unrelated, and I am as confident in the future success of the Regional Scheme as I was when I first worked it out in principle some years ago.

Perhaps, as we have just reached a second stage in the Regional Scheme development, it might be interesting to hear once again what it's all about and why the B.B.C. are spending a good deal of time and money in scrapping practically all the existing transmitting equipment and substituting these new “twin-wave” transmitters.

The whole point is bound up in the desire on the part of the B.B.C. to provide facilities for alternative programmes. In the old days when I saw a good deal of the programme side of the B.B.C. I was always struck that decisions apparently

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Captain Eckersley, who has joined our staff as Radio Consultant-in-Chief, will contribute exclusive articles to “P.W.” Below he has something of outstanding interest to say about the Regional Scheme and its future.

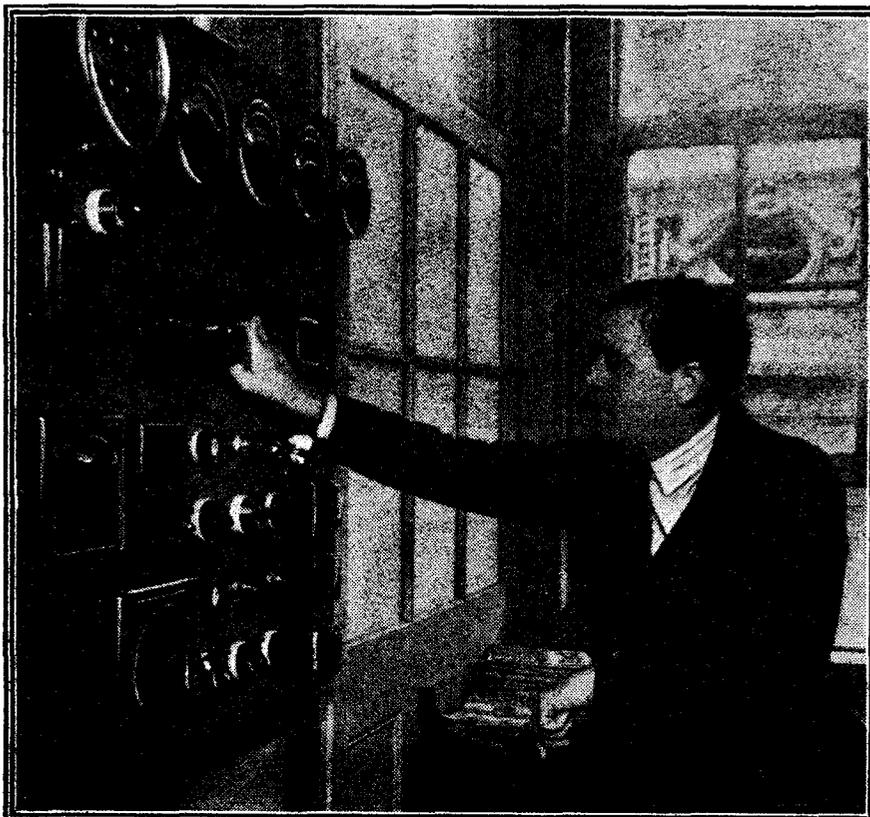
\*-----\*

had to be in terms of compromise because it was possible to transmit only one item at one time. I felt that an alternative programme facility would make far less excuse for compromise. Thus the whole forward policy of the B.B.C. is to arrange a system of alternative programmes so that the listener can have a true choice between this sort of thing or that.

In essence the scheme as first proposed was to contrast the efforts of a Regional programme director with those of the London office, but the scheme has had to be somewhat modified and the listener under the Regional Scheme is to find much of his choice as between two different London programmes. It will be appreciated that London contains more talent, and it would be absurd to contrast one talented programme with another which could not compete (for lack of talent).

The first instalment of the Regional Scheme has been in operation for over two years now. Daventry 5GB started a regular service in August, 1927, and has been giving programmes “in contrast” to those of 5XX ever since. A great many of the programmes for 5GB have been supplied from London and some from Birmingham, so listeners who have been

*(Continued on next page)*



[Captain P. P. Eckersley, the most popular radio engineer in the world, tries the new “Popular Wireless” power plant which was recently installed in our laboratories. This plant is mainly used for testing sets, components and accessories.]

## TOWARDS THE REGIONAL SCHEME.

(Continued from previous page.)

accustomed to choosing between 5 X X or 2 L O and 5 G B know the conditions of the Regional Scheme. Those conditions are now to be extended to the London Station.

This new London Station is thus designed to give a service on two separate wave-lengths over the whole London area, so that the very simplest receiving sets give their owners the possibility of a "choice" of programmes. For a year now we have been building and the station is nearly complete. I think that it combines a boldness of general conception and a thoroughness in practical detail design that makes it unique. Mr. N. Ashbridge, the Chief Engineer elect, has done a most wonderful piece of work in the specification of the electrical machinery and the detailed working out of the whole station, and he, with the

now on the top of the Selfridge building. He has got an indoor aerial (1,000 ohms), a piece of crystal (1d.), a pair of 'phones (borrowed), and he listens quite contentedly because the strength of the signal is so overwhelmingly great that it finds its way past any number of technical imperfections which would be quite enough to be fundamental say ten miles from Selfridge's.

### That Tremendous Signal.

Now we go over to the new transmitter (near Potter's Bar and fifteen miles from our friend); whatever within reason the power of the new transmitter, it cannot in the nature of things be as strong to our friend as it was before. He complains "They've taken away my service," etc., etc. I should complain if I were he, too. He paid for a licence with an implied guarantee in his mind, and he is justly annoyed when service conditions as he sees them are removed. He has really got a tremendous signal under the new scheme, far more than millions of Londoners have been getting since broadcasting began, but it's not enough for his crude set because it's not as much as he had before. He complains, his neighbours are

the two, and complain. More evidence of failure!

The B.B.C. will have a hard time answering these complaints, with all of which one can thoroughly sympathise, none of which are really justified, all of which in the long run will die. The crystal-set user who hears nothing has only to put up a little bigger aerial, get a proper tuning arrangement, and he will be all right.

The B.B.C. issues pamphlets of all kinds to help him. The man who listens to distant programmes, and is debarred therefrom, should look to a super-het, and a frame for a solution of his difficulties, but he should further realise that the B.B.C. responsibility does not extend to his problem. They will help all they can, but they cannot constitute it as a fundamental objection to their scheme that more people will have difficulty in not listening to the programmes they provide under that scheme. Remember, too, there will be an alternative programme.

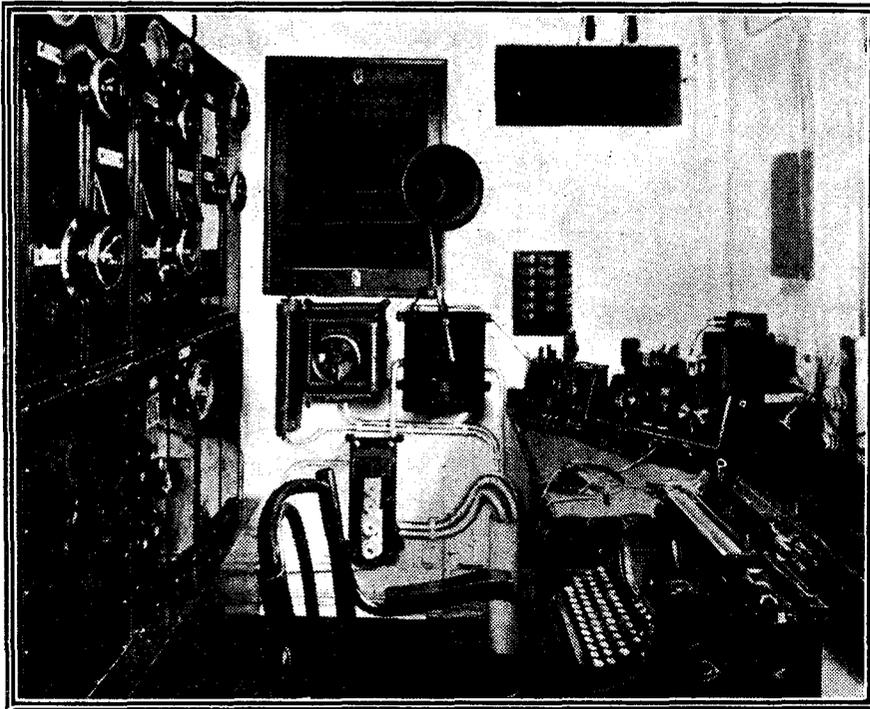
### A Unique Improvement.

In brief, and in sum, every innovation designed for the eventual good of the majority is unpopular in its inception. It is apparently unpopular because only those who, to their minds, do not benefit complain (the knowledgeable are satisfied and do not complain), unpopular because a little trouble has to be taken before its full benefits can be derived.

Circular traffic is on certain routes, for certain individuals, a real nuisance, but does it speed up the traffic of London? Daylight saving was opposed by the cows for years, but did it bring more opportunities of health and recreation to millions? Democratic institutions were an awful nuisance to autocrats—but I labour the point.

The Regional Scheme is a unique improvement, it is original in the world, and it exists to enable the giving of a greater liberty of choice to the individual listener. Surely it is, therefore, a beneficial scheme, and its dislocations should be faced by the public with co-operation rather than facile condemnation.

## RADIO ON THE HIGH SEAS.



This is the 800-watt transmitter fitted on the ship "Ozeana." The receiving outfit can be seen on the right.

Civil Engineer, Mr. M. T. Tudsbury, and the Development Department (particularly Mr. B. N. MacLarty, who designed the actual transmitter), should receive the very warm congratulations of those whose congratulations mean anything—one should bring in here something about a committee of peers, but I just forget the exact quotation.

### The Test by Results.

But the public cannot in the very nature of things appreciate the thoroughness or subtlety of the interior of a wireless station they will very likely never see; they are much more interested in the result. In this they are bound at first to be disappointed. Take the case of someone who lives say a mile from the present transmitter, which is

in the same plight and they too complain, and the Regional Scheme is voted a failure.

### Simultaneous Programmes.

Similarly, another man lives at Golder's Green. He has been used to 15-20 millivolts from the Selfridge station. He gets 200 or more (ten times the signal) from the new Brookman's Park Station. He is accustomed to getting foreign stations, he fails to do so any longer, his set is condemned to local listening; he too complains. Another person (and all his neighbours) agree that the Regional Scheme is a failure. When perhaps all that fuss has died down we introduce the new wave-length for the alternative. Lots of people get two programmes at once and cannot select between

## RECEPTION REMINDERS.

One good method of improving the sensitivity of an ordinary one-valve set is to join a potentiometer across the filament circuit, and to connect the L.T. end of the grid-leak to the slider of this.

If acid is spilt from an accumulator, the level of the electrolyte should be restored, using acid of the correct specific gravity for that particular type of accumulator. (It is only when the loss is by evaporation that distilled water should be employed to restore the level.)

Indoor aerials of the spring type should be extended as far as is possible as generally the longer they are, the better is the reception obtainable.

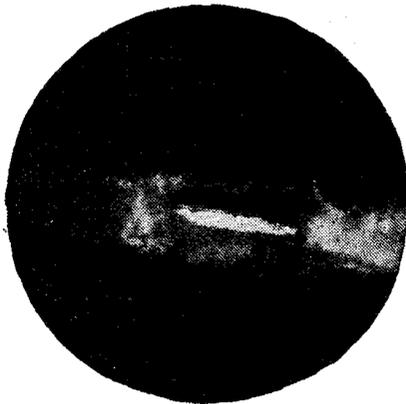
One of the commonest causes of crackling and distortion is a faulty anode resistance.

When using a screened-grid valve remember that a little difference in the H.T. voltage may mean a big difference in the results obtained.



**AGAIN at Olympia**

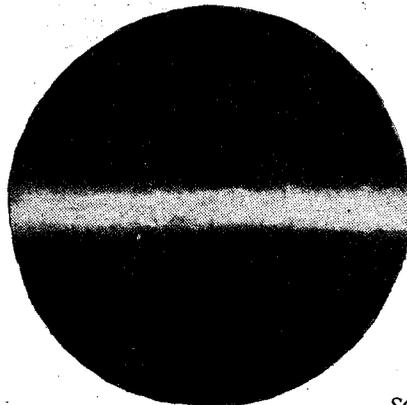
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WITH**

**“TENACIOUS COATING”**

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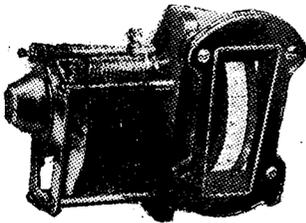
This new Polar condenser has both Quick and Slow Motion control.

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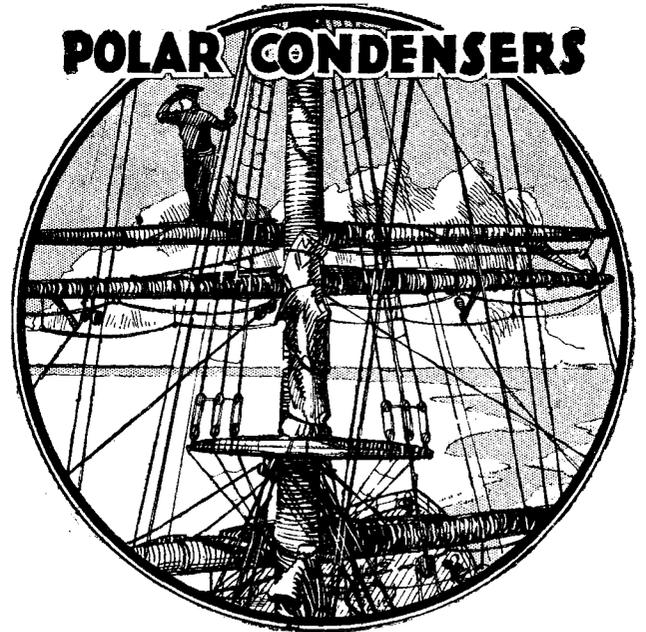
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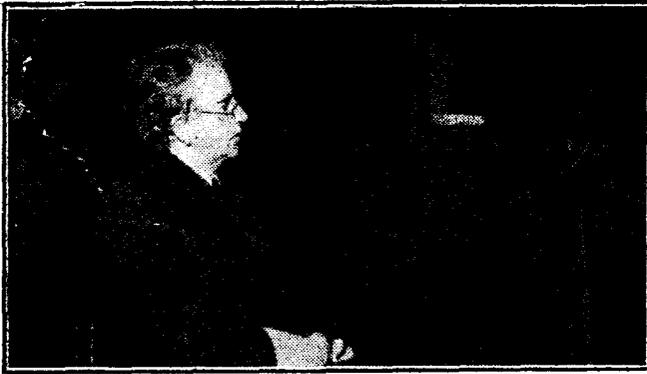
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# MR. BAIRD EXPLAINS.

On and after Sept. 30th, we may expect to have regular television test transmissions in this country, and in this article Mr. Baird's future plans and the position of the listener and home constructor are discussed.

By K. D. ROGERS.

**F**OLLOWING the opening of Brookman's Park, we may expect to have some regular television test programmes. They will be sent out, either from 2 L O or Brookman's Park, every day except Saturdays and Sundays from 11 a.m. to 11.30 a.m. Talking to Mr. Baird recently, I asked

requires about 200 volts H.T. and an anode current consumption of at least 50 milli-amps. In addition, other pieces of apparatus are required, a scanning disc, neon lamp, and synchroniser; but it is hoped that cheaper running will be possible as the results of experiments that are now being carried out.

Now, in operation, the action is as follows: Between one image and another there is a black division. This black division is not artificially produced, but is the natural demarcation between one picture and another.

Now when the machines are in synchronism, the commutator connects the relay just at this black space; therefore, no current flows through the relay. If, however, the receiver goes slightly faster than the transmitter, the commutator comes into action at a lighted portion of the image, and current passes through the relay, giving an accelerating impulse. The receiving machine is arranged to run very slightly slower than the transmitting machine, so that by means of the relay a balance is achieved.

### Televisor Prices

The price of the apparatus will be from about £12, or a little less, upwards for complete televisors, the cheaper models being additional units to be connected to the loud-speaker terminals of an existing four or five-valve set, and the more expensive types being complete outfits, including the radio as well as the television side.

The synchronising apparatus is made public for the first time, and two types will probably be available.

