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No. 539. Vol. XXII.

INCORPORATING "WIRELESS"

October 1st, 1932.

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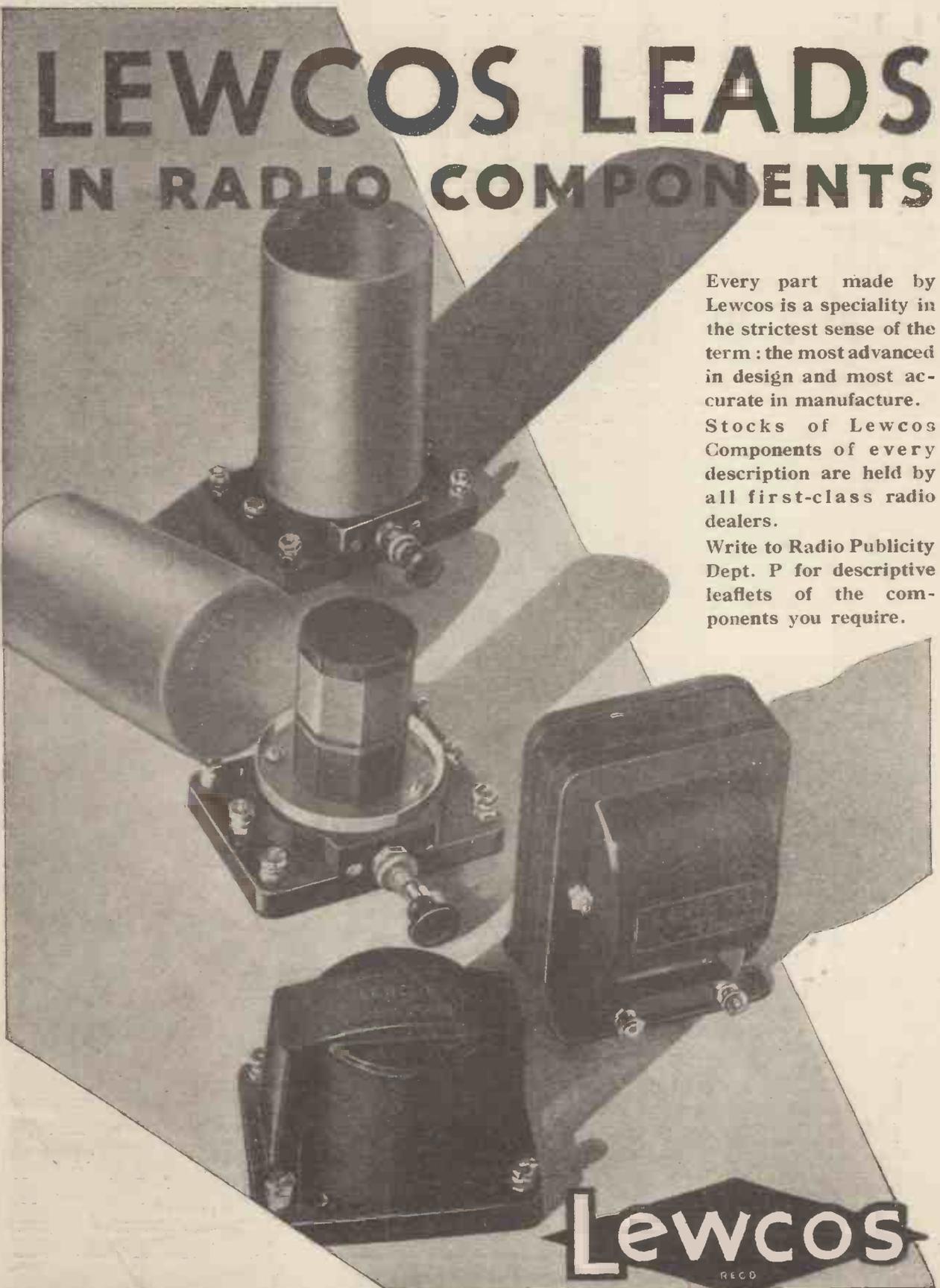
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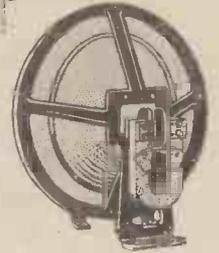
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A Catalogue of Standard Wearite Components—range is ever expanding—but sufficiently comprehensive to indicate the reason for Wearite's supremacy in the field of Radio Components

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- 1 Paxoline Panel 14" x 7" x 1/8" Price 6/-
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- and for the best results from any set use the new Wearite Selectivity Control Aerial Lead-in (S.G.A.) Price 1/-.

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- 5 Gives the required tone correction without an extra L.F. stage.
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- 7 The ideal L.F. coupling for selective sets.
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# THE NEW RECTATONE L.F. TRANSFORMER



Ratio 7-1 List No. D.P. 33

Compensation is controlled by a variable resistance of about 5,000 ohms connected externally between the terminals H.T. + and RES. With a pentode output valve a 2,000-ohm fixed resistance may be connected in series with the variable resistance in order to prevent excessive amplification of high frequencies with consequent liability to self-oscillation.

### Suitable Resistances for use with Rectatone are:

- Varley C.P.157 5,000-ohm Wire-Wound **5/6**
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To Messrs. Varley, Kingsway House, 103 Kingsway, London, W.C.2.

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Date.....

Name .....

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P.W.4



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You can't go wrong in radio with this wonderful little instrument to guide you.

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Radiometer for  
Battery Sets only,  
as shown here.

Price 12/6

De Luxe Model,  
for Battery Sets,  
Electric Receivers  
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PIFCO  
**ALL IN ONE**  
RADIOMETER

# FOR EVERY SET — there's a PILOT AUTHOR KIT

CASH — C.O.D — or H.P.

## EVERYTHING RADIO CARRIAGE PAID TO YOUR DOOR

**COSSOR MELODY MAKER.** Model 335. Complete with valves, speaker, and cabinet. Cash Price, £7/17/6. Carriage Paid. Balance in 11 monthly payments of 14/10. Send **10/-** only

**RADIO FOR THE MILLION "STATION MASTER 3"** (Model A.). With valves and cabinet. For battery use. Cash Price, £5/11/0. Carriage Paid. Balance in 11 monthly payments of 10/2. Send **10/2** only

**SLEKTUN SCOUT S.G.3.**—S.G., Detector and Power. Pilot Author Kit "A" (less valves and cabinet). Cash or C.O.D. £4/8/6. Carriage Paid. Balance in 11 monthly payments of 8/1. Send **8/1** only

**EPOCH "20 C" PERMANENT MAGNET MOVING-COIL SPEAKER.** (New Edition.) With 3-ratio input transformer. Cash Price, £1/15/0. Carriage Paid. Balance in 5 monthly payments of 6/6. Send **6/6** only

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## THIS YEAR'S WINNER

**LISSEN "SKYSCRAPER 3."** Chassis model with (Lissen) S.G., Detector and Pentode valves. Cash Price, £4/9/6. Carriage Paid. Balance in 11 monthly payments of 8/3. Send **8/3** only

**BLUE SPOT SPEAKER UNIT AND CHASSIS.** Type 100U. Cash Price £1/12/6. Carriage Paid. Balance in 6 monthly payments of 5/2. Send **5/2** only

**ATLAS ELIMINATOR.** Type A.C.244. Three tappings, S.G., detector and power. Output: 120 volts at 20 m/a. Cash Price, £2/19/6. Carriage Paid. Balance in 11 monthly payments of 5/6. Send **5/6** only

**GARRARD INDUCTION GRAMOPHONE MOTOR.** For A.C. Mains. Model 202. Mounted on 12-inch Nickel Motor Plate with fully automatic electric starting and stopping switch. Cash Price, £2/10/0. Carriage Paid. Balance in 11 monthly payments of 4/7. Send **4/7** only

**REGENTONE W.I.F. H.T. ELIMINATOR** for A.C. Mains, tapped S.G. Detector and 120/150 v. at 12 m/a. Cash Price, £2/15/0. Carriage Paid. Balance in 11 monthly payments of 5/1. Send **5/1** only

**COLLARO INDUCTION MOTOR with PICK-UP.** For A.C. mains. 12 in. turntable, moulded pick-up, automatic stop, and volume control. Cash Price, £4. Carriage Paid. Balance in 11 monthly payments of 7/4. Send **7/4** only

**READY RADIO 303 3-Valve Kit** (Det., 2 L.F.) with valves, cabinet and permanent-magnet moving-coil speaker. Built in 20 minutes! Cash Price, £6/17/6. Balance in 11 monthly payments of 12/7. Send **12/7** only

**BLUE SPOT UNIT AND CHASSIS TYPE 99 PP.M.** Including matched Transformer. Cash Price, £2/19/6. Balance in 11 monthly payments of 5/6. Send **5/6** only

## APEX THE KIT THAT FITS THE FREE BLUEPRINT EXACTLY

EXACT TO SPECIFICATION

### COMPLETE KIT PRICES KIT "A" 79/-

Author's Kit of specified components including ready drilled panel and terminal mounts, but less valves and cabinet. Or 12 monthly payments of 7/3. Carriage Paid.

**KIT "B."** As Kit A, but WITH VALVES, less cabinet. CASH or C.O.D. Carriage Paid **£5:11:3**

**KIT "C"** Complete Author's Kit, with valves, cabinet CASH or C.O.D. Carriage Paid **£6:6:3**

Or 12 monthly payments of **10/3** Carriage Paid. One Set of Valves **£1/12/3**. One Specified Cabinet **15/-**

### FINISHED INSTRUMENT

Fully Assembled. Aerial Tested. Complete with Valves and Cabinet, excluding batteries. Royalties paid. CASH or C.O.D. Or 12 monthly payments of **14/5**

**IMPORTANT** Part Kits, miscellaneous components or accessories are available under our own Easy Way H.P. System. Send us list of your wants. We will quote by return without any obligation.

### These are the parts the author used

	s. d.
1 Baseboard, 14" x 10" .....	1 0
1 PETO-SCOTT Panel, 14" x 7", ready drilled .....	4 0
2 COLVERN screened coils, type T.D. ....	17 0
1 TELSEN .0003-mfd. solid dielectric reaction condenser .....	2 0
1 TELSEN 3-point wavechange switch (push-pull) .....	1 3
1 TELSEN 2-point wavechange switch (push-pull) .....	1 0
1 BULGIN on-off switch, snap type, S.102 .....	1 3
3 BENJAMIN valve holders .....	2 6
1 FERRANTI .0003-mfd. fixed condenser, mica type .....	1 6
1 T.C.C. .0002-mfd. fixed condenser, type 34 .....	1 6
1 DUBLIER .0001-mfd. fixed condenser, type 610 .....	1 3
1 FERRANTI 2-mfd. condenser, type C.2 .....	3 9
1 TELSEN 1-mfd. condenser .....	2 3
2 ORMOND No. 6 .0005-mfd. slow-motion variable condensers .....	13 0
1 FERRANTI 2-meg. grid leak with holder .....	1 6
1 GEAHAM-FARISH 30,000-ohm resistance .....	1 6
1 DUBLIER 200,000-ohm resistance, 1 watt type .....	1 0
1 READY RADIO H.F. choke, S.G. type .....	5 6
1 LISSEN Hyperbolic L.F. transformer .....	12 6
4 BELLING & LEE indicating terminals .....	10
2 Terminal strips, 2" x 1 1/2" .....	6
1 Wiring, sleeving, screws, etc. ....	1 6
1 Piece of copper foil, 10" x 5 1/2" .....	1 0
2 G.B. plugs .....	4

KIT A, Cash or C.O.D. **£3 19 0**

Lissen Tone Compensator 10/- extra if required.