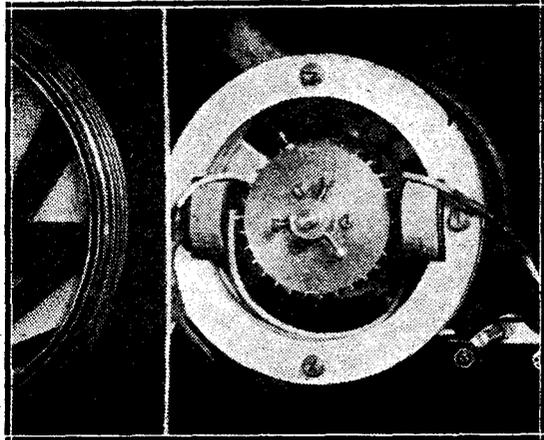
The synchronising is accomplished by taking from the picture part of the current and using this to keep the mechanism in step. Where a large receiving disc is used, a commutator directs this current through a relay circuit for a brief interval during each line of the picture.

For example, if there were thirty lines (one for each hole in the scanning disc) in the picture, the commutator sends thirty brief impulses through a relay during each reproduction of the image.

### Technical Details

The above synchronising mechanism is simplified in the smaller machines, which will be most likely the types supplied to the general public. In place of a commutator and relay, the correcting signal is applied directly to the coils of an electro-magnet which acts upon an iron wheel having little teeth corresponding to the interruptions in the commutator. Thus, when the machine runs too slowly, the correcting impulse pulls directly upon the iron teeth and accelerates the motor. If it runs too fast, it pulls back the teeth and retards the motor. The cogged wheel is not a driving mechanism, but only functions as a speed corrector.

(Continued on next page.)



The automatic synchronising device used in the Baird Televisor.

him how listeners were to receive the programmes without apparatus, and what sort of programmes were to be transmitted. Smiling, he answered:

"As regards programme material, we shall transmit head and shoulder pictures with or without speech (according to whether 2 L O or the two-wave Brookman's Park is used), and hope to give all sorts of interesting talks, comedy turns, and musical items.

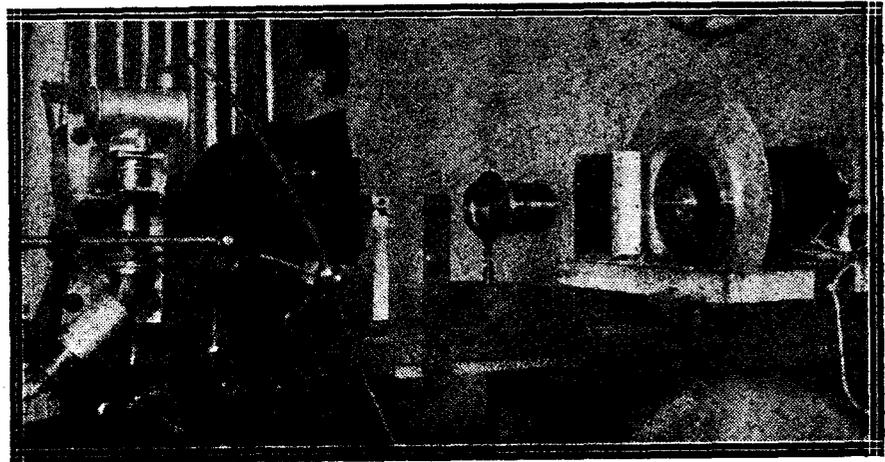
### Guaranteed Sets

"As regards sets, we are allowing the wireless trade, or certain members of it, to manufacture televisors under licence to us, and these should soon be ready." These sets, I understand, will be guaranteed by the Baird Television Development Co. to be fully up to standard and passed by them.

The question of the home constructor was raised, and it appears that he will be catered for in the usual way. POPULAR WIRELESS and its contemporaries, "Modern Wireless" and the "Wireless Constructor," will, of course, keep readers *au fait* with all the latest developments, and any technical modifications that may be made from time to time.

At the moment the running of a televisor is not a cheap matter, as two detector and amplifier systems are required, one for the speech side and one for television reception; while the latter apparatus

## MR. BAIRD'S TELE-TALKIE TRANSMITTER.



The film is run through the small projector on the left, and the image is focussed through the lens to the sensitive cell on the other side of the scanning disc.

## MR. BAIRD EXPLAINS.

(Continued from previous page.)

The "Televisor" disc has 30 holes, although discs having holes from 90 downwards have been experimented with. With a larger number of holes more detail is obtainable, but as broadcasting is restricted to the use of not more than 10 kilocycles, with a corresponding restriction of detail, there is no possibility of providing more holes in the disc than can be accommodated by the wave-length band.

The discs, run at  $12\frac{1}{2}$  revolutions per second, are about 20 in. in diameter, the 30 holes being approximately  $\frac{1}{10}$  in. across, while the pitch of the series of holes in the disc is such that a picture of about  $2\frac{1}{2}$  in.  $\times$  1 in. is provided.

### Limited Subjects.

A universal type motor (for A.C. or D.C.) can be used, and the operation of the whole outfit appears to be very simple. Those recently demonstrated to me by Mr. Baird certainly were easy to control, and once the disc was running in step with the transmitting disc (a state of affairs quickly obtained) the synchroniser "held" the motor and kept the apparatus in step perfectly.

Lenses for the magnification of the received image, which is only about the size of a cigarette picture, can be obtained, though by using these the picture loses some of its brilliance.

Outside scenes, plays, boxing matches, and the like are still for the future, but the detail obtained by Mr. Baird in head and shoulder and other limited transmissions is now adequate for recognisability, and a watch held up before the transmitter is televised with sufficient clearness to enable the "looker" to tell the time without much trouble.

At the present time I cannot say more about the technical aspect of the Baird Televisor, nor about the arrangements that have been made with the trade and the B.B.C., but Mr. Baird is very hopeful that before many weeks have passed the British listener will be able to "look" as well as listen, and that his early promises will

be on the way to fulfilment and some form of television will be here.

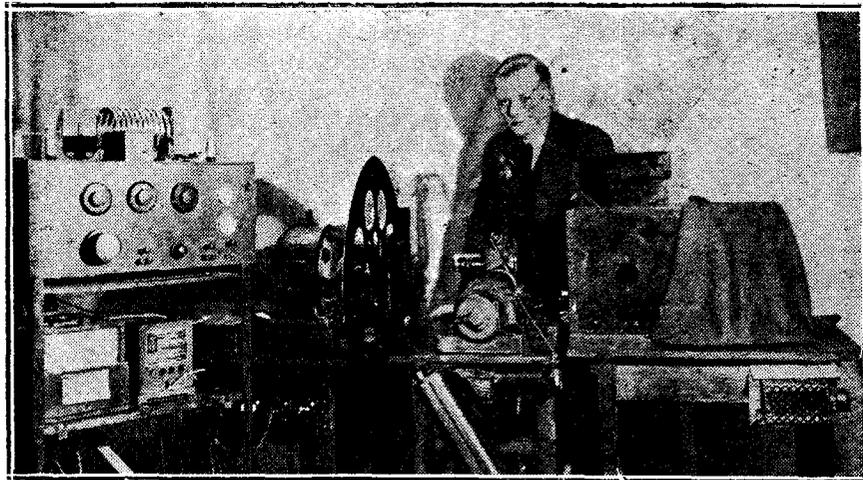
The ultimate future of the Baird television system is still "in the air," so to speak, in that it depends upon the results and data obtained from the experimental transmissions from Brookman's Park.

It must be realised that the final stages are still a long way off, and that perfection has not yet been reached. It is not possible,

items—the ordinary talking film (or a section of it) being run through before the televisor.

This type of transmission was also demonstrated to me by Mr. Baird, but the definition seems to suffer for some reason or other, and the demonstration of the "tele-talkie" was not so successful, in my opinion, as that of the real objects.

I was told that the finding of suitable



The cinematograph television transmitter designed by Denis von Mihaly, the Hungarian inventor.

as many people imagine, to throw the image received by the televisor upon a screen in the same way as a cinema projector does. This would mean a very powerful light, instead of the neon lamp, with its orange-yellow glow.

### The Wave-length Problem.

The size and definition of the picture is wrapped up in the station crowding problem. Very fine definition means a large number of holes in the disc, and this means a more rapid scanning rate in order to preserve sufficient optical continuity. This all means a wider frequency-band in broadcasting, and as the present system of broadcasting limits the modulation to a band of 10 Kc. such definition is not practicable.

In addition to ordinary television the Baird Television Development Co. intend to transmit "tele-talkies" as alternative

"television faces" was not an easy task and with the present state of development this part of the technique is, of course, extremely important.

### What I Saw.

The televisor has, as seen by me, an upsetting habit of altering the colour of the hair and somewhat distorting the features, so that while persons are certainly recognisable, the process of picking out "who it is" is not always an easy one.

There is no doubt that some faces transmit better than others and that certain angles of view suit the televisor better than others.

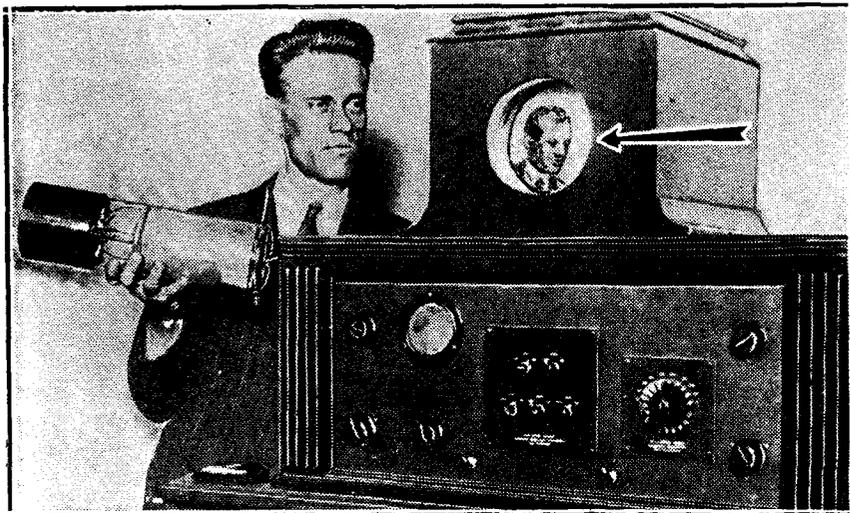
Nothing like the clarity (in the case of living objects) is obtained as is usually given by the ordinary photograph published in the daily Press, though televised photographs come over much more clearly.

It is difficult to give an exact impression of the state of development which has been reached, for if I say persons are recognisable that may impart the idea that a glance at the image is quite sufficient for the "looker" to tell at once who the "sitter" is.

This is not always the case—it seems to depend on the sitter. I personally took a long time to "recognise" Mr. Baird when he was televised, and without the voice as well, I do not think I could have done it. Other people I knew, however, were easier to spot. I think it was the converting of Mr. Baird's fair curly hair to a dark non-curly substance by the televisor that made his test so difficult.

One can recognise a very well-known face, but if a long-lost friend were to appear unexpectedly, I doubt whether one would have an inkling as to who it was—without the assistance of the voice.

But we must wait and see, not for very long now, says Mr. Baird, for the opening of Brookman's Park later this year should give us a chance to see in our own homes what manner of thing is this television.



A new television device which has been demonstrated to American scientists, and which claims to provide a larger image (arrow) than any other machine.



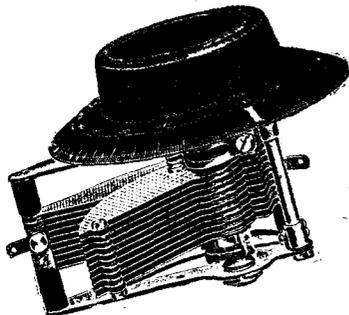
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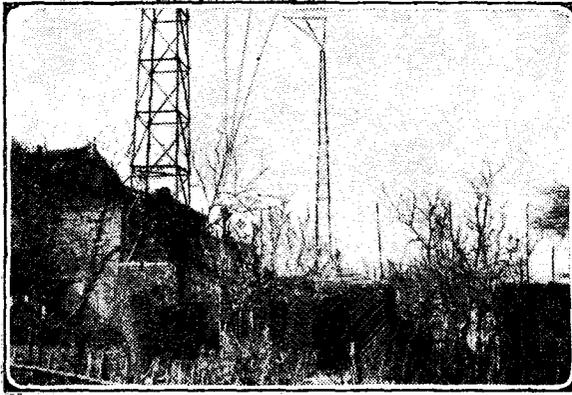


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# Toulouse Calling

Some interesting and amusing sidelights on the equipment and personnel at Radio Toulouse.

By OUR OWN CORRESPONDENT.

**T**OULOUSE is nowhere near the Riviera nor is it close to the sea, but still it is in the famous "midi." Sleepy inmates of the express trains running from Paris to Barcelona and from Paris to Madrid realise Toulouse as a station where the train always stops. Tourists wishing to discover the beauties of the Pyrenees anew usually have to change at Toulouse. But who stops at Toulouse?

Foreigners and tourists very few. But ask the gay French university students about Toulouse, ask well-known French Opera singers about Toulouse, they will all be able to tell you a lot about the town.

## No Land-lines Allowed!

In spite of only 250,000 inhabitants Toulouse boasts of two broadcasting stations: Toulouse-Pyrénées, one of the PTT brigade (those we know best because of those wandering waves!), and Radio-Toulouse, that Toulouse listeners all over Europe and Northern Africa have learnt to count on as the provider of at least part of the evening radio programme.

Much as I admire the work done by Toulouse-Pyrénées and its able director, Mr. Dardignac, and much as I hope that his efforts will be recognised more than hitherto, I think I am justified in writing more about Radio-Toulouse than the PTT station. After all Radio-Toulouse is the station we hear most. But before commencing on Radio-Toulouse a few words on Toulouse PTT. The transmitter is

other French administration stations. The power is small, but sufficient to enable good crystal reception within the limits of the town.

Radio-Toulouse, on the other hand, has its transmitter beyond the boundaries of the town and two kilometres from the centre. Differences with the French postal administration, who as a result do not permit the use of their lines by the private stations in France, and who do not permit the laying of special, private lines, forced Radio-Toulouse to install the necessary studios at the actual transmitter.

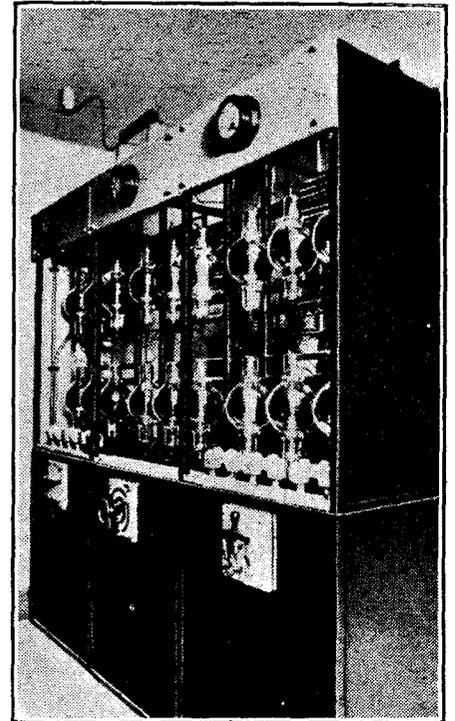
Two private houses were leased, one was converted into an office and transmitter building, the other contains habitations for the station engineers. And now you may ask: "But what of the studios?" Well, the waiting-rooms are in the office building, in the Villa Schmit as it is picturesquely (?) called, but the studios proper are situated in a former outbuilding of the Villa Schmit, now connected to it by doors.

## The "Pigsty" Studio.

This outbuilding was used, before the advent of Radio-Toulouse, as a barn for storing grain, part was used as the stables, and the part now containing the small talks studio was used as the—well, it will out—pigsty!

Nothing whatever now remains to remind one of the antecedents of these studios but I think they are unique in Europe as far as this is concerned. The Villa Schmit is up on a small hill, and five minutes walk takes you to the "Octroi," or the town boundary, jealously guarded and barricaded. Peasants coming to market have to pay duty to the town for the permission of bringing their wares into the precincts of the town. Artistes performing at Radio-Toulouse's studios and returning home in the dark could do quite a lot of smuggling as they are well-known to the guards. Only I am afraid it is rather un-

comfortable to carry a freshly slaughtered cock or goose under one's coat for the sake of saving a few pence duty. Radio-Toulouse has many difficulties owing to the lack of permission to use land-lines. No relays are possible, neither from other parts of the country nor from

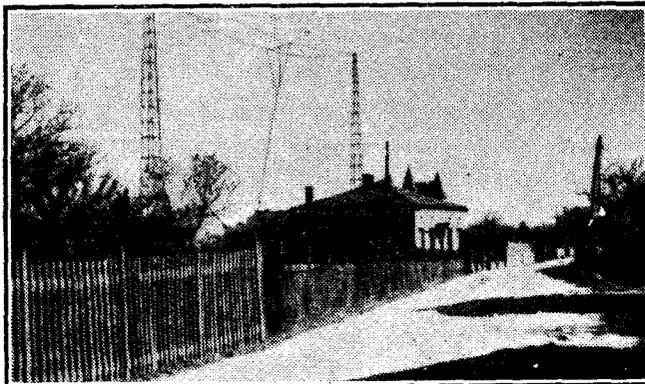


One of the huge rectifying panels. This portion of the Toulouse gear embodies 20 valves and rectifies the H.T. required for the transmitter.

soloists, are packed into the cars and off we are to the Villa Schmit.

After the studio performances the buses take the artistes home again. This is necessary as no tram-line runs near the Villa Schmit and other conveyances do not venture out so far at night. So Toulouse uses buses instead of landlines—by a little stretching of the imagination at least.

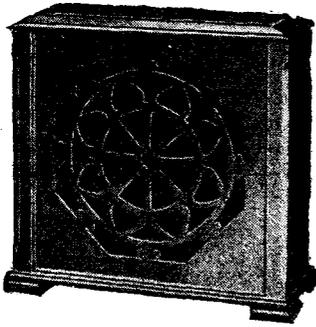
Radio-Toulouse has recently installed a picture transmitter. This transmitter is not the usual Fultograph, but was specially constructed for Toulouse by Mr. Edouard Belin, of Paris, the well-known inventor. I hear that similar apparatus has now been installed in Scandinavia.



The aerial masts of Radio-Toulouse. The house that can be seen is the Villa Yvonne, in which the engineers live.

situated in the centre of the town in the building of the General Post Office. In the same building there is a small studio, waiting-room and offices.

Toulouse PTT for the greater part of the week acts as a relay station for the programme sent out by Paris PTT or

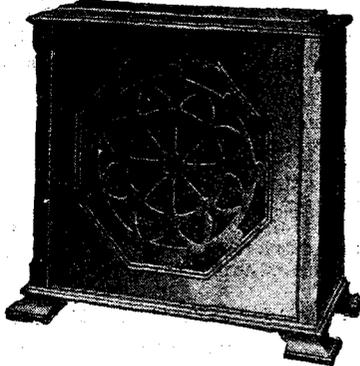


MODEL Z.20

Oak .. ..	£7 15 0
Mahogany ..	£8 5 0
Walnut ..	£9 0 0

(to special order only)

Size 19½ ins. by 18 ins. by 8½ ins.  
Resistance 750 ohms (other resistances to order, at 5/- extra).

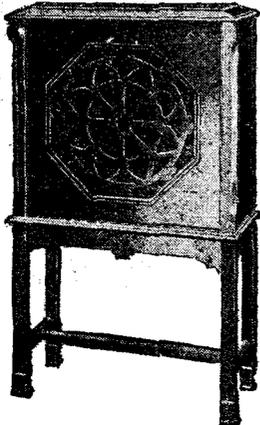


MODEL Z.25

Oak .. ..	£15 0 0
Mahogany ..	£15 15 0
Walnut ..	£15 16 0

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Size 24 ins. by 24 ins. by 14 ins.  
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6 v. D.C. complete

Oak £24 0 0; Mahogany £25 0 0

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Oak £25 10 0; Mahogany £26 10 0

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## FROM THE TECHNICAL EDITOR'S NOTE BOOK

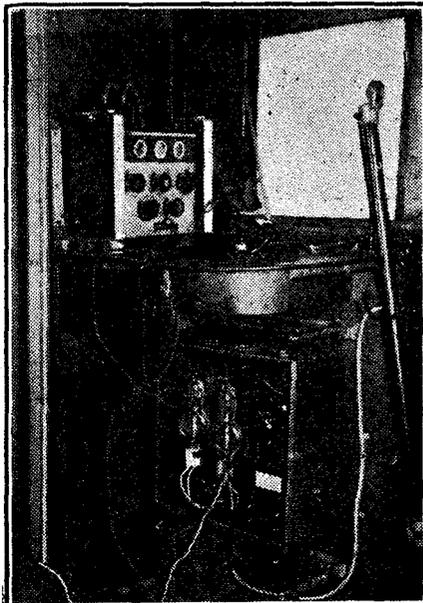
# Tested and Found—?



## THE VOLUSTAT.

**T**HERE is now a close British equivalent to a very cleverly boosted American line. This—the British production—is the “Volustat” recently introduced by Harlie Bros. It is a one-hole-fixing variable resistance of the compression type. By using a patent mixture of graphite and mica and other materials, packing is avoided, and a smooth reliable resistance variation is obtained.

It is rated to carry 10 watts, so that its usefulness is extended to mains units. It is available in three models, the Universal giving a variation from 50 to 500,000 ohms, the medium 2,000 to 2 megohms, and the high resistance 10,000 ohms to 10 megohms. The price is the same in each case, i.e. 7s. 6d.



The radio gear installed on the “Yellow Bird,” the aeroplane in which three brave Frenchmen flew the Atlantic from West to East.

The “Volustat” has numerous uses, and these are very interestingly dealt with in an illustrated leaflet published by the makers. The “Volustat” is designed to carry 500 volts continuously and to withstand tests at this pressure. The case is of bakelite and the two terminals are widely spaced, so that there is no danger of “flash over.” I have tested the samples sent me, and find them completely satisfactory.

## C.D.M. FIXED CONDENSERS.

C. D. Melhuish, of Goswell Road, E.C.1, has sent me further samples of C.D.M. condensers. The special feature of the condenser is that it is mountable by means of only one screw, as it has a nice large metal bushed hole in its centre—a good point and

one which constructors with experience of the breaking-away of composition, which occurs with some fixed condensers when screwed down by means of holes in their casings, will appreciate.

Readers will no doubt remember that I gave a favourable report of these C. D. M. productions some time ago, so that it only remains to be said that the prices of C. D. M. fixed condensers are of a very reasonable order, all capacities from .00005 mfd. to .002 being 1s. 3d. each, from .0025 to .006, 1s. 9d., .006 to .01, 2s. 9d. each. A grid condenser and leak combined, .0003 mfd. and 2 megohms, is available at 2s.

## BROWNIE WIRELESS COMPONENTS.

The Brownie Dominion vernier dial—a production of the Brownie Wireless Co., is available both in black and mahogany styles. The dial is of the aperture variety, and the drive transmitted from a neat milled knob is a friction one. The gearing ratio is twelve to one, and there is not the slightest backlash. The bakelite moulding, which forms the main part of the structure, is a beautifully clean job, and the whole assembly makes an attractive and efficient component. Its price is 2s. 6d.

The Brownie anti-phonic valve holder is of straightforward, sensible design. My only criticism of this is that movements of the soldering tags are liable to loosen the terminals in their settings and this might be followed by a faulty connection between the socket and the terminal or tag. Recesses for the tags to fall in in the mouldings would eliminate any possibility of trouble of this nature occurring.

Together with samples of the above two Brownie components we also received from the same source a “Popular” Transformer. Contained in a moulded case of pleasing and original design, this transformer retails at 9s. 6d. At this figure it is undoubtedly excellent value for money. Its performance is equal to that of some trans-

formers selling at even higher prices and it undoubtedly merits the constructor's serious attention.

## NEW CARRINGTON CABINET.

On September 23rd, the Carrington people are releasing a new pattern American type cabinet for panels 18 in. × 7 in. with a 10 in. baseboard; retailing to the public in one finish—oak—at the extremely low figure of 18s.

## PRICE REDUCTIONS.

The price of the Varley Couplers have been reduced as follows:—R.C. coupler, type “H,” 14s.; type “M,” 14s.; type “L,” 13s. Anti-Mobo R.C.C., type “MH,” 21s.; type “MM,” 21s.; type “ML,” 20s.

## “EUREKA” RADIO PRODUCTS.

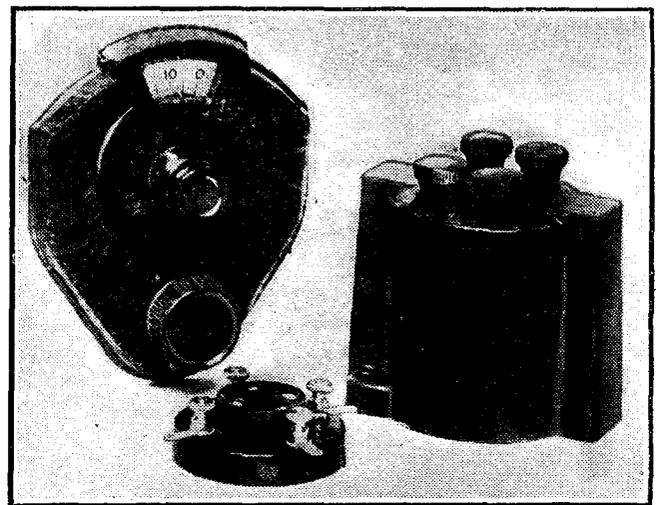
L. Person & Son, of 63, Shaftesbury Street, N.1, inform us that they have acquired the goodwill and trade marks of the Portable Utilities Co., Ltd. (in voluntary liquidation), late proprietors of

Traders and manufacturers are invited to submit radio sets, components, and accessories to the “P.W.” Technical Department for test. All tests are carried out with strict impartiality under the personal supervision of the Technical Editor, and readers are asked to note that this weekly feature is intended as a reliable and unbiased guide as to what to buy and what to avoid.

“Eureka” Radio Products; and are continuing the manufacture of transformers and chokes; also that they are prepared to execute repairs to these instruments.

## THE BROWN PROGRAMME.

The latest “Brown Budget” to hand discloses details of the extensive campaign the S. G. Brown concern is arranging for the coming season. The campaign is the biggest that has ever been launched for Brown products. The continuous and consistent advertising designed to reach 20,000,000 eyes is to be supplemented by the distribution of new and attractive window display materials.



Here are the three Brownie Wireless Components reviewed. Note the distinctive shape of the transformer casing and the artistic lines of the Dominion Vernier Dial.



**Leading again**

**1929-30**

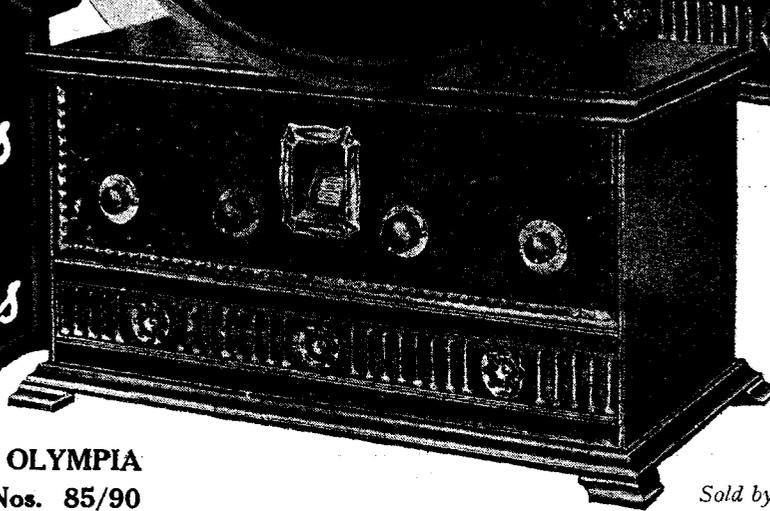
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*The contrivational articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless receivers. As much of the information given in the columns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

## QUESTIONS AND ANSWERS.

### AN UNUSUAL FAULT.

J. M. S. (Whitley, Yorks).—"I built it up from the white print, and I must admit I was very disappointed at first. Although I hoped to work a small loud speaker I could hardly hear on telephones. Thinking that something must be wrong, I tried all sorts of different tests and then found by accident that the L.F. transformer appears to be the cause of the failure.

"To my astonishment, I found that when I connected up its primary in place of its secondary and its secondary in place of its primary, results were quite good; in fact, rather better than I had hoped for, considering the simplicity of the circuit. It seems impossible to me, but do you think that in a cheap transformer like this the makers may have mixed up the primary and the secondary?"

It is certainly a very unusual fault, but we think that from your description there is but little doubt that this is what has happened, and the manufacturers have labelled the instrument wrongly, marking the primary as secondary and vice versa. The fact that the instrument works better round the wrong way seems proof that this is so, but you can easily make a rough-and-ready check if you like by means of a dry cell and a pair of telephones.

In any ordinary L.F. transformer the primary winding is very much shorter than the secondary winding, and as each has resistance, and very often the same wire is used for primary as for secondary, it follows that the resistance of the primary winding is very much lower than that of the secondary winding. This difference in resistance can easily be tested by means of a low voltage battery in series with a pair of telephones, because the low-resistance circuit will, in comparison, give a much louder click than the high-resistance winding.

(All you have to do for the test is to disconnect the leads of the transformer and join one side of the battery to one side of the telephones. The other telephone tag is joined to the winding under test, and the other side of the battery is touched on the opposite side of the winding. Probably you will find that in your own case, owing to the mistake in labelling, the "secondary" winding will give a much louder click than the "primary" winding, which is the reverse of the usual result.)

### THE CAUSE OF FLAT TUNING.

D. F. (Granttham).—"I altered the layout a little and put the tuned-anode coil close against the side of the screening box. Now I am very troubled to find that the receiver tunes flatly, and I am wondering whether there could be any possible connection between this and the new position?"

The extra damping involved by placing the coil close to the screen is quite sufficient to account for the flat tuning noticed, and we think that you will find that if the coil is placed centrally, and well away from the screen the sharpness of tuning will become normal.

### WHICH IS THE NEGATIVE LEAD?

L. M. (Southend).—"Please inform me of a reliable method of finding the polarity of my D.C. mains, as I wish to use them for my new H.T. unit, and also for charging my accumulator?"

There are several good methods of finding the polarity of D.C. mains, the water test being perhaps the best and the simplest.

This consists of inserting the two leads from the mains in a glass of water. The two wires must be kept well apart in the water, and bubbles of gas will be given off by the negative pole to a greater degree than by the positive.

(Continued on page 93.)

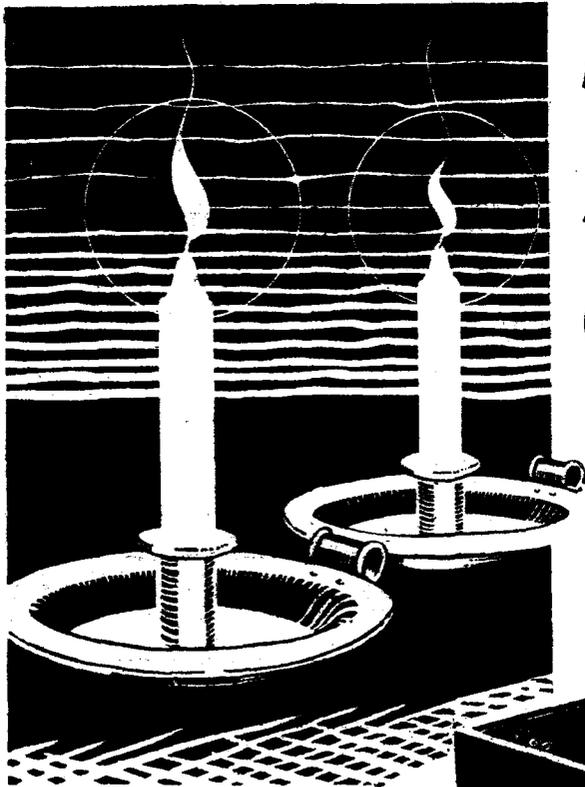
**IF YOU THINK  
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ALL MAINS SET**

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**HIGH TENSION SUPPLY  
UNIT** to operate your  
present receiver,  
**REMEMBER**

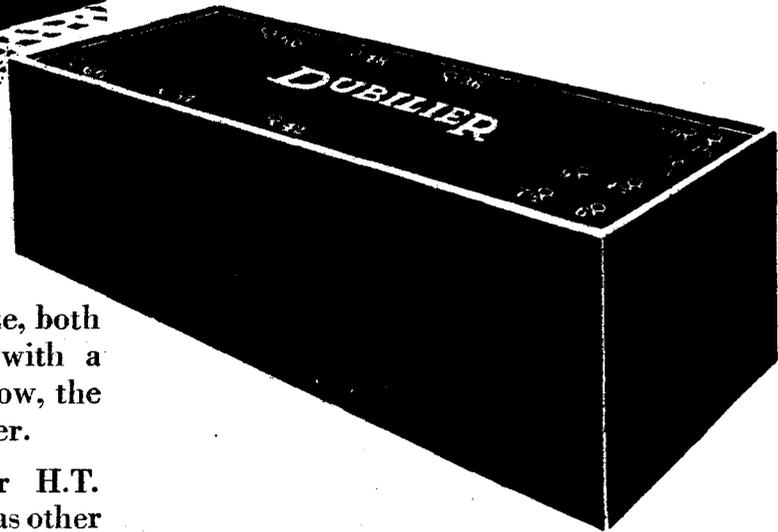
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# BOTH LOOK ALIKE BUT ONE GIVES LONGER SERVICE



Two candles—both the same size, both giving the same light, but with a difference. One is made of tallow, the other of wax. One lasts longer.