## PILOT ALTERNATIVE KIT CHOSEN FROM EDITOR'S LIST

### COMPLETE KIT PRICES KIT "A" 68/-

Alternative Editors Kit including Ready Drilled Panel and Terminal Mounts but less Valves and Cabinet. Or 12 monthly payments of 6/3 carriage paid. CASH or C.O.D. Carriage Paid.

**KIT "B"** Alternative Editor's Kit with Valves, less Cabinet. Cash or C.O.D. **£5:0:3**

**KIT "C"** Alternative Editor's Kit complete with Valves and Cabinet. Cash or C.O.D. **£5:15:3**

Or 12 monthly payments of **9/3** Or 12 monthly payments of **10/7**

**IMPORTANT** Parts, Kits, Miscellaneous Components, Finished Receivers, or Accessories for Cash, C.O.D., or H.P. on our own System of Easy Payments. Send us a list of your wants. We will quote you by return. C.O.D. orders value over 10/- sent carr. and post charges paid.

### DETAILED LIST OF PARTS

	s. d.
1 Baseboard, 14" x 10" .....	1 3
1 PETO-SCOTT Panel, 14" x 7", ready drilled .....	4 6
2 COLVERN screened coils, type T.D. ....	17 0
1 TELSEN .0003-mfd. solid dielectric reaction condenser .....	2 0
1 PETO-SCOTT 3-point wavechange switch (push-pull) .....	1 3
1 PETO-SCOTT 2-point wavechange switch (push-pull) .....	1 0
1 BULGIN on-off switch, snap type S.102 .....	1 3
3 JUNIT valve holders .....	1 0
1 T.C.C. .0003-mfd. fixed condenser, type "M" .....	1 0
1 T.C.C. .0002-mfd. fixed condenser, type "M" .....	1 0
1 PETO-SCOTT 2-mfd. condenser .....	3 0
1 PETO-SCOTT 1-mfd. condenser .....	2 0
2 ORMOND No. 6 .0005-mfd. slow-motion variable condensers .....	13 0
1 DUBLIER 2-meg. grid leak (wire end) .....	1 0
1 DUBLIER 30,000-ohm resistance .....	1 0
1 DUBLIER 200,000-ohm resistance, 1 watt type .....	1 0
1 PETO-SCOTT H.F. choke, S.G. type .....	3 6
1 R.I. Hyperbolic L.F. transformer .....	6 9
4 BELLING & LEE indicating terminals .....	10
2 Terminal strips, connecting wire, screws, one piece copper foil, 10" x 5 1/2", two G.B. plugs .....	2 6

**£3 8 0**

Lissen Tone Compensator 10/- extra if required.

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Dear Sirs,—Please send me C.O.D./CASH/H.P. for which I enclose £ s. d. CASH/H.P. Deposit. Send me your **FREE 1933 Catalogue**

NAME .....

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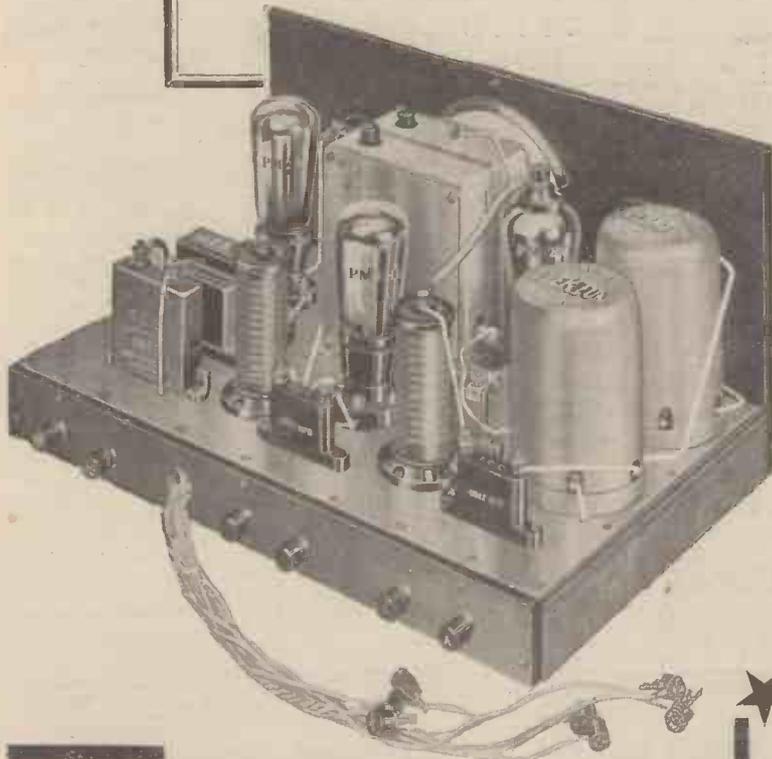
# Build yourself this Radio Thrill

## 40-50 Stations

AT FULL LOUDSPEAKER STRENGTH

*Simplest of all sets to build—most amazing for results*

### SLEKTUN SCOUT S.G.3



● NOW  
available as a  
**COMPLETE  
KIT of Parts**

incorporating Slektun Super Transformers and Coils, Cyldon Ganged Condenser with Sector Vision Escutcheon, T.C.C. Fixed Condensers, W.B. Valve Holders and Switches, Ready Drilled Panel, Konductite covered Baseboard, etc., etc.

# 84!-

Thousands are making this sensational set and testify to its remarkable performance, its simplicity of construction, its wide range, selectivity and power. Build it yourself. The complete kit of parts and a screw-driver are all you need. The set has been designed by leading component manufacturers so that even a novice can build it—at a cost which anyone can afford.

### FREE THE "SCOUT" BOOK AND BLUE PRINT

The book of the "Scout S.G.3" is a revelation of simplified set construction. Ask your dealer for a Free copy, together with Free Blue Print—or POST THE COUPON TO US TO-DAY.

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Please send me the FREE illustrated Book of the SCOUT S.G.3, together with the full-size Blue Print. I enclose 1d. stamp to cover cost of postage.

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Address.....

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SLEKTUN PRODUCTS LTD., 21, DOUGLAS STREET, WESTMINSTER, S.W.1

# POPULAR WIRELESS

LARGEST NET SALES

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 CAPT. P. P. ECKERSLEY, M.I.E.E.  
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WHATEVER NEXT!  
 BITS AND PIECES.  
 BELIEVE IT OR NOT.  
 "NO HOKEY-POKEY."

## RADIO NOTES & NEWS

FEELING THE DRAUGHT.  
 KIPPER PROBLEMS.  
 CORN IN EGYPT.  
 TRADE FOR N.Z.

The "Apex."  
 TWO weeks ago your "P.W." contained a sixpenny book—free. Last week two sixpenny blue prints—absolutely gratis. To-day a full-size shilling blue print of the "Apex"—for nothing.

No wonder they all call POPULAR WIRELESS the paper that made wireless popular! Such an unprecedented series of gifts by a journal that costs only 3d. makes people wonder whatever we shall do next!

So be firm with your newsagent, this time. None of those "Sold out" stunts. Lean on the counter, look him straight in the eye, and say, "Look here, my lad, I want POPULAR WIRELESS every week. No hokey-pokey." He'll know what you mean!

**A** COURSE of lectures on television, illustrated by experiments and demonstrations, will be given on

Exports Extraordinary.  
**G**ERMANY'S exports of wireless apparatus to Great Britain have certainly felt the draught from the increased customs duties. As you know, money talks. And this is what the money says:

Value of our radio imports from Germany during first half of 1931, £283,000.  
 Ditto, 1932, £31,000.

So well over a quarter of a million J. O'Goblins stayed at home!

### What Next?

**B**EFORE entering upon that intriguing subject just a word about this "Apex." You have probably grabbed the 1s. blue print, but have you grasped the great idea?

All the ordinary-wave and long-wave stations on tap as she stands—and if you want the very short waves on the "Apex" as well you simply add "a couple of bits and pieces" and there you are!

(A tremendous short-wave revival is on the way with the B.B.C.'s Daventry short-waver opening soon, so if you build an "Apex" you are all ready for it!)

### And Again!

**O**NE more word about "P.W."

before I turn to general topics. Believe it or not, we have got *another* gift for you next week.

It's a book this time—all about your problems and perplexities. And it's a first-class, easy-to-read, you-bet-your-life sort of book, for in it Capt. P. P. Eckersley, himself, originator of the B.B.C.'s Regional scheme, tells you how to solve your radio difficulties. Yes. Actual readers' questions, with the genuine straight-from-the-shoulder P. P. E. answers!

### RADIO-GRAM'S ROLE IN "LOVE ON WHEELS"



Both Jack Hulbert and the H.M.V. Radio-gram "play" prominent parts in this very funny "sack-him" scene in the new British talkie, "Love On Wheels."

Thursdays from 8 till 9.30 p.m. at the Borough Polytechnic, Borough Road, S.E.1.

They will commence next Thursday, October 6th, and will be given by J. J. Denton, A.M.I.E.E.

Only five minutes by car from the Embankment—but you have got to pay a fee to get in. And for students residing in the Administrative County of London that fee is twenty shillings. Full particulars from above address.

the book is called, and I confess to having found it uncommonly interesting.

### Manchester's Relaxation.

**G**LANCING through a Manchester paper I was astonished to read that "95 per cent of listeners arrive home between 5.30 and 7.30 p.m. for their evening meal. And all they are fit for then is tight music."

Surely not 95 per cent of them? And before eight o'clock, too?

(Continued on next page.)

### Wireless and Shipping

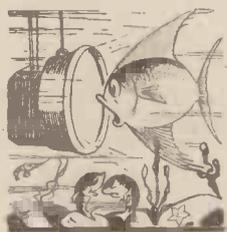
**M**ERCANTILE mariners, and others interested in the sea, have often written to me for compact details of wireless development on ships; and now I see that "The Shipping World" has issued a two-shilling book on the subject. There are 87 pages, plenty of illustrations, and 12 chapters by different authorities.

Beginning with Marconi's experiments, and ending with an account of the latest supersonic sounding device, this record of progress is necessarily compact. But there is a whole lot of inside information in "Wireless and Shipping," as

# NEWS—VIEWS—AND INTERVIEWS (continued)

## Television at Work!

A YORKSHIRE paper affirms that a Dr. Hartman is testing in the Riviera seas an apparatus which is intended to televise the finny denizens of the deep.



A steel globe is lowered into the domain of Davy Jones; it (the globe) contains a television transmitter and a camera, besides powerful electric lamps. So that when a deep-sea

tragedy or comedy is enacted the ship sees it by television and a cinematographic record is made.

We shall yet learn whether kippers swim folded or flat, and television will solve the mystery for us.

## Corn in Egypt.

WAY out in Aboukir, Egypt, is a dark-skinned gentleman who demands two piastres for a copy of "P.W." That's about fivepence.