Externally the new Dubilier H.T. Battery appears much the same as other good batteries. But fundamentally it is different—its working life is longer.

Dubilier resolved to produce a Battery, not merely just as good as others, but one that would have a materially longer life. Months of research and experiment have at last enabled them to do so.

Ask for a copy of the free booklet—"A Bit about a Battery"—which gives chapter and verse for the claims of the Dubilier H.T. Battery. But your best proof is to try one in your set now.

SUPERIOR (Single Capacity)			SUPREME (Treble Capacity)		
9 v. ... 1/6	66 v. (with G.B. Tappings) 7/11	60 v. ... 13/6			
63 v. ... 7/6	99 v. ... 11/9	63 v. ... 14/3			
66 v. ... 7/9	103 v. ... 12/9	100 v. ... 22/-			

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Ducon Works, Victoria Road, North Acton, W.3.

Visit us at Stands Nos. 181 and 182  
Radio Exhibition, New Hall, Olympia.

E.I.

# RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 88.)

To prevent the possibility of blowing a fuse, the leads from the main should not be taken direct to the water, but a lamp of the mains voltage should be inserted in one of the leads. (See also the longer reply to M.K.G., Cranbrook Park.)

### ARE THE TELEPHONES O.K. ?

F. R. H. (Shepperton-on-Thames).—"What is the best method of testing whether the telephone windings are O.K. ?"

The best way to tell if a pair of 'phones is in good condition is to disconnect them, put the 'phones on and place the end of one of the leads between the teeth. Rub a key or nail upon the other lead and the weak currents set up in them will cause a scraping sound in the earpieces which will correspond with the rubbing of the key. If the sound is very weak in one earpiece and not in the other you will have ascertained which is wrong, and if both give distinct and clear scraping noises you will know that the 'phones are very sensitive, for no ordinary battery is being used for the test and only a sensitive instrument will give results.

### WHO IS CAUSING THE WHISTLE ?

J. S. (London).—"Sometimes the set whistles when I touch it and sometimes it whistles when nobody is near it. How can I tell whether it is my fault or not ?"

You will find a good deal of help on this point, and in fact upon all kinds of oscillation and the correct methods of overcoming it, if you write to the P.B.C. for a small pamphlet called "Oscillation." This is obtainable upon application to Savoy Hill, or at any broadcasting station, and we certainly advise you to get it and read it up if you wish to get the best out of your receiver.

The reason that sometimes the whistle appears to be due to your own operation and sometimes not, is the fact that an interfering whistle which is heard in a receiving set may originate in that set itself or it may be caused by a neighbouring set. In order to determine this point, the following tests may be carried out by the listener.

Leave the reaction control in the fixed position. Slowly rotate the tuning dial and note particularly

any change in the sound of the whistle. If the whistle rises or lowers in pitch when a movement is made on the tuning dial, it indicates that your own receiving set is in a state of oscillation and is probably causing interference to other sets.

On the other hand, if the whistle does not change in pitch corresponding with the movement of the tuning dial, but simply varies its volume or strength, the whistle is not being caused by your set, but is interference received from some other oscillating receiver in the neighbourhood.

### WORKING ON EBONITE PANELS.

"SET BUILDER" (Nottingham).—"I am a novice at the game, and should like to know the chief points to watch when drilling and cutting ebonite ?"

In general, ebonite is very easy to work, and as a little practice is worth a great deal of theory, we advise you if you wish to be successful to obtain a few scrap pieces of ebonite and to accustom yourself to drilling and cutting this before actually starting on the panel. A very little practice will show you that there is really nothing in it to anyone who is handy with tools, and the following hints will help you to steer clear of common errors.

Do not use a pencil to mark a panel, because unless it is thoroughly cleaned off there is a tendency for a leak to occur round the pencil mark. After a position has been marked on a panel a light tap with a centre-punch should be given to ensure that the drill starts in exactly the right place.

If a hacksaw or rip saw is used to cut ebonite, the cut should not be along the line, but just outside it, as otherwise the panel will be too small owing to the large wastage with this class of saw. Use a coarse file to trim panel edges, because fine files are liable to become choked.

Remember that the bench should be kept clear when working on ebonite or the panel is liable to be spoiled by scratches from nails, etc. When the end of the drill is "breaking through," relax the pressure on it or the panel surface may chip at the far side. When you are withdrawing the drill do not reverse but continue turning it slowly. Ebonite softens easily when heated, so terminals will need tightening after they have been soldered.

### Short-Wave Results.

T. M. F. (Leamington Spa).—"I built up the screened-grid short-waver, described by W. L. S., and at first had wonderful results

with it. Just lately, however, there seems to be a decided falling off and, although I can get American broadcasting, other stations seem to be very elusive and weak. Are short-wave conditions bad, or do you think it is a little fault in the set ?"

Just at the time of writing there was a rather "off season" for short-wave reception and, in fact, when we received your letter our contributor, "W. L. S.," was remarking that he had noticed this effect too. His own results fall very much with yours, so we do not think that there is any question of a fault in the receiver, but merely a passing soggiess in short-wave reception.

### IMPROVING AN INDOOR AERIAL.

D. M. (Swindon).—"I have had an indoor aerial for some time, and wish to improve this, if possible. At present it consists of a single wire about two inches from the wall of the room, and about four inches from the ceiling. Is this the most efficient ?"

The best position for an indoor aerial must be found by experiment, as it chiefly depends upon the local conditions. A good arrangement consists of four parallel wires placed 1 ft. apart about 18 in. from the ceiling, with the lead taken from the centre, or from one end. Single-strand bell wire, size 18 or 20 S.W.G., is a good size to use, and the four wires should be as long as the space permits.

### NUMBER OF TURNS FOR H.F. TRANSFORMER.

E. C. C. (Hereford).—"I should like to make my own H.F. transformers of the split-primary type, if you can tell me how many turns I shall want for the 250-500-metre wave band, and also for 5 X X Daventry."

To cover the wave-length between 250 and 550 metres the secondary winding will need 90 turns of No. 30 D.S.C. wire spaced 40 turns to the inch on a 2-in. former. The neutralising and primary winding each consist of 20 turns of No. 30 D.S.C. wound on a 1½-in. former (diameter) placed inside the secondary and arranged to come inside its centre; 25 turns of No. 30 D.S.C. are wound below the primary to form a reaction winding.

(Continued on page 92.)

WE ARE AT OLYMPIA STAND 93

# The Ready Radio Review & Buyers' Guide

PAY US A VISIT

No. P.W. 1

IT PAYS TO BUY EFFICIENCY.

SEPTEMBER, 1929

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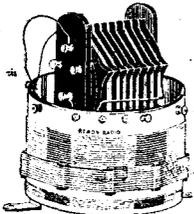
**APPROVED TITAN 3 KITS**  
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## THIS WEEK'S SET

### THE "P.W." FOUR

A great feature of this receiver is its remarkable selectivity and range. A set which can be thoroughly recommended

#### PRICE LIST.

	£	s.	d.
1 Resiston Panel, 21" x 7"	1	9	3
1 Cabinet 10" baseboard	1	10	0
2 Dubilier '0005 variable condensers	1	4	0
1 J.B. '0001 reaction condenser	4	6	
2 Ready Radio wave change switches	3	0	
1 Wearite double pole, 2-way switch	3	6	
1 Varley 50,000-ohm potentiometer	10	6	
4 Lotus valve holders	5	0	
1 Ready Radio Titan Coil Unit	15	0	
2 Dubilier 1 mfd. condensers	5	0	
1 Dubilier 2 mfd. condenser (type B.B.)	3	6	

	£	s.	d.
1 Dubilier '001 mfd. condenser	3	0	
1 Dubilier '001 mfd. condenser (type 620)	3	0	
1 Dubilier '0003 mfd. condenser	2	6	
1 Ediswan 2-meg. leak and holder	2	0	
2 Lotus single coil holders	1	4	
1 Cosmos 50,000-ohm resistance and holder	2	5	
1 Ready Rad o H.T. fuse	1	6	
1 Lewcos H.F. Choke	7	9	
1 Igranite H.F. Choke	5	0	
1 R.I. Hypermu transformer	1	1	0
1 Ferranti A.F.3 transformer	1	5	0
1 Ready Radio Screen, 10" x 6"	2	0	
1 Strip, 19" x 2"	2	3	
10 Inscribed terminals	5	0	
20 ft. Glazite, flex, screws, nuts, bolts, etc.	2	0	
4 Valves as spec. (S.G. Det. L.F. & Super Power)	2	18	6
Total (including valves)	£13	7	6

Any of the above components can be supplied separately if desired.

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Your goods are despatched post free in sealed cartons or carriage paid by rail. A nominal charge of 2/- is made on crates, and this amount is credited if the case is returned within 7 days. NOTE.—You can if you desire avail yourself of the C.O.D. system.

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All your goods are very carefully packed for export and insured, all charges forward.

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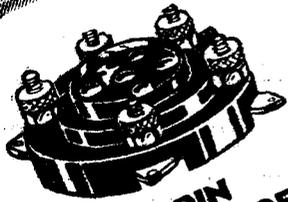
If you require any goods not shown in our lists, send your order and they will be despatched promptly at list prices C.O.D.

Telephone No. Hop 5555  
Private Exchange.

**Ready Radio**  
159, BOROUGH HIGH STREET, LONDON BRIDGE, S.E.1.  
(Three Minutes from London Bridge Stations.)

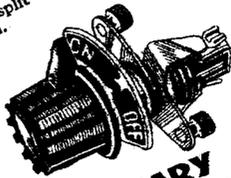
Telegrams: Ready Hop 5555  
London.

What! Not seen them? try to get through the crowd on Stand 31



### 5-PIN VALVEHOLDER

Designed for use with the new 5-pin A.C. valve with centre leg. The well-known Benjamin anti-microphonic feature is incorporated, and also patented contact, which ensures perfect contact when using either solid pin or split pin valves. Price 1/9d. each.



### ROTARY BATTERY SWITCH

An attractive alternative to the usual Push and Pull type of Switch. All insulated, with indicating "On" and "Off" dial, pointer knob, double contact and suitable for use with panels up to 1/2 in. thickness. Price 1/9d. each.



### PENTODE

The famous Benjamin Clearer-Tone Valveholder equipped with small attachment enabling same to be used with the pentode valve. Flexible connection is provided for attaching to the terminal on the cap of the pentode valve. Price 2/3d. each. Pentode attachment only for use with existing Clearer-Tone Valveholders or Vibroholders, 3d. each.



### TURNTABLE

Ball-bearing Turntable, 9 in. in diameter, brown crystalline finish. Fitted with hinged and folding legs which enable the set to be used on uneven ground, while maintaining perfect level. For indoor use, the legs can be folded up, being equipped underneath with rubber buffers, to prevent damage to furniture, etc. Price 7/6d. each.

The continued popularity of Benjamin Valveholders, Vibroholders and Switches is proved by the past year's sales, which have exceeded all expectations, and these will be again actively sold this season.

**YOU ALREADY KNOW THESE THREE**

The original CLEARER-TONE VALVEHOLDER in face of considerable low price competition has more than held its own, and will be continued at 2/- each list.

The BENJAMIN VIBRODER was last season's most successful accessory, the self-aligning feature ensuring positive contact with all types of English 4-pin valves. Price 1/6d. each.

The popular Push and Pull double-contact Battery Switch. It's off when it's in. Price, with terminals 1/3d. each, without terminals 2s. each.

★ Leaflets giving full details of all the above lines will be ready and will be sent on request.

# BENJAMIN RADIO PRODUCTS

THE BENJAMIN ELECTRIC, LIMITED,  
Brantwood Works, Tottenham, LONDON, N. 17

## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 90.)

For the Daventry 5XX range the secondary consists of 300 turns of No. 40 S.S.C. wire, while the neutralising and primary windings consist of 75 turns of No. 30 D.S.C. In this instance the reaction winding consists of 100 turns of 36 D.S.C. The connections are arranged so that the secondary of the coil takes Nos. 1 and 2, the primary takes 4 and 5, the neutralising winding is across 4 and 3, and the reaction winding across 2 and 6.

### H.F. AMPLIFICATION.

"ABDULLA" (Norfolk).—"What is the method you recommend for readjusting a neutralising set which has got out of its neutralising adjustment?"

The following method of neutralising is recommended for use in sets employing one stage of H.F. and provided with a reaction control.

Set the reaction control at minimum, and likewise the neutralising condenser. Now, on setting the tuning condensers so that the two tuned circuits are in step with each other, it will probably be found that the set is oscillating. To test for oscillation, touch one or other of the sets of plates of the tuning condensers (this may be either the fixed or moving, according to the particular set).

You will probably find that the set will only oscillate under the above conditions when the two circuits are in tune with each other, and this can be used as an indication. It is convenient to perform the operation at some point near the middle of the tuning range. Now, increase the capacity of the neutralising condenser. (In the case of such condensers as the Gambrell "Neutrovornia" this means screwing downwards.)

Test at intervals for oscillation as this is done, and you will presently find that the set has ceased to oscillate, and will not recommence even when the tuning dials are slightly readjusted. Now increase the reaction a little, until the set once more oscillates, and again increase the neutralising condenser setting until oscillation ceases. Slightly readjust the tuning condensers again to make sure that the set is completely stable once more.

Proceed in this way until it is found that the correct adjustment of the neutrodyne condenser has been overshoot. Once this point has been passed it will be observed that further increases of the

neutrodyne condenser setting no longer stop oscillation, but cause it to become stronger.

The object is to find such an adjustment of the neutralising condenser as will permit the greatest setting of the reaction condenser to be used without producing oscillation. It will then be observed that when the two tuned circuits are in step, and the set is brought to the verge of oscillation a slight movement in either direction of the neutrodyne condenser will cause the receiver to break into oscillation.

It is to be understood that in the preceding notes, where a reaction condenser is spoken of, any form of reaction control may be understood.

### THE USE OF A COUNTERPOISE.

M. G. (Nuneaton, Warwickshire).—"Sometimes I get a lot of clicking noise, but I am



told that this is due to local electrical interference, and I should put in a counterpoise. What is this, and how does it work?"

Very often electrical machinery in the neighbourhood gives rise to this sort of disturbance, and the first cure to try is the effect of keeping all leads well away from power leads and electric-light wiring. In simple sets, where the aerial and earth leads are connected straight to the grid and filament wiring, improvement may often be effected by loose-coupling the aerial-earth circuit to the grid circuit. A variation of this method is to use a counterpoise earth of the kind to which you refer.

This consists of two or more wires arranged near the ground to form a kind of false aerial. These wires have to be just as well insulated from earth as the aerial itself, and ideally they should be arranged symmetrically under the main aerial. For instance, if a three-wire counterpoise is being erected, its central wire should be arranged exactly underneath the main aerial wire and the two outer wires run parallel at a distance of, say, 3 or 4 ft. from this. If this is impracticable, keep it as well under the aerial as possible.

The height of the counterpoise above the ground may be anything from 1 ft. to 8 ft., the former being the more effective distance, and the latter the more convenient. All the wires should join at one end, like a multiple wire aerial, and then be taken to the set's earth terminal.

### WHICH MAIN IS EARTHED?

M. R. G. (Cranbrook Park).—"It is my first experience of radio from D.C. mains, so will you tell me how I can find out which main is the positive one, and also, which one is earthed?"

First of all, we hope that you will remember it is unsafe for anyone not experienced in this class of work to meddle with the mains wiring, as accidents very easily happen if the experimenter does not know exactly what he is doing. (Incidentally, it will probably be found that the supply company's regulations specifically forbid any alteration to the wiring except by a qualified electrician.)

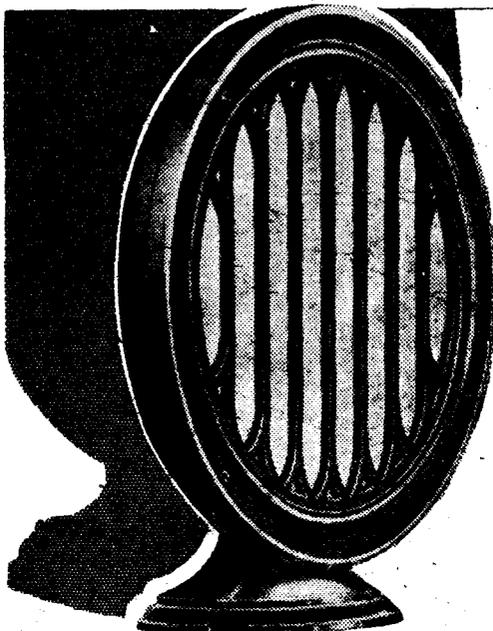
An easy method of finding which main is negative and which is positive is to make a simple electrolytic cell by dissolving a little salt in a tumblerful of water and inserting into this two leads from the mains, on opposite sides of the glass. The salt is not essential. A lamp of the ordinary household voltage should be in series with one of these leads to prevent excessive current being supplied accidentally.