And "W. C. L.," who hangs out in that salubrious spot, tells me that he pays those piastres with pleasure, because "P.W." is well worth it." (I'll bet he will think so this week, too!)

Now this "W. C. L." is a man of skill and understanding, as you will agree when you read his further remarks about the "Pop" Portable.

## The "Pop" Portable.

"I BUILT this set last winter," says W. C. L., "and was amazed at the fine range of programmes I could choose from, with only a frame aerial. And then I tried 40 feet of 24 D.C.C., suspended under the rafters, 10 feet above the ground.

"The stations simply poured in! I won't bother you with a full list. Suffice it to say that Nat., Reg., and their brothers and sisters, gave me many an enjoyable evening, and I was able to receive the news from London continually throughout the winter. Thank you for such a fine receiver."

Thank you, W. C. L., for a fine letter.

## The Wireless Germ.

I RENTED a bungalow for half of September on a certain British island; an all-electric house, but one without a wireless set. I have now no portable set, so we took a few books and a pack of cards. Imagine how we missed our broadcasting!



September evenings tend to be chilly, and after supper, when cards seemed silly dumb bits of pasteboard, we simply hun-

gered for a spot of loudspeaker noise and for the voices of the bright young B.B.C. men.

It is certain that there is a radio bacillus and that it bites hard if it is not fed.

## Radio and Ottawa.

THOSE stalwarts of the radio industry, Capt. J. W. Barber, C.B.E., and Mr. R. Milward Ellis, the R.M.A. delegates to Ottawa, affirm that their visit to Ottawa has been of great value. They pressed for the recognition of a Standardised Empire rating for radio sets and equipment and are satisfied with the results of their activities.

All the same, home manufacturers must pay more attention to the special needs of the various units of the Empire and make the designs and prices for their export trade accordingly. We cannot hope to sell apparatus to, say, New Zealand, on the strength of its British make, if it is not what N. Z. wants.

## A Good Example.

MY selection of New Zealand as an example was a happy one, for although that country is more British than the British, so to speak, its imports of radio goods from us for some years have been

## "SHORT WAVES"

Dr. D. S. Spens Stuart, who has succeeded in making friends with the wolves at Whipsnade Zoo, declares that these animals have their own sort of wireless.

We wish he would send an urgent S O S to the one at our door.—"Punch."

A well-known statesman declares that listening to a wireless vaudeville entertainment cheers him up more than any cocktail. It must be a sorry sight to see him stumbling to bed after having a "turn" too many.

"Of course," writes a correspondent, "the real radio fan doesn't want to listen-in. He spends his whole time in picking up stations."

Or trying to.

A Philadelphian scientist says that a new branch of the science of psychiatry is to be called Psychobiological pharmacodynamics.

Our wireless announcers are very glad they don't live in Philadelphia.

"A B.B.C. official stated that the tunes which have won most appreciation are 'Hush, hush, hush, here comes the b'y man...'"—Manchester paper.

Hush, indeed.—"Punch."

but 10 per cent of the total imports, the greater part of the 90 per cent being taken from the U.S.A. A prominent manufacturers' agent from N.Z. visiting Radio-lympia for the fifth time, told our "trade" contemporary, "The Broadcaster," that if only British manufacturers would examine the N.Z. market for themselves and offer the required goods, "we will send them back loaded with orders."

(How often "P.W." has told the "trade" that!)

## Too True.

"OF all our modern inventions," quoth S. P. B. Mais, in a London lecture, "the two which are most opposed to each other are the cinema and wireless. The film tries to entertain too much. The B.B.C. try to teach too much and entertain too little."

Remembering the charm of Mr. Mais's own broadcasts, we are confirmed in our opinion that he knows what he's talking about. And I'm glad that a hiker of his calibre will back up my contention that the B.B.C. should lift up our hearts—not uplift our minds!

## Natural Radio.

AN estimable young radio engineer, who I last saw kicking on his cot, two feet long, and who is now somewhere in East Africa or Uganda, tells me that the

colubus monkeys plunge and swing through the jungle trees as orderly as though they were 'planes directed by wireless.

He sent me a skin of one of these fine chaps and I almost blush every time I see the fur with its catlike tail. My friend is convinced that they have a signalling code, and he adds that he is positive that the Masai natives have learned to signal from the conversational methods of lions.

Talking of lions, he says that he and a lion met quite unexpectedly on a narrow trail and that the lion fled when he started to yell the "Stein Song" as a measure of panic and despair.



## Gracie's Gramophone.

THE photograph of Miss Gracie Fields which appeared on our "Radio Notes and News" page three weeks ago seems to have attracted unusual interest, and several inquirers have demanded what gramophone she was listening to. Well, there is no secret about that, for it's an H.M.V., made at the Hayes works of the world's biggest gramophone manufacturers.

I went over those works some weeks ago, and came away feeling galvanised by the go-aheadness of the plant and personnel. Everything right up to date, or in advance of it, and nothing in a groove except the needle!

## Is It a Vendetta?

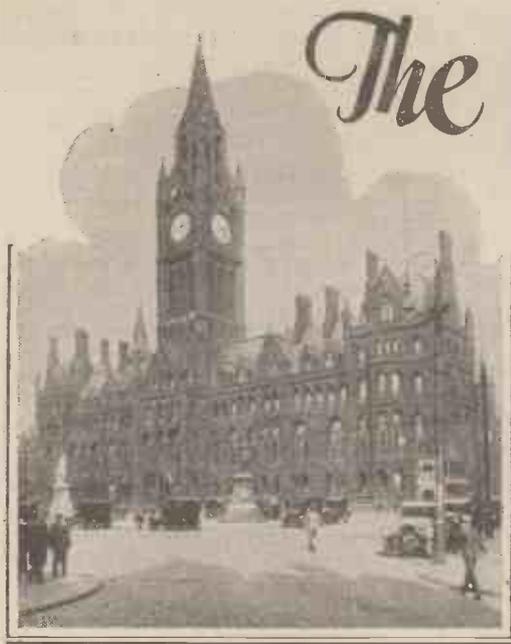
I DO not believe that any branch of radio has suffered more from theft than the portable-set section, and I would like a pound note for every one that has been unlawfully portaged. Is it a vendetta or simply a tribute to the sets?

The latest exploit was to sneak an all-mains set from one of the London-Leeds express trains. The joke—a left-handed one—was that the exploit was not discovered until after the attendant had travelled the length of the train, hiring earphones at a bob a nob!



ARIEL.

# The NORTHERN RADIO EXHIBITION



at the  
**CITY HALL**  
**MANCHESTER**  
 OPENED—Sept. 28th. CLOSES Oct. 8th.

This week sees radio activity in the north concentrated in Manchester for "The Show," where all the latest models for the coming season are being displayed to the public. In this picturesque account of the scene at the City Hall there is a great deal of condensed information about the exhibits of outstanding interest.

THERE'S a sameness about the streets in Manchester that has an unhappy knack of landing me for excess fare whenever I board a tram-car.

The streets all seem cobbled, the buildings look alike, and the point where the street cars cross, which you have carefully noted as a landmark, you discover—when it's too late!—to be duplicated every hundred yards or so of your route.

I was explaining all this to my colleague as the reason for my apparent inattentiveness, when our tram pulled up (without anything approaching logarithmic control) and considerably more than half of our fellow-passengers got off.

"Now," I said, as we resumed our journey, "don't you worry, I know my way all right *this* time, and when we turn into Deansgate we've got to make a grab for that bell-push as soon as we sight the railway bridge, and then we shall be—" But my conversation was rudely interrupted by a stentorian voice behind us.

"Ere, you two! Didn't you ask for t' City 'All? Well, jump to it, my lads, and don't you try any more of this joy-riding or you'll find yourselves paying again."

Full of apologies, we alighted, crossed the road, and then proceeded to trek our way back to the City Hall.

## First Impressions.

"This," I said, as we passed under the railway, "is the bridge that we should have looked out for if you hadn't started your discussion on the covering of the new 'golden' valves." But my colleague preserved silence.

Nor did he show any signs of excitement until we finally rounded the corner by the church railings and found ourselves face to face with the entrance to the City Hall.

So this was the home of that Northern annual Mecca of radio. Well, as far as I was concerned, it looked just as uninviting from the outside as ever—but *what* a difference when once we were inside!

There, in all its glory, was the show itself. Brilliant illuminations everywhere—scintillating signs to attract the attention to some particular exhibit; keen, attentive crowds roaming from stall to stall in wonder-

ment at the great variety of things to be seen—literally a sight to warm the very cockles of the heart!

This, indeed, was worth all our trials on the tram-car!

Alas, sad to relate, I soon lost my colleague. I am not quite sure how it happened, but I have a lurking feeling that he actually found his "golden" valves, and that no doubt accounted for it!

But taking the broad view, it was probably as well, for I was here on a serious

## THE NEW "MELODY MAKER"



The new Cossor "Melody Maker," which is a feature of the firm's display at Manchester, can be supplied this year with a cabinet containing the loudspeaker.

mission, and no enticement could be allowed to delay the despatch of the press telegram which was to convey my impressions back to London in time for this issue of "P.W."

So without further delay I began my survey.

At the time when I lost my colleague, my attention was drawn by a little crowd which had congregated round a part of the Lissen stand. They were all very intent upon the new Lissen "Scyscraper," a kit for home

constructors, and I wasn't a bit surprised at the interest they were showing.

I like the look of this new Lissen production. It's one of those things which impresses you the moment you see it, and I think it constitutes as fine an example of the modern trend in kit assemblies as I have seen. Nor was this the only reason for my hesitation at the Lissen exhibit.

There was their usual attractive array of components—this year better and more comprehensive than ever—as well as the new Lissen range of receivers which constitute an addition to the commercial set field of which Messrs. Lissen can be justly proud.

Loth as I was to move from this—probably the most comprehensive exhibit in the whole show—time and recollections of the telegram compelled me to move on.

At Stand Number 54, which is quite close to the Lissen exhibit, my attention was drawn towards an attractive-looking, self-contained mains set which compelled attention on account of the remarkably low price at which it was offered. It was the new Clarke's "Atlas" model for A.C. mains.

## A Good Start.

This year, for the first time in the history of the firm, Messrs. H. Clarke & Co. of Manchester!—whose name requires no introduction as the makers of high-class components—have turned their attention to the production of sets. There are three of them in all, one for D.C. and one for A.C. mains operation, and a third model for batteries.

I had a good look at these sets on the Atlas stand, and as I examined the models that were displayed, I couldn't help thinking that it isn't often that a firm embarks upon a new line by hitting the nail on the head first time.

I've been thinking for a long time that the two-valve market has been very inadequately covered by manufacturers as a whole, and as a result of my visit to Stand Number 54, I begin to think that there is something in thought-reading after all. for

(Continued on next page.)

## THE NORTHERN RADIO EXHIBITION

(Continued from previous page.)

each of the new "Atlas" sets is a "two," and a very good one at that!

Lotus, too, to whose stand I paid a visit, are deserving of special mention for having had the foresight to realise what a big potential market there is for a really good "two" at a cheap price.

The Lotus "Bud," which, in my opinion, is a remarkable proposition at 10 guineas (which includes the moving-coil loudspeaker) has quickly sprung into prominence and, in my opinion, deservedly so. I have had the privilege of trying one and I am convinced that it is worth every penny of the money charged for it.