When such a simple electrolytic cell is placed in series in this way it will be found that bubbles rise from the ends of the wires under water, and one of the wires will bubble much more freely than the other. The wire which has the excess of bubbles is the negative.

To find out if the negative main is earthed, all that is necessary is to connect a lamp of the ordinary house supply voltage to an earth, such as a water-pipe or buried earth plate, joining the other side of this lamp to a flexible wire that can be touched in turn on the negative and positive leads on the mains. The lamp will light when touched on one main

(Continued on page 94.)

# BEAUTY • TONE AND HARMONY • • • • THAT'S



The most critical listener with the most sensitive ear—this speaker was designed to please him.

Nor was appearance an afterthought. This speaker is finished in a rich brown colour and has a decorative grille backed with gold gauze.

This is the speaker to suit your pocket—you will know that you have an instrument which will satisfy you.

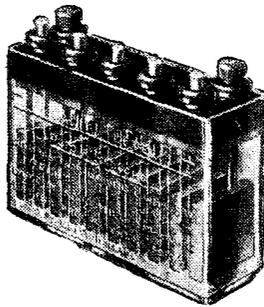


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### EDISWAN RADIO PRODUCTS

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THE EDISON SWAN ELECTRIC CO., LTD.,

HEAD OFFICE & WEST END SHOWROOMS, EDISWAN RADIO DIVISION:  
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## Thoroughly well designed

**T**HE Peto & Radford R.H.T. High-Tension Accumulator was designed by people with 40 years of accumulator-making experience. It was designed, too, by people who know a great deal about radio. Therefore the P. & R. R.H.T. is a first-class wireless battery. Here are some of the reasons why:— To give absolute purity of reception special arrangements have been made to keep the R.H.T.'s internal resistance low, so that its voltage remains constant under all variations of discharge rate. The R.H.T.'s terminals—which cannot be interchanged, by the way—are hollow, so that 10-volt tapplings can be made by wander plugs. The plates are strong and so designed that they hold their charges for long periods. And the price is only 6/3 per 10-volt unit of 5,000 milliampere-hours capacity. Like all P. & R. batteries, the R.H.T. is guaranteed for 6 months.

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**THE NATIONAL ACCUMULATOR CO., LTD**

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I want you to realise that I have helped thousands of people to qualify for and obtain good positions. Our gigantic connection brings us in touch with all the big employers, therefore, although we do not undertake the work of an employment agency, we certainly do know where the demand exceeds the supply. If you think you are in a rut, or if advancement seems slow, write to me, telling me your age, past experience, present employment, and anything else that may help, and I will tell you what chances there are; if they are suitable for you, and if so, how you may attain your objective.

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DEPT. 106.

# RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 92.)

but not on the other, and, of course, the lead in which it does not light is the one which is earthed.

### AMALGAMATING A ZINC ROD.

"WHOOPEE" (Suffolk).—"I have become interested in running a one-valve set from primary cells, and should be glad to know the method of preparing a zinc rod to be amalgamated?"

To amalgamate a zinc rod it should first be cleaned with dilute sulphuric acid, this being applied with a well-greased cloth to prevent burning of the fingers. When perfectly clean, mercury is rubbed over the rod to amalgamate and obtain a bright and shiny surface all over it.

### CALCULATING CAPACITIES IN SERIES.

L. S. F. (Seaforth, near Liverpool).—"I have been trying to find out how to calculate the total capacity of two different capacities in series, but the only book I have on the subject is not very helpful. It says 'the reciprocal of the total capacity is equal to the sum of the reciprocals of the individual capacities.' What does that mean?"

The reciprocal of any number is equal to that number divided into one. Therefore, the reciprocal of 3 is  $\frac{1}{3}$ , and the reciprocal of 8 is  $\frac{1}{8}$ , etc. Obviously if you can find the reciprocal of the total capacity, you can then merely wash out the one above it and you have the total capacity.

To find the reciprocal of the total capacity you have only to find the sum of the reciprocals of the individual capacities; and to do this all you have to do is to put down the individual capacities underneath a 1 in each case, and add them together, this total being itself then turned into a reciprocal.

Suppose there are two condensers to be joined in series, the capacities being 2 mfd. and 4 mfd. respectively. To find their total capacity you have first of all to convert these number to their reciprocals—i.e.  $\frac{1}{2}$  and  $\frac{1}{4}$  which, added together =  $\frac{3}{4}$ .

Finally, you have to find the reciprocal of this, which is merely  $\frac{4}{3}$  divided into 1. In this instance the answer comes out at 1.3 mfd., which is the effective capacity of these two capacities joined in series. Any number of condensers and any values can be worked out in the same way.

### "CORRESPONDENCE COURSE."

"RINGWOOD" (Hants).—"I often hear the term 'response curve,' but I have never

## "P.W." TECHNICAL QUERY DEPARTMENT

### Is Your Set "Going Good?"

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

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

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

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

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

seen an explanation of this in simple terms. What does it mean?"

A response curve is a drawing or sketch of the kind which shows by sloping lines how an alteration in one set of conditions will affect another set of conditions.

In general principles it is the same as a valve curve of the kind which shows, for instance, how an alteration in the voltage applied to the grid of a valve will affect the anode current flowing in its plate circuit.

Response curves, however, generally apply to circuits or to pieces of L.F. apparatus, and the effects which are found are not on the one hand, grid bias, and on the other hand anode current, but the amount of current flowing and the effect of an alteration in frequency. For instance, a response curve for a tuned circuit would show that but little current flows therein at frequencies entirely different from the circuit's own frequency, but when that frequency is approached the response becomes greater, and is at a maximum when the two circuits are "in tune."

### THE "P.W." WAVE-TRAP COIL.

S. R. G. (Pentonville).—"What size was the wire used on the 'P.W.' wave-trap, and where are the tappings taken? I am told there are 60 turns on a 2-in. tube."

The original coil consisted of 64 turns of No. 28 D.C.C. wire wound on in a single layer. As the coil is wound on its 2-in. diameter former, tappings are made at the sixteenth and twenty-fourth turns, these being the alternatives for the aerial tap.

In winding the ends of the coil are secured by the simple process of passing them through two small holes drilled in the tube at the correct point, whilst the two tappings may be made in a variety of ways. If desired, the whole coil can be wound without making any tappings at all, and the sixteenth and twenty-fourth turns can then be lifted up slightly with the blade of a pocket-knife, two short pieces of matchstick, about half an inch long, being driven underneath them.

This will enable the wires in question to be scraped bare of insulation, after which the leads can be soldered to these points and taken to the appropriate places for connection to the aerial.

### "EVERYBODY'S" THREE.

S. W. (York).—"I have a set called the 'Everybody's Three' built by a friend from your popular wireless weekly, and he tells me that recently there was another article about this set, which I do not remember seeing. What number was it that this appeared in?"

The article "More About 'Everybody's' Three" was published in P.W. 357 (April 6th, 1929) issue.

**TWO VOLTS**

Universal	.1 amp.	5/6
Resistor	.1 amp.	5/6
Super H.F.	.18 amp.	7/6
Super-Power	.15 amp.	9/6
Hyper-Power	.3 amp.	18/6
Pentodion	.3 amp.	18/6

**5/6 UNIVERSAL**

**FOUR VOLTS**

Universal	.075 amp.	5/6
Resistor	.075 amp.	5/6
Super H.F.	.075 amp.	5/6
Hyper-Power	.1 amp.	7/6
Pentodion	.15 amp.	9/6
	.15 amp.	18/6

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Made in one of the world's  
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valve guaranteed.

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The "Condenser in the green case" now Costs less!

**Reduced Prices.**

CAPACITY MFDS.	OLD PRICE.	NEW PRICE.
<b>400-volt D.C. Test (200-v. D.C. Working).</b>		
3	6/6	5/3
4	7/6	6/3
5	9/6	8/-
6	11/6	9/-
8	14/9	11/9
10	18/6	14/6
<b>Upright Mica Type No. 34.</b>		
.0001 to .0009	1/10	1/6
.001 to .004	2/4	1/10
.005	3/-	2/6
.006	3/-	2/3
.01	3/6	3/-
.02	4/-	3/6
.05	5/6	5/6
.1	8/-	8/-
.2	14/6	14/6
.25	18/-	18/-
<b>Flat Mica Type.</b>		
.0001 to .0009	1/10	1/3
.001 to .004	2/4	1/6
.005	3/-	2/-
.006	3/-	2/-
.01	3/6	2/6
<b>800-volt D.C. Test (400-v. D.C. Working).</b>		
.1	2/6	2/3
.25	3/-	2/9
.5	3/3	3/-
1	4/3	3/9
2	6/-	5/-
3	9/-	7/6
4	12/6	8/6
5	12/6	10/6
6	15/-	12/-
8	20/-	15/-
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**Other Prices remain unaltered.**



Advt. The Telegraph Condenser Co., Ltd., Wales Farm Road, N. Acton, W.3.

449 (A)

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And now the Belling-Lee products for the coming season—all of them the result of years of experience in making the "little things that mean so much"—products for which there is a real need in modern sets.

Belling-Lee components are essential in constructing mains-operated sets—sets where high voltages make anything but insulated terminals and plugs positively dangerous. Look out for the future advertisements where each product will be dealt with more fully—look out for the Belling-Lee product that your set needs.



**SPADE TERMINAL, 4d.**



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Horizontal Entry 4d.  
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Complete with Adaptor, 1/-  
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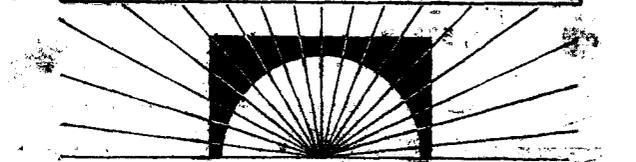


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Ask your dealer for Belling-Lee Handbook "Radio Connections."

**BELLING-LEE FOR EVERY RADIO CONNECTION**



Advt. of Belling & Lee, Ltd., Queensway Works, Penton End, Middlesex.

## CAPTAIN ECKERSLEY JOINS OUR STAFF.

(Continued from page 57.)

that Captain Eckersley, in accepting the position of Radio Consultant-in-Chief, will be in close touch with our Technical Research and Construction Department, and that regular conferences will be held in connection with the discussions which must necessarily take place re the design and construction of the sets which we describe regularly in POPULAR WIRELESS. "The Wireless Constructor" and "Modern Wireless."

### Special Contributions.

Arrangements have already been made in connection with a new series of articles by Captain Eckersley for POPULAR WIRELESS, "The Wireless Constructor" and "Modern Wireless" and, as our readers will see, in this issue we already publish one of Captain Eckersley's articles; and in our Exhibition Number of "Modern Wireless" we would also refer readers to another contribution of his, entitled "Adventures with a Crystal Set"—which is a prelude to a series which cannot fail to interest the listener or the home constructor.

\* \* \* \*

Once again the Radio Exhibition is with us, and every keen amateur will be visiting Olympia some time during the next few days. The Show this year is indeed a wonderful one for, as the years go by and broadcasting enlarges its scope, and more and more progress is made in the develop-

## Don't Miss It!

On no account forget to obtain your copy of "Popular Wireless" next week, for among many other special features, there is an

### Article By Capt. Eckersley

in which in his inimitable manner he deals with this year's

### Radio Exhibition

It is an article to read and remember, and its reading, as with all Capt. Eckersley's articles, is a sheer joy. You must not miss this special contribution.

ORDER YOUR "P.W." NOW

ment of all branches of the industry, the Exhibition naturally becomes, even if more complex, more interesting and more worthy of something better than a casual visit.

But even a cursory glance at the review of the exhibits at Olympia this year, which appears in this issue, will indicate how the Radio industry of Great Britain has expanded since those now seemingly distant days when the first transmissions took place from Marconi House in the Strand, and when Mr. Arthur Burrows made that classic opening remark: "Hallo, Everybody. You know, this broadcasting is going to be great fun!"

A good deal of water has flowed under the bridges of the Thames since those days, but the interest which radio has exercised over thousands and thousands of people in this country has certainly not lost its hold, and I am confident that if you pay a visit to this year's Exhibition you will feel that one visit will not be enough but that, really to enjoy and take in the marvels of Olympia, it will require not one visit and not two, but three, or even four.

### YOUR L.T. BATTERY.

Charging and discharging of an accumulator should only be done within the limit or rates laid down by its maker.

No accumulator should be allowed to stand discharged, or partly discharged, for long periods, or sulphation is sure to set in.

Keep a watch to see that sediment does not form at the bottom of your accumulator. (This is often a sign that it is being charged wrongly.)

# EVERYTHING RADIO ON EASY TERMS!

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UPWARDS

We cater for every radio requirement. Any article can be obtained on easy deferred terms. (Ireland and Overseas excepted.) All products stocked by us (and we are the largest radio stockists in the country) are from reputable makers. If your present needs are not shown in the list below, send us your requirements.

**NEW OSRAM MUSIC MAGNE**, complete kit including Valves. Supplied on first payment of 15/3 and 12 monthly payments of 15/3.

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**NEW MARCONIPHONE 5-VALVE PORTABLE**. Supplied on first payment of £1 10s. 0d. and balance as monthly payments of £1 4s. 9d.

**B.T.H. MOVING COIL**. £6 6s. 0d. Supplied on first payment of 10/8 and 12 monthly payments of 10/8.

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**BURNDIPT S.G. FOUR**. Supplied on first payment of 39/6 and 12 monthly payments of 41/6.

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**BROWN "VEE" UNIT**, complete with Chassis. Supplied on first payment of 8/7 and 4 monthly payments of 8/7.

**B.T.H. ELECTRIC PICK-UP AND TONE-ARM**. Supplied on first payment of 6/- and 7 monthly payments of 6/-.

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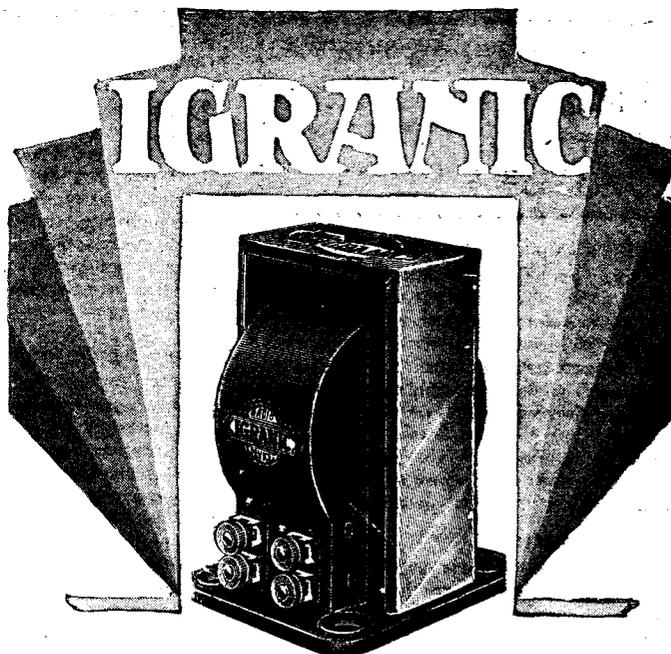
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IT'S AT  
OLYMPIA**

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Essential with Pentodes

The Pentode Valve is a remarkable achievement, but it cannot be expected to give the best results unless it is operated under the correct conditions. Its impedance is high—that of the average loud-speaker is low—a suitable step-down transformer is essential.

The Igranic Pentoformer is an output transformer specially designed for use between the pentode valve and the loud-speaker.

**IGRANIC PENTOFORMER, Price 30/-**

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Obtainable from all high-class radio shops. If your dealer cannot supply please write to Dept. R128.

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**161  
AND  
162**



## RADIO AND THE SCHNEIDER TROPHY RACE

By L. H. T.

IN these enlightened days we have all got into the habit of taking radio and its benefits for granted; it is not often that we pause and think of what everyday events would be like without it. The long evenings without a broadcast programme are unthinkable (although no one minded them in 1921!), and the more thrilling events from time to time are brought home to us and taken very calmly, without a thought of what we owe to the development of radio in recent years.

### Radio Communication.

Having seen a little of the "back-stage" part of the Schneider Trophy race, probably the most important event in the public eye this year, I have no hesitation in saying that without the highly-perfected condition of radio in this country it would not have been possible to hold the event at all. Radio was, of course, used in far more ways than the mere broadcasting of a running commentary, although the latter was very excellently carried out from a technical point of view.