### Constructors' Components.

I was impressed with the number of new components of interest to the home constructor that were to be seen on the Lotus stand. Year by year this enterprising firm has brought out a succession of high-quality components at really competitive prices, and it is firms such as this that have helped to place the home-construction ideal on its present solid foundation.

As I moved away from the Lotus stand,

### RHAPSODY IN BLUE SPOT!



Pleasing simplicity is the keynote of this Blue Spot mains set, only one of many handsome models to be seen on Stand No. 62.

I caught sight of a slogan that informed me that this was going to be a radio-gram year. And when I looked up at the fascia and found that my wanderings had led me to the Climax exhibit, I had reasons for agreeing with the slogan.

Messrs. Climax Radio have produced a range of radio-grams which I am confident will go a long way towards making this a radio-gram year. They have every appearance of being first-class productions, and at prices which are somewhat staggering when one recalls the tendency in previous years.

### Direct Comparison.

Not so many yards farther on, I came across another outstanding radio-gram exhibit. I noticed this one particularly because it happened to be the instrument which played such a prominent part in what must now be regarded as the famous Ekco "direct comparisons" demonstration.

I take my hat off to the originality of thought behind this ingenious effort by our Southend friends, for it just shows the confidence that "Ekcos" have in their pro-

ductions—a confidence which, in my opinion is not a bit over-rated.

Mention of radio-grams calls to mind the fact that it now seems to be almost universal practice to include provision for the connection of a pick-up in commercial receivers. To my way of thinking, it's a very logical development, and I was glad to observe that there were very few commercial sets without it.

After all, there is not much point in

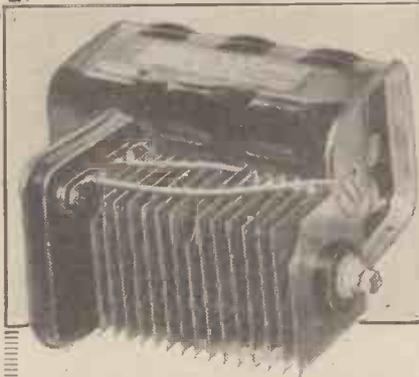
### G.E.C.—D'YOU SEE?



This elegant-looking radio-gram is the new G.E.C. "Carnival" receiver. You will find it on stand No. 23.

THE NORTHERN RADIO EXHIBITION, WHICH IS HELD AT THE CITY HALL, DEANSGATE, MANCHESTER, IS OPEN FROM SEPTEMBER 28 TO OCTOBER 8. THIS YEAR'S SHOW IS BIGGER AND BETTER THAN EVER, AND ALL OUR NORTHERN READERS SHOULD MAKE A POINT OF SEEING IT.

### FINS FOR FANS!



"Inside information" concerning the Westinghouse Metal Rectifier, Model H.T.7. It gives 30 milliamps at 200 volts.

buying a complete radio-gram if you already possess a really good mechanical turntable. Who wouldn't be satisfied, for instance, with the new Ferranti superhet.? And that is only one of the many sets that is available for use with an external pick-up and turntable.

This new Ferranti, super, by the way,

impressed me tremendously. At the price at which it is offered, and with an intimate knowledge of what it will do, I regard it as one of the most outstanding examples of the new season's designs.

I lingered for quite a long while at the Ferranti exhibit. The new kit sets seemed to be creating quite a mild sensation—at least, it was several minutes before I could get anywhere near them!

The superstition associated with number 13 was dispelled for ever as far as I was concerned when I discovered that it was the stand number of Telsen's. I do not think that it would be possible to isolate a single firm who have done more to popularise home construction than have Messrs. Telsen, an achievement due almost entirely to the electric personality of their chief, Mr. Macnamara.

Here was a range of components to quicken the pulse of everyone bitten with that insatiable germ of home construction. And what attractive-looking assemblies, too, were the new Telsen home constructor sets!

### Good Showmanship.

My parting recollections of the Telsen exhibit was of the crowd waiting in the usual orderly Mancunian manner for a glimpse of the new "Macnamara" set. I wasn't a bit surprised at the enthusiasm that was being shown, for this new set must go down as one of the most outstanding models of the new season's range. I fancy that you

### ALWAYS CURRENT—



—and plenty of it—is the slogan of this Ediswan battery, which was a feature of the firm's display at Manchester.

will think so, too, if you get an opportunity of seeing exactly what you get for the 12 guineas that it costs.

While I was down at this end of the hall, I was attracted by what I thought was a really good piece of showmanship. I refer to the artistic stand of Messrs. A. C. Cossor.

Cossors have gone from strength to strength with that very famous kit set of theirs—the "Melody Maker"—and to those of us who are acquainted with previous models, it seems almost impossible to believe that they can have improved it still further.

### Better Than Ever.

Nevertheless, I am convinced that this year's model—the "335," as it is called—is better than ever! It has every appearance of being the most simple set in the world to construct, and yet the features of the design stamp it as modern in every sense of the word.

I thought the array of sets exhibited on the Cossor stand was particularly attractive, to say nothing of their famous valves.

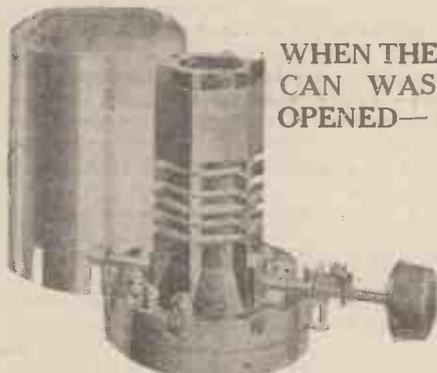
My next port of call was where I should  
(Continued on next page.)