I was on Ryde Pier some days before the actual race, and, having found that the journey from Southsea to Calshot (the

R.A.F. base) by road was not far short of forty-five miles, I decided instead of going to the base to watch the practice flights. On Ryde Pier two R.A.F. officers were in communication with Calshot, and, although, as it happened, the practice flights were badly interfered with by various causes, the "powers that were" on the pier knew all about it by the means of a low-power short-wave transmitter within a few seconds. Calshot could only be reached in anything like reasonable time by speed-boat, so that the radio installation in this case was quite invaluable.

### Announcing the Result.

Incidentally, the public-address system for keeping the crowds posted during the running-off of the event was rather wonderful in its way, since the Schneider Trophy race was over a course of thirty-one miles, meaning that the public who came to see it were probably spread out over a good fifty miles! At the same time, very few indeed appeared to be out of reach of the Marconiphone loud speakers, which were installed at some eighteen different points round the course. The installation on Ryde Pier was used for the purposes of relaying the B.B.C. commentary to the crowd, putting the Marconiphone engineers themselves in touch with the crowd, and also allowing the stationmaster of the pier station to broadcast "traffic-control messages."

At the other points 5 X X was relayed to the crowd, but on the pier, since the B.B.C. commentators were only a few yards away, the B.B.C. "mike" was directly connected to the amplifiers, while the operators could

listen to the same thing coming via 5 X X if they so desired! The equipment there consisted of a two-stage microphone amplifier, a standard "B" amplifier, with five LS5A valves and triple output circuit, feeding three power banks feeding the various groups of loud speakers.

Although the installation might not appear on first sight to be as big a business as that used, for instance, at Hendon, it was, I am told, by far the biggest ever carried out by the Marconiphone Co. Over two hundred loud speakers were used, and about 756 valves in all, 694 being of the super-power type! Low-tension requirements alone made it necessary to use 230 Exide accumulators, and about fifteen miles of wire were used altogether.

Those who were fortunate enough to see the race must agree that the broadcasting of the lap times and speeds doubled the interest in the whole thing, while those not present were quite thrilled to put it mildly, by the broadcast.

### World-wide Broadcast.

Incidentally, it is interesting to note that through the development of short waves during recent years the whole broadcast was perfectly received in Australia, Italy, and practically all over the United States, where a special chain of stations was organised for the purpose.

The smoothness with which the whole organisation worked rendered it so inconspicuous that it is only by looking back and considering at leisure that one can realise the enormity of the task and the excellence with which it was carried out.

## How do you pronounce RADIO?

Some say

**"RA-DEE-O"**

Others say

**"RA-DAY-O"**

But—

Of course, when all is said and done it doesn't really matter how you say it because both mean the same thing.

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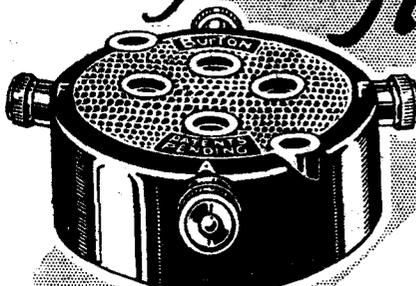
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**RESTORING EMISSION.**  
By J. R. WHEATLEY.

SOME types of valves, notably the fairly older dull emitters, employ metal filaments coated with thorium.

If this class of valve is overheated, part of the surface of the filament coating breaks up and evaporates. The emission of the valve is then very considerably reduced. Distributed throughout the metal forming the core of the filament is additional thorium, and if this can be brought to the surface the life of the valve is renewed.

The method of bringing this secreted thorium to the surface is by carefully heating the filament to its proper working temperature and allowing it to remain in this state for several hours. The loss of emission may have been due to using a 4-volt accumulator with a 2-volt valve and turning the rheostats beyond the danger mark, thus applying above 2 volts to the filament.

**Two Simple Methods.**

Alternatively, the high-tension supply may have been momentarily flashed across the filament. The period of the flash may not have been sufficiently long to burn out the valve filament, but yet of sufficient duration to evaporate the coating of thorium.

Restoration of filaments can be successfully accomplished with valves in which the filament is of the thorium-coated variety, oxide-coated filaments do not appear to benefit in any way by this

heating process when once their emission has been lost. An oxide-coated filament usually operates at a dull red glow.

The actual method of applying the restoring process is to join the filament in series with some constant source of supply,

so that the filament is kept at a constant temperature for two hours or so.

There are two simple methods of carrying out the above "cooking" process.

(1) By means of an accumulator of suitable voltage.

(2) By the use of a step-down transformer fed from A.C. mains.

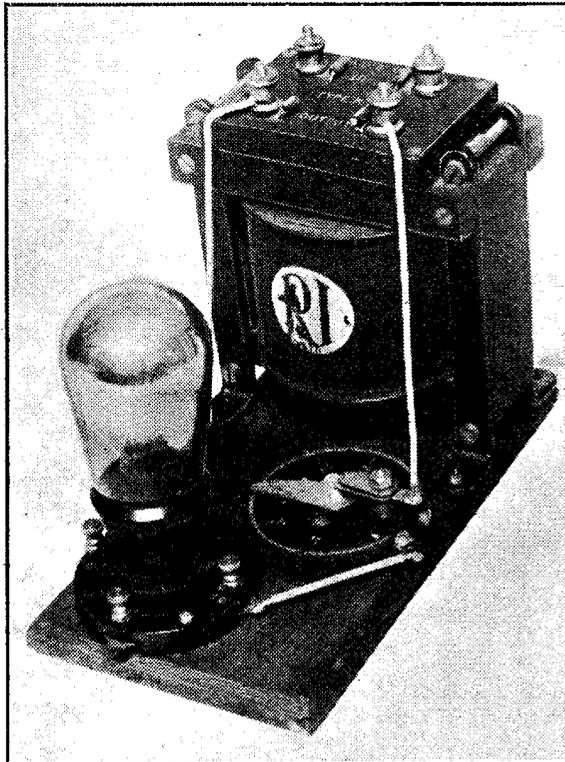
In the first case the procedure is merely to join the accumulator directly across the filament pins and leave it in circuit for, say, two hours. Then the valve is tried in a set and the results obtained noted. If it is not up to the correct standard, then the cooking process should be tried for a further hour or so.

**With A.C. Mains.**

The second method of applying the necessary constant voltage is to use a step-down transformer giving approximately correct voltage across the secondary terminals for the valve to be treated. A good plan is to obtain a transformer arranged with tappings on the secondary, so that it may be used for 2-, 4- or 6-volt filaments.

In series with the secondary winding a rheostat is arranged so as to be able accurately to adjust the voltage across the filament.

The actual treatment of the filament is similar to that employed when a battery is used.



The simple apparatus used in connection with A.C. mains.

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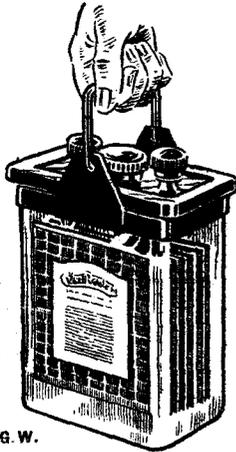
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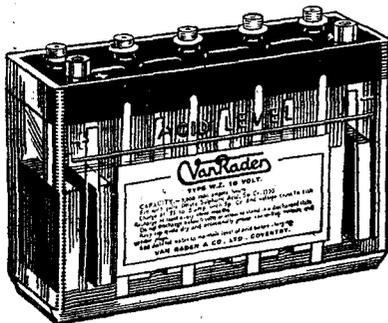


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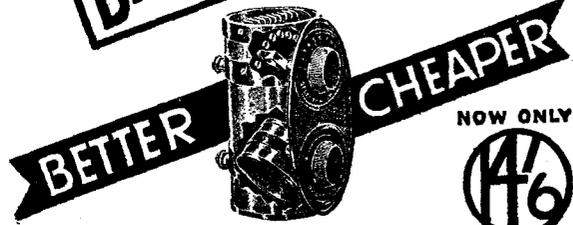
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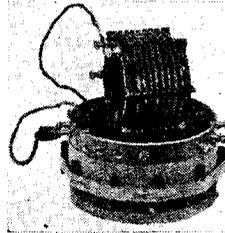
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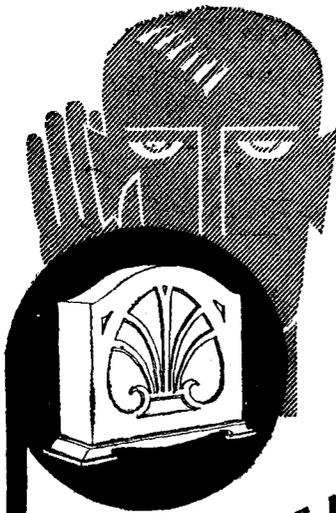
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**The Side-Band Effect.**

There are, however, two fundamental sources of imperfection in reception quite apart from the instrumental defects referred to above. The first is the well-known "side-band" effect.

In a receiver possessing any marked degree of selectivity there must be a weakening of the higher-pitched notes in comparison with the lower, since the latter are beat notes resulting from two waves differing but little in wave-length from the fundamental wave-length of the transmitter, whilst the high-pitched notes result from waves more widely spaced from the fundamental.

The receiver being tuned to this fundamental wave-length naturally does not respond so readily to the out-of-tune waves carrying the higher notes.

The second source of distortion is the production of harmonics during rectification. It can very easily be shown theoretically, and just as readily demonstrated experimentally, that in the operation of rectification are produced (1) direct current, (2) alternating current of the applied frequency, (3) harmonics (particularly the first) of this current.

**Production of Harmonics.**

For example, if an audio-frequency alternating current be applied to the circuit shown in the figure, the note in the telephone is compounded of the original frequency, together with the harmonics of that frequency. By suitably arranging the values of R, C<sub>1</sub>, and C<sub>2</sub>, the original frequency may be balanced out, but the harmonics being produced in the rectifier cannot be so removed.

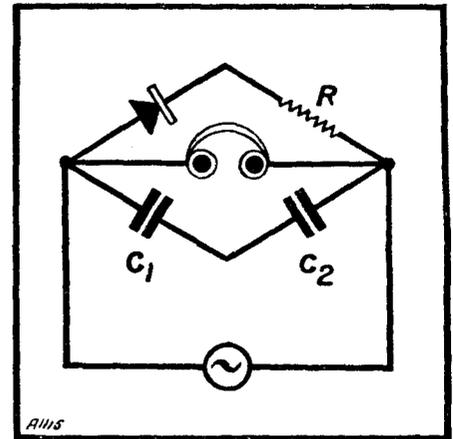
In this experiment the intensity of the harmonics, as compared with the fundamental note, depend on the characteristics

of the rectifier, and it is possible for the harmonics obtained to be louder than the fundamental note.

The reception of a modulated H.F. wave is somewhat different from this simple case, but the harmonic is produced in a similar way.

Since the fundamental note and its harmonics are both produced in the rectifier, we cannot balance out one frequency, and the relative intensities no longer depend on the characteristics of the rectifier, but on the extent to which the carrier-wave is modulated. For a fully modulated wave the first harmonic should be of the same intensity as the fundamental note.

It may be observed that in a circuit employing reaction from the plate of the rectifying valve we are feeding back both the fundamental note and the produced harmonics, so that more and further harmonics are produced.



**WHAT IS OVERLAP?**

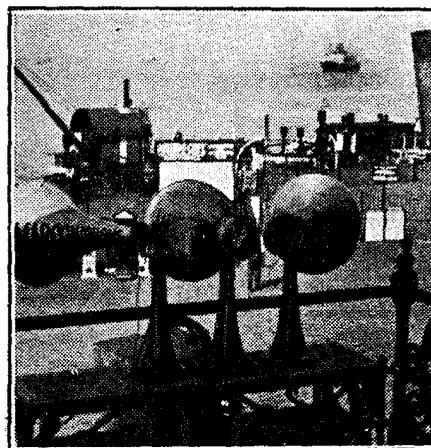
**O**NE little trouble which is not very clearly understood by many people is the reaction irregularity known as "over-lap," and it may be useful to some readers to try to explain just what it is. Here goes, then. In a normally working set you should find that if you gradually increase the reaction condenser setting the set will presently break into oscillation at a certain reading, and will stop again at the same reading if you reduce reaction once more.

For example, if you find that the set goes into oscillation as the reaction condenser passes the fifty degree mark, it will stop again when the condenser passes fifty degrees once more as you bring it back.

That is what happens in a set behaving properly. In one afflicted with overlap you would find that although it might go into oscillation as the reaction condenser reaches, say, fifty degrees, it will not stop again until the reaction is slacked off to perhaps forty-five degrees. The two points overlap, hence the name.

Where the overlap is at all serious it can be an extremely annoying fault, and in a set depending to any great extent on

(Continued on page 104.)



The loudspeakers on Ryde Pier to which reference is made this week, in the article on page 98.

# M.P.A. COMPONENTS - BEST IN RADIO!



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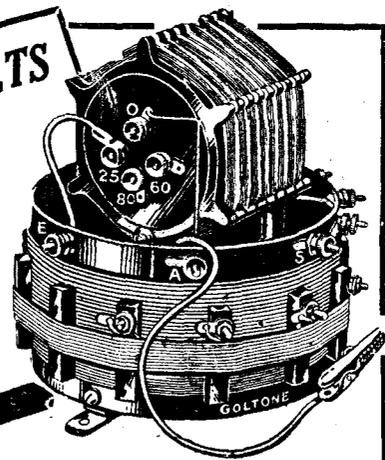
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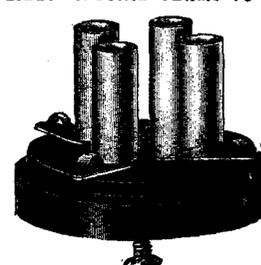
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A.C. MAINS RECEIVERS  
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Telephone: CENTRAL 9661.

## WHAT IS OVERLAP ?

(Continued from page 102.)

properly applied reaction for its sensitivity can make long-distance reception almost impossible. The trouble is that if you adjust the set to its most sensitive state a little below the oscillation point it is working in a thoroughly unstable condition. If a strong atmospheric comes along the set will probably break into oscillation, and will not stop again until you slack back the reaction considerably.

Each time you have to do this, of course, you probably lose the station altogether, because by the time the set stops oscillating the reaction has been reduced so much that it is a long way off its most sensitive adjustment. You then have to bring it up once more to the sensitive setting, just short of oscillation, presently it goes over the edge once more, and you begin again.

### Some Likely Causes.

Altogether a most annoying business, both for yourself and for anyone else listening to the same station in your neighbourhood. It is not, you will see, the same thing as "ploppy" reaction, although the causes are much the same. Probably it should be regarded as a more acute form of the same complaint, ploppiness run wild, so to speak.

Here are some of the likely causes, from which you can pick out the ones most likely to be responsible in any particular case; wrong size of reaction coil, wrong H.T. voltage on detector, unsuitable detector valve, detector valve losing emission, grid leak of wrong resistance for the valve, grid leak gone dud, H.T. battery running down, coupling troubles in H.T. mains unit, H.F. currents getting through into L.F. stages, bad H.F. choke, and (don't forget this one!) a run-down L.T. battery.

## FOR YOUR NOTEBOOK

Keep your lead-in as short as possible, in other words, place the set as near the lead-in point as possible.

Reversing the L.F. transformer primary connections may be a very old-fashioned remedy, but it often has a wonderfully beneficial effect in cases of humming interference.

Never run the lead-in wire too close to a gutter-pipe or other metal surface, or otherwise signals are liable to leak away owing to stray capacity effects between the aerial wire and the pipe.

Varying the aerial coupling is a great factor in improving reaction control in a short-wave receiver.

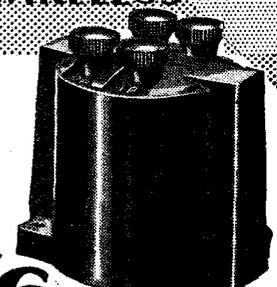
Use a little flux only, for good soldering; one of the commonest faults being to make the work swim in flux instead of being thinly covered over the small area where the joint will be.

Never try to solder with an iron that is not properly tinned.

When removing a coil from its holder, do not pull on the windings, but on the coil base.

# BROWNIE

## WIRELESS



# 9'6

## POPULAR TRANSFORMER

When planning your new set ensure perfect amplification by including a BROWNIE POPULAR TRANSFORMER. The core iron and the windings which are the very finest obtainable are assembled in the famous Brownie Factory; while all the delicate parts are protected by an attractive moulded casing which seals the whole transformer against any atmospheric interference. Send P.C. to Dept. 22 at address below for free booklet, "Wireless Without Worry."

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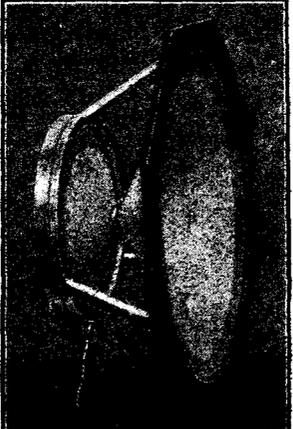
The small cone, 8½ in. diameter, ensures that the response to higher frequencies is clear and crisp, and the large cone, 15 in. diameter, gives full scope to the bass. Full volume is handled with an entire absence of drumminess, and moderation to a whisper causes no loss of tone.

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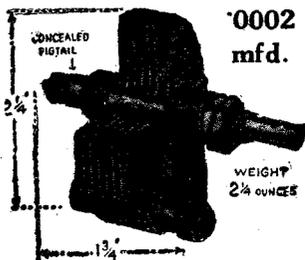


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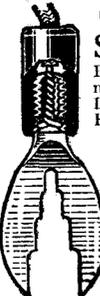
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## 21

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**CORRESPONDENCE.**

### THE "PRESTO" TWO.

**SHORT-WAVE NOTES—DO ACCUMULATORS ACCUMULATE?—A 'PHONES TAP—THE BYRD EXPEDITION—etc., etc.**

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

#### THE "PRESTO" TWO.

The Editor, POPULAR WIRELESS.  
Dear Sir,—I should like to thank you and the "P.W." Research Department for the excellent set, the "Presto" Two, described in the August 24th number of "P.W." I tried it out on the short waves first, and I was surprised at the remarkably fine reaction control, and also the lack of hand-capacity effects. As to the results, the first station I logged was a German who announced the station as Königswusterhausen (this station is not on the list of stations in "P.W.")—the wave-length is about 32 metres; then came P.C.J. and 5 S.W. and a host of British and French amateurs.

The best was to come—for on Saturday, August 31st, I heard W 2 X A F transmitting baseball news and dance music! The announcer said it was W G Y relayed by W 2 X A F on 31.48 metres, or words to that effect.

On Sunday, September 1st, I also logged W 8 X K on 25.25 metres relaying K D K A. I listened to this station from 9 to 10 p.m. and heard every word clearly. They were transmitting a play called "The Yankee Consul." Sunday seemed to be a good night, for I also heard W 2 X O testing on 19.54 metres, and Doberitz.

Altogether, this set is the "goods." I have put a neutralising condenser in series with the aerial and used a '0003 tuning condenser instead of a '0005. Everything else is the same as in the book. I have had experience of two other S.W. sets, but this one certainly beats them.

Wishing "P.W." the best of luck,  
Yours faithfully,  
N. Bristol. C. VOSS-BARK.

#### SHORT-WAVE NOTES.

The Editor, POPULAR WIRELESS.  
Dear Sir,—In your No. 366 issue reference is made to K G O (Oaklands). I have logged this station several times, and receive him at practically full loud-speaker strength—in fact, almost as clearly as our local stations. I first heard K G O in April last. In my opinion K G O is one of the best American stations received in this country. We receive this station at breakfast-time every Wednesday morning.  
Yours faithfully,  
P. MITCHELL.

Transvaal, South Africa.

#### DO ACCUMULATORS ACCUMULATE?

The Editor, POPULAR WIRELESS.  
Dear Sir,—I am sufficiently broad-minded to be amused at "Ariel" when he takes me to task in your issue dated August 24th, in spite of the fact that his criticism is entirely wrong, and, perhaps, hardly in the best of good taste!

In fact, he pushes the lack of knowledge on to his innocent readers, for he states:—"P.W." readers know that an accumulator on charge accumulates (chemical) energy and delivers it up in the form of electrical energy."

All I can say is that "P.W." readers must be sadly misinformed!

Let my friend "Ariel" turn to "A Text Book of Wireless Telegraphy," by R. Stanley, B.A., LL.D., M.I.E.E., a standard work of reference. In a lengthy chapter devoted to the subject of cells, both primary and secondary, beyond the following quotation, Mr. Stanley never mentions the word "Accumulator" at all, showing that he realises that the word is a misnomer, just as "storage battery" is in America. Here is the quotation which will be found on pages 439/440:—

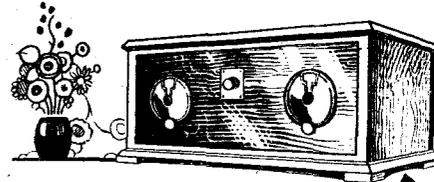
"... but because a chemical action is first necessary, a cell of this kind is called a 'Secondary Cell'—sometimes an 'Accumulator,' but the latter term is not theoretically correct, as it implies an accumulation of electricity."

Again, if "Ariel" will kindly refer to "Practical Wireless Telegraphy," by E. E. Bucher, M.I.R.E., an American authority, he will find on page 7 the following words:—

"It will be seen, therefore, that it is not really electricity which is 'stored up' in the 'storage cell,' but that the current supplied to the cell during the charging process produces an electro-chemical change, which gives the plates dissimilar properties."

(Continued on next page.)

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## EXACT TUNERS

250 to 2,000 metres. Thousands of these tuners are in use, and we can strongly recommend them. No further coils are required. Send P.O. for particulars and circuits. FREE.

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PLEASE be sure to mention "POPULAR WIRELESS" when communicating with Advertisers. THANKS!

**CORRESPONDENCE.**

(Continued from previous page.)

As I have pointed out, both "storage cell" and "accumulator" are not words which accurately describe a secondary cell of the type under consideration. Further, it cannot be argued that such a cell accumulates chemical energy when being charged. Nothing could be further from the truth. Most people are aware that a definite chemical change takes place, resulting in the formation of an oxide of lead which is deposited on the positive plates of the cell.

I challenge "Ariel" to prove that an accumulator does any accumulating at all other than the production and destruction of certain chemical compounds which enter into the composition of such a cell. My point was perfectly clear, and I am prepared to stand by it, namely that the word "accumulator" is misleading, causing people to imagine that electricity is stored up for future use in such a cell.

The least said about the question of "experts" the better, some newspapers may be afflicted with the particular brand of expert to which "Ariel" refers, but not the "Bradford Telegraph and Argus."

Yours faithfully,  
"DETECTOR."

**A 'PHONES TAP.**

The Editor, POPULAR WIRELESS.  
Dear Sir,—Perhaps the following slice of circuit will be of interest to you.

Most people at times like to use headphones for searching. Also very few like to get 2 L O at full loud-speaker strength in their ear drums accidentally.

The accompanying sketch fulfills both requirements very well, and at the same time is quite an efficient output filter.

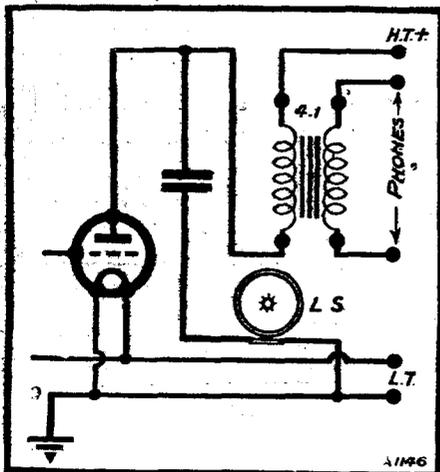
To the best of my knowledge, this is original, and I have it in use on my set now. (H.F., Det., R.C., L.F.)

An old L.F. transformer is justifying its existence in this position and giving complete satisfaction.

One great advantage of this arrangement is that either 'phones or L.S. may be used individually without any appreciable effect on either.

Hoping this will be of use to you.  
I remain, yours,  
W. H. BOLTON.

Lewisham, S.E.13.



**THE BYRD EXPEDITION.**

The Editor, POPULAR WIRELESS.  
Dear Sir,—Some months ago details of the Byrd Expedition appeared in "Notes and News," and ever since, I have been on the look-out for signals from this expedition.

I am very pleased to be able to say that on two successive mornings recently, at 07.00 B.S.T. I heard W.F.A.T working with amateurs located in the seventh district (Pacific Coast) of America. Signals were easily readable on my 0-v-1 set, though "Xs" were bad on the first day.

W.F.A.T is the s.s. "Eleanor Bolling," and it is only fair to state that it was not actually in the Antarctic when I heard it, but only at Port Chalmers, New Zealand, from which country she is apparently picking up further supplies at various ports.

The wave used on this occasion was 21 metres, though several are used, according to what conditions are like.

The following list of calls used may be of interest:—  
W.F.A. Base station.  
W.F.D. Portable.  
W.F.B. "Plane "Floyd Bennett."  
W.F.C. "Plane "Stars and Stripes."  
W.F.E. "Plane "Virginian."  
W.F.A.T. s.s. "Eleanor Bolling."  
W.F.B.T. s.s. "City of New York."  
I hope, on some future occasion, to hear actually from the base in the Antarctic.

(Continued on next page.)

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**B.T.H. SENIOR R.K. UNIT** (ditto). Send only 12/6. Balance in 11 monthly instalments of 13/6.  
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**KIDE 120-v. H.T. ACCUMULATOR, TYPE W.J.**, in crates. Send only 8/11. Balance in 11 monthly instalments of 8/11.  
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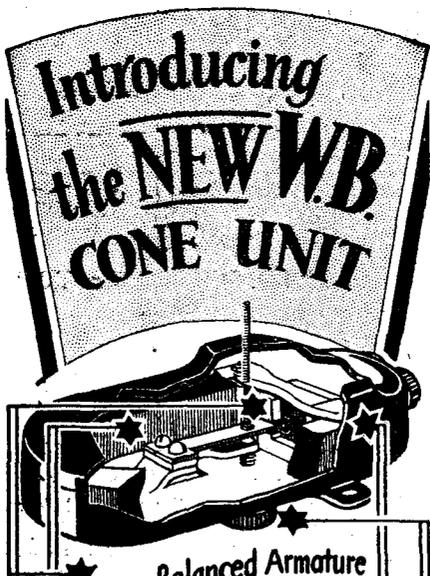
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The 4-Pole Balanced Armature is the secret of its great volume, purity of tone and fidelity of reproduction. In fact the efficiency of the Balanced Armature principle is miles ahead of any other method—excluding Moving Coil—for ensuring successful vibratory movement in any cone speaker. Where other Balanced Armature Units cost more than £1, this W.B. precision instrument costs only 12/6.

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This W.B. device ensures added convenience without impairing efficiency.

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The full and never-failing volume and tone of the W.B. Unit owes much to the powerful magnet of Cobalt steel.

**Artistic Bakelite Case**

—and the finishing touch to this remarkable unit is added by the neat Bakelite case in which it is housed.

This Unit will work either a free edge cone—obtainable at 1/- from W.B.—or a baffle cone.

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National Radio Exhibition  
Sept. 23 — Oct. 3, 1929

**CORRESPONDENCE.**

(Continued from previous page.)

Hoping that the foregoing will be of interest, and wishing "P.W." every success.

Believe me to remain,  
G. C. ALLEN.

P.S.—W.F.A.T. does not use telephony.  
London, S.E.16.

**EARTHED POSITIVE.**

The Editor, POPULAR WIRELESS.  
Dear Sir,—With reference to your notes in "P.W." recently, concerning J. L.'s letter about earthed pos. or neg., may I suggest that, in my opinion, his claim of a 50 per cent improvement with pos. earthed is quite allowable. No doubt in his set he uses "leaky-grid" rectification with the grid leak clipped across the grid condenser, which in its turn is earthed; thus his detector valve obtains the necessary positive bias only when the pos. L.T. is earthed. No doubt if J. L. traces any orthodox circuit with neg. earthed, he will discover that the detector obtains a pos. bias in one way or another.

I have two other suggestions here:  
1. That, as remote-control is becoming popular, sets be designed with two terminals, for connecting either straight to a remote switch or to a relay.

2. That the "P.W." Technical Staff design a standard Det.-2 L.F. set with a reliable wave-trap built in—suitably screened and with a panel controlled condenser.

A short while ago I read in "Radiotorial" that a "P.W." reader found that the wave-length of Bournemouth had dropped many metres (dekameters, in fact) according to his dial reading. Perhaps he was listening to the same programme (2 L.O.) from Plymouth. But that was before the Regional Scheme!

Before I close I should like to thank "P.W." for the excellent set of white prints.

Yours faithfully,

London, S.W.16. K. S. LAVER.

**THE "FILADYNE" CIRCUIT.**

The Editor, POPULAR WIRELESS.  
Dear Sir,—In an issue of POPULAR WIRELESS recently, your correspondent Mr. G. Andrews, of Halesowen, Birmingham, asked if I could supply him with the name of the potentiometer I am using in the "Filadyne" Two. It is a Lissen and works splendidly, and is perfectly even.

I should like to let you know that to-night my set is working as well as ever, although I had an accident and shorted a great part of my 120-volt H.F. As a matter of fact, the actual readings to-night are 18 volts on detector valve and 45 on L.F. This is giving ample volume on loud speaker for a room 14 feet square, which speaks wonders for the set. I think, more especially as I am only using a loft aerial.

By the way, I must apologise to Mr. Andrews for not having answered his inquiry before, but I have been away on holiday. Wishing you continued success.

Yours sincerely,

Wallington. E. W. C. CLARKE.

**THE "BREMEN" BROADCAST.**

The Editor, POPULAR WIRELESS.  
Dear Sir,—With reference to your note on the "Bremen" recently, at 9.15 p.m., I picked up this ship at full loud-speaker strength, calling up New York in English. I am using the original "Sydney" Two, with the omission of the aerial coupling condenser. Could one of your correspondents give me the call sign of this New York station, as I missed it?

Yours sincerely,

P.S.—The wave-length of the "Bremen" was about 37 metres.  
Brooklyn. F. E. STOCK.

**OUR LOUD-SPEAKER NUMBER.**

The Editor, POPULAR WIRELESS.  
Dear Sir,—Many thanks for your articles in a recent "P.W." on loud speakers—and particularly for Mr. Harris' straightforward talk about production.

It seems to me, the reason why so many people quarrel with their loud speakers is that the impedance of the last valve does not match that of the speaker, causing very poor reception, and I feel that radio journals do not stress this point—as a matter of fact, hardly ever mention what seems to me to be the real remedy, viz., an output transformer.

Like myself, there are many thousands of listeners groping their way to perfect radio reception alone; or, even if they read all the radio papers (as I do), they experience some bitter disappointments through having no one with real radio knowledge to help them.

Being very dissatisfied with my loud speaker, I wrote Messrs. Ferranti, giving them all particulars regarding valves and make of speaker, and they very kindly advised me to procure an output transformer of a given ratio—multi-ratio, in fact: this advice I followed, with the result, I believe I am getting as near perfect reception as it is possible to get, less all the dissatisfaction and heartbreak.

Might I, therefore, advise any of your readers, in the same boat as myself, to do as I did—viz., write Messrs. Ferranti, or your own Information Dept., and get the advice of the best brains in the industry.

Yours faithfully,

Glasgow. ALFRED MORRIS.

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See Competition in "Wireless World" Miscellaneous Cols.

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PLEASE MENTION "POPULAR WIRELESS" WHEN REPLYING TO ADVERTISEMENTS.

**TECHNICAL NOTES.**

(Continued from page 58.)

**Production of Waves.**

It was known also that electrons in motion—at any rate in oscillatory motion—gave rise to ether vibrations, and it was evident that some very intimate relationship existed between the electron and the ether. As you know, it is the up-and-down surge of the electrons in the aerial of the transmitting station that creates and maintains transmitted radio waves; when these waves strike any conducting object (such as, in particular, a receiving aerial) they set up the same to-and-fro surge of electrons in it, and this oscillatory current, which is represented by this surge of electrons is, in fact, the incoming high-frequency current which operates the receiver.

According to the latest theoretical and experimental investigations it is believed that the relationship between the electron and the ether is even more intimate than was hitherto suspected. It is now thought that the electron consists of or is associated with a special train of very high-frequency ether waves, the frequency of these waves being computed to be of the order of a million times that of ordinary light. In this connection it is very interesting to recall that quite recently Professor Millikan of Moitreal has investigated a type of very high-frequency radiation known as cosmic rays, these rays apparently proceeding, at any rate in the main, from outer space.

**New Theories.**

It would take much more time than is available here even to touch upon the various highly interesting speculations which are raised by these new discoveries. But I would like to mention that the new developments seem in particular to fit in with the so-called quantum theory. Those of my readers who are mathematically inclined will know that in some respects radiation appears to behave as though it were of a corpuscular character, whilst in other respects it agrees entirely with the undulatory theory.

It has, therefore for some years been suspected that radiation must have a character enabling it to fit in partly with a wave theory and partly with a theory of discrete particles. Now that we seem to be coming upon the very intimate relationship between the electron and the ether wave it looks as though we are on the eve of great and fundamental revelations with regard to the nature both of electricity and of ether waves.

**A.C. Sets.**

When you wish to run your set from the A.C. mains there are two principal ways of doing it. In the first place, you may use an "ordinary" set, that is, a set fitted with "ordinary" valves, and then employ H.T. and L.T. mains units, or a combined unit for H.T. and L.T. In this case what you are really doing is to take the alternating current from the mains and to convert it into smooth H.T. and L.T. direct current such as you would obtain from H.T. and L.T. batteries; so far as the set itself is concerned it is receiving practically the same kind of current as it would if batteries were used.

(Continued on next page.)

**RAYMOND'S**

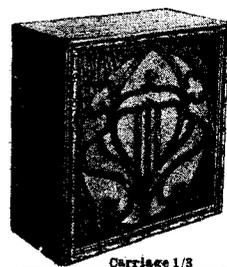
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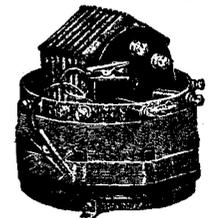
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3 Spring V. holders, Combined wave coil, Permacore L.F., Chmax L.F., H.F. Choke, Battery Switch, J.B. -0005, J.B. -00055, Mullard 0003 and 2 meg. holder, -0001 fixed, panel brackets, spades, 8 plugs, Flex, Links, 4 engraved terminals, Baseboard, all screws, Aluminium panel ready drilled (or obsolete if preferred), Grid Bias, Handsome American Type Cabinet, hinged lid, 3 Mullard valves.

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Asiatic Choke ... 7/6  
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15/- each.  
Cosor 230P, Mullard 252, Six-Sixty 230SP, Marconi 240 (O.Sram name), Ediswan PV225, Screened Grid, 22/6, Pentodes, 25/-.

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**SIEMENS EVER-READY**  
60-v., 8/-; 100-v. 13/-; Power, 60-v., 13/6; 100-v., 22/6.  
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**EASY TERMS** Titan 3 Kit of Parts, 14 x 7 x 10 Cabinet with hinged lid, Mullard S.G Valve, 2 Dullemitry Valves, 12 Equal Monthly Payments of **11/8**  
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TWO VOLTS. Universal, 1 amp. 5/6; Resistron, 1 amp. 5/6; Super H.F., 1 amp. 5/6; Super-Power, 1 amp. 7/6; Hyper-Power, 3 amp. 9/6; Pentodion, 3 amp. 13/6.  
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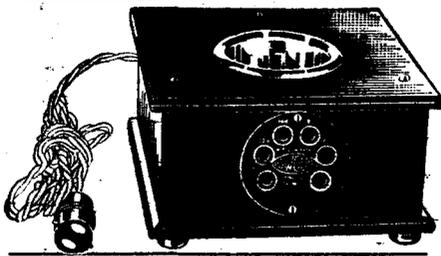
Kit of specified parts: Coils 200/2,000 metres. Panel 12 and Baseboard. No substitutes. **14/6** equal Monthly payments of

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save their initial cost  
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Leyton Primary H.T. Battery, Pl Porous Pot Cells  
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18" x 7" x 10"	12/6	21" x 7" x 10"	12/6

Postage and Packing 1/3 extra.

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DEMONSTRATIONS

IN GALLERY . . . (ROOM L)

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WHEN REPLYING TO ADVERTISEMENTS.

## TECHNICAL NOTES.

(Continued from previous page.)

In the second place, you may use a receiving set fitted with valves which are themselves adapted to operate on alternating current. This is quite a different proposition from the first one, and does not involve any intermediate apparatus between the supply mains and the valves themselves—or, at any rate, if there is any intermediate apparatus, it need only be very little.

### Types of Valves.

Assuming that you decide to use a set fitted with A.C. valves you then have a choice between two main principles: (1) valves in which the filament is directly heated by the A.C., and (2) those in which the working filament is indirectly heated from a subsidiary filament.

The great thing to be looked after in all cases of valve operation on A.C. is, of course, the question of A.C. hum. With a valve of the ordinary D.C. type the voltage applied across the ends of the filament is of such a value that if it were made rapidly alternating it would cause disturbance in the receiving circuit. If, however, we can reduce the voltage across the ends of the filament and still dissipate sufficient energy in the filaments for the operation of the valve, then our chances of avoiding A.C. hum are much better.

Suppose, for instance, we make the filament very much thicker; then a voltage of perhaps half-a-volt may be sufficient to drive the heating current through it necessary to raise it to the required operating temperature. By suitable design of the filament we can get it to operate satisfactorily with an applied voltage of something less than one volt. In this case the voltage is so low that even when it is alternating it causes very little disturbance to the circuit.

Valves of this type are made for the usual various requirements, but are subject, at any rate at present, to certain limitations as to impedance.

### Indirect Heating.

On the other hand, if the operating filament (that is the filament which does the "electron-emitting") is formed as a fine tube and if a subsidiary filament is passed inside, along the axis of this tube, but electrically insulated from it, then by heating the inside or subsidiary filament (with A.C.) we can heat the outer or operating filament to its working temperature without allowing the alternating current to get into its circuit.

The operating filament heats up and cools down comparatively slowly, at any rate so slowly that it cannot in any way respond to fluctuations having the frequency of the alternating current. Its temperature, therefore, remains sensibly steady and the A.C. effect is almost completely overcome by this very simple arrangement. Of course, the operating cathode is connected in the receiving circuit in virtually the same way as the filament in an ordinary D.C. valve.

Personally I consider that there is a very important future for the indirectly-heated valve, as it is not only very robust and comparatively easy to manufacture, but also it is to a large extent free from the limitations of the directly-heated A.C.

(Continued on next page.)



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SET A.—The New Cossor Melody Maker Kit in Sealed Carton, complete with every component, including valves for making the above three-valve screened-grid set (for further description send for Maker's pamphlet).

CASH £7:15:0

TERMS—20% with order and 9 monthly payments of 16 6.

SET B.—The New Cossor Melody Maker Kit complete as above, and with M.P.A. Cone Loud Speaker. EXIDE 2-Volt. L.T. Accumulator and 2 60-Volt British "long-life" H.T. Batteries.

CASH £10:10:0

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"AEONIC" PORTABLE 5-VALVE SETS.

Either Real Hide Suitcase Model or Walnut Transportable Model. Usual Price, £16:16:0

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TERMS—20% with order and 12 monthly payments of 20.-

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Terms to Trade.

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Parallel working. Fine adjustment. Worm-driven Coils cannot fall. Easy movement, Perfect Finish. Of all high-class radio dealers or by insured post 4/6 from Sole Makers:—

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## TECHNICAL NOTES.

(Continued from previous page.)

type. Several of the leading valve manufacturers in this country have now undertaken the manufacture of these valves, and there is an excellent supply of indirectly-heated valves available for all requirements.

### Loudspeaker Design.

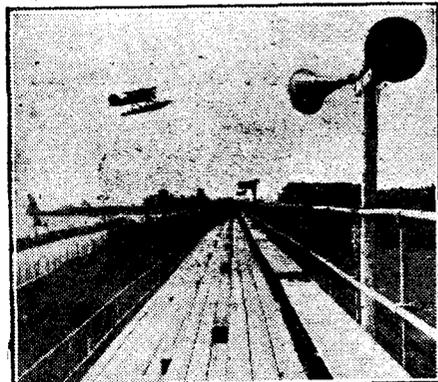
Leading points in the technical design of a loud speaker may probably be summarised as follows: First, to obtain reasonable sensitivity throughout the desired range of frequency, second, to avoid resonances within that range and third, to give reproduction as faithful as possible to the original.

The first condition, namely good sensitivity, is probably the easiest to secure; the second and third conditions are to some extent bound up with one another, inasmuch as distortion and unfaithfulness in the reproduction are often due, partly at any rate, to unwanted resonances within the working range.

### Test Records.

As you know, "frequency records" have now been produced by some of the leading gramophone record manufacturers, upon which pure, or practically pure, notes are impressed, these, however, varying in frequency at different parts of the record. For instance, in one of the Parlophone test records a practically pure sine wave is recorded, starting at a frequency of 6000 vibrations per second and tailing off gradually to 100 vibrations per second.

As the frequency drops uniformly from the start to the finish of the record, the frequency at any point can be instantly de-



Over two hundred loudspeakers were used in connection with the Schneider Race broadcast. A special article describing the installation appears on page 98.

termined from the position of that point between the starting and the finishing points of the record. Of course, the actual frequencies are dependent on the assumption that the record is rotating at its rated speed of 80 revolutions per minute.

### Testing a Pick-up.

Suppose, for example, you wish to test a gramophone electrical pick-up. This is fitted to the gramophone in the usual way and is played on the test record. In order to register the voltage developed at the terminals of the pick-up these should be connected with a valve voltmeter. In this way it will be a very simple matter to see whether the output voltage remains

(Continued on next page.)



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*The choice of critics*

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He knows that every product is as near perfection as skilled design and craftsmanship can make it.

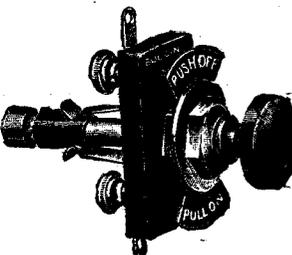
#### FUSEHOLDERS

A modern essential in every set. Made of highest quality bakelite with terminal connections to fit all standard 9<sup>d</sup>. fuse bulbs. **EACH**



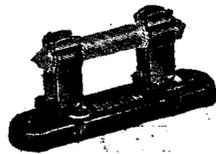
#### GRID LEAK CLIPS

A real serviceable bakelite base grid leak clip, with resilient spring clips which facilitate easy 9<sup>d</sup>. exchange of resistances. **EACH**



#### PUSH PULL SWITCHES

Five years experience, and constant improvement is embodied in this switch. You will never be "let down" by faulty contact if you 1/6 decide on using it. **EACH**



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Jars (waxed)	1 3 1 4	1 3 1 4
Sacs	1 2 1 9	1 2 1 9
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Special sizes for Pentodes.



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### NEW IMPROVED PUBLIC ADDRESS and Broadcasting MICROPHONES

The ideal Instruments for making announcements through Loud Speaker operating from Gramophone Pick-up, and for relaying Orchestra or Artist's performance from Stage to Front of Theatre or Garden etc.

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highly distance-sensitive, yet guaranteed entirely free from distortion or microphonic noises, absolutely silent background; far superior to ordinary Microphone Transmitters; for use with Valve Amplifier or Valve Set (through leads of Gramophone Pick-up if desired) at Open-air Meetings, in Cinema, Theatre, or Concert Hall. Operates from 2-Volt tapping of L.T. Accumulator, through Microphone Transformer. Current consumption one-tenth Ampere. Provided with detachable Sound Collector, handle, hook for suspension, and 9 ft. silk connecting cord, as illustration ... **16/6**




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highly sensitive Microphone as above described, provided with detachable sound collector and 9 ft. silk connecting cord, but fixed by rubber-cord suspension in nickel-plated frame, on pedestal 11 in. high; for mounting on Speaker's Platform, in Pulpit, or on top 25/- of Camera Stand, as illustration

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Microphone Transformer. special design to obtain best possible results from sensitive Microphones when connected to high-resistance phones, Loud Speaker, Valve Set, or Valve Amplifier; best Transformer made for clear Speech with volume, modulation speech and music transmission. Public Address Microphones, etc.; Prim. and Sec. terminals fitted; full directions for use of Microphone and diagrams of connections 6/- free. Goods by return post ... ..

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**JOHN H. LILE, LTD.,**  
4, LUDGATE CIRCUS, LONDON, E.C.4.

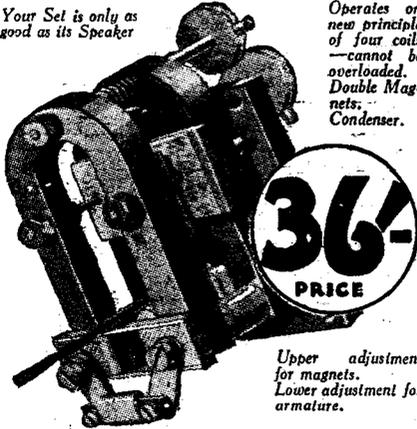


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# WATES STAR LOUD SPEAKER UNIT

HEAR it but ONCE. Conviction is forced upon you by the amazing refinement of reproduction—the glory of golden melody, the clarity of the spoken voice. The WATES STAR is seriously acknowledged by experts and all those who have heard it as a truly sensational advance over any reproducing instrument yet produced, irrespective of price! The cost is higher because of exclusive innovations and expensive improvements in design and material, but the RESULTS, we are convinced, are the deciding factor, and we ask every listener considering the purchase of a loudspeaker to HEAR the WATES STAR first!

Your Set is only as good as its Speaker



Operates on new principle of four coils—cannot be overloaded. Double Magnets. Condenser.

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PLEASE MENTION "POPULAR WIRELESS" WHEN REPLYING TO ADVERTISEMENTS

## TECHNICAL NOTES.

(Continued from previous page.)

fairly constant throughout the descending scale of frequencies as the record is played, or whether there are peaks or other considerable variations.

If any serious departure from the normal is observed, this should be noted and, at the same time, the position of the needle on the record should be noted. In this way it is possible to map out a curve showing the response of the pick-up for sounds of a given loudness and different frequencies.

### Testing Loud Speakers.

Having found an electrical pick-up which gives a pretty good and uniform response—or a pick-up of which the peaks and other characteristics are noted—it is then easy to amplify up the reproduction with one or two stages, preferably resistance-coupling, and reproduce through a loud speaker.

In this way, as you run through the scale of frequencies you can easily determine any peaks or other peculiarities in the loud speaker, bearing in mind that any peaks which are known to be already present in the pick-up must not be blamed upon the speaker. Of course, it is possible, although extremely improbable, that a peak in the pick-up may coincide with one in the loud speaker, and this possibility, although remote, should not be overlooked.

### Reflections and Resonances.

There is a further point which I should perhaps mention before leaving this subject and that is that when making tests with the loud speaker, especially on single notes such as the note of the test record (even if of falling pitch), reflections and resonances may occur due to surrounding objects, and these may give an erroneous impression.

It is, therefore, a good plan to carry out the test on the loud speaker several times, the speaker being moved to a different position for each test. In this way you will soon be able to tell whether any accidental effects are creeping into the experiment.

### NOTES TO READERS:—

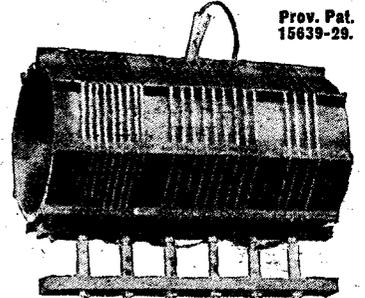
Regarding the Lewcos X Inductance Coils, type 7B dealt with on page 816 of our September 7th issue, will readers please note that the tapping figures given indicate percentages of inductance in the case of the first two and centre-taps in the case of the third on each coil. The figures do not represent turns of wire.

\* \* \*

Hart Bros. Electrical Mfg. Co., Ltd. have drawn our attention to the advertisement in September 7th issue of "P.W." (page 823) dealing with Easyfix Twin Flex. This should have been described as Capacity Reducing Flex, and not as given.

## DON'T MISS THE ULTRA-SHORT-WAVE STATIONS THIS SEASON.

Prov. Pat. 15639-29.



THE S.R.S. ULTRA-SHORT-WAVE UNIT enables any valve set of ANY DESCRIPTION to IMMEDIATELY receive THE WHOLE ULTRA-SHORT-WAVE BAND. 5 to 100 metres. NO ALTERATIONS! NO FITTING!

PROOF OF EFFICIENCY. Specified by "AMATEUR WIRELESS" For the L.S. "AMERICA" TWO. Whatever your set, within two minutes of receipt you can receive the Ultra-Short-Wave Stations. Send now C.O.D. or P.O. 12/6 (Postage (Write for special leaflet US1) 9d. extra)

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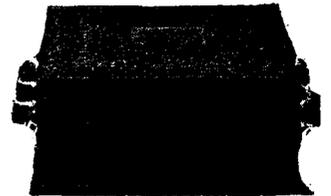
STONEHOUSE RADIO SUPPLIES, 54, Union Street, Plymouth, Devon.

## FAMOUS S.R.S. Ultra-Short-Wave APPARATUS

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The illuminating article on H.F. Chokes, which appeared in the "Wireless World" dated July 17th, 1929, was a revelation to many who became aware, for the first time, of the inefficiency of many of the modern commercial H.F. Chokes. A reprint of this article will be sent post free at request.



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