## THE NORTHERN RADIO EXHIBITION

(Continued from previous page)

logically have started, stand No. 1! It was occupied by Celestion, a firm who have set about the popularisation of moving-coil speakers this year in a way which is more convincing than any other.

They have actually produced a moving-coil instrument which sells complete with



**WHEN THE CAN WAS OPENED—**

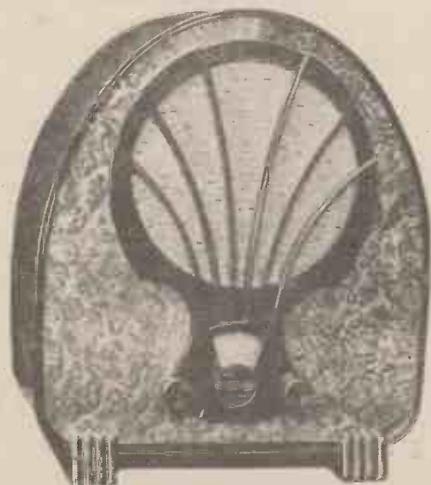
it revealed the efficient-looking interior of the new Telsen screened coil, with its snap-action wave-change switch.

input transformer for the astonishingly low price of 27s. 6d. But that was only one of the fine speakers that I saw on their stand.

It was just after I left Celestion's stand that I ran into my colleague again. He was rubbing his hands with evident satisfaction over the praiseworthy exhibit of the General Electric Company.

"There, my boy," he greeted me with. "And what do you think of that for a kit-set achievement?" And when I had

### MITCHAM FARE!



This handsome instrument is one of the latest models from the all-British factory of Philips, at Mitcham.

examined the new Osram "Music Magnet" myself, I quite understood the reason for his enthusiasm. It was a superb-looking job, and it was drawing the crowds like nails to a magnet!

When I finally managed to get him away from it, his first topic of conversation—

exactly as I had expected!—was the new "golden" valves. So we went straight over to Mullard's stand to see them in reality!

I must confess that I wasn't disappointed in the slightest with what I saw. The new valves were interesting enough, but the rest of the exhibit was ample justification for the visit.

My hopes of being able to stick to any sort of pre-arranged plan faded into thin air, because my colleague dragged me off to see some of the more noteworthy stands that had so far escaped my attention. Nevertheless, I think that we saw most of the things of interest.

### Good Ganging.

We saw the sparkling efforts of the British Blue Spot Co., a firm who have carried their fame and reputation as loudspeaker manufacturers into the commercial set field with particularly gratifying results. We spent more than a few minutes almost lovingly appraising the new Blue Spot pedestal receiver which is entirely battery operated.

We found plenty to occupy our attention in the fine range of ganged condensers exhibited on the stand of the British Radio-Phone people close by, and after a close examination of the models shown we

### MULTUM IN PARVO



The new Igranic "Parvo" transformer has been specially designed for use in parallel-feed circuits.

mutually agreed that there was no longer any excuse for circuits going out of gang.

As a matter of fact, we felt even more strongly about this question of matching after we had paid a visit to the Colvern stand, and had heard from no less a person than Mr. Collinson himself exactly what precautions are taken these days to ensure the accurate matching of his firm's productions. The array of coils that we examined on the Colvern stand was most impressive.

### An Incident.

It was the crowd more than anything else that finally ushered us away from the Colvern stand, and then it was that I nearly lost my colleague for the second time!

He had spotted the Marconiphone exhibit, and by the time I got there he was already engaged in conversation with one of the "incidents"—as our friends Flanagan and Allen would say.

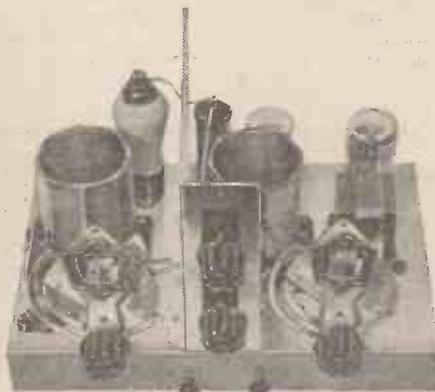
As a matter of fact, we lingered there rather longer than we should have done when an anxious printer was kicking his heels in London, but it wasn't really surprising. For the exhibits on the Marconiphone stand were symbolic of all that is good in modern radio, and there was a variety of mains sets to suit every conceivable purpose.

Battery users, too, were well catered for

with the three new models that are to be featured during the coming season. One of these, is a six-valve portable superhet. that consumes only 10 milliamperes! And a very fine job it is, too.

Then we found the Ready Radio stand, and that was the signal for another lengthy pause. My colleague fell to a minute examination of the new Ready Radio

### TRI-BAND TRIUMPH



Ready Radio are responsible for this attractive-looking home constructor's kit. It's the new "Meteor S.G.3."

"303" (a wonderful proposition at 70s., while I was content to cast my optics over the many fine points of their new "Meteor S.G. 3." For reasons of space I cannot record all the impressions that my colleague gave me concerning the "303," but he had nothing but praise for it.

I, too, left the stand full of enthusiasm for the new "Meteor." I am quite prepared to believe every one of the claims that are made for it; in fact, it was my impression that the claims were very modest for such an efficient looking instrument.

By this time our visit had necessarily to

### LISSEN'S LATEST



The pleasing appearance of this new Lissen band-pass receiver is in no small measure due to the side mounting of the controls.

draw to a close. But we didn't waste a second of the time that was left.

We enjoyed a brief stay at the Dubilier stand, where their new range of resistances were most effectively displayed: we had a look at the latest Epoch range of speakers

(Continued on page 174.)

## BROADCASTS TO SCHOOLS

By M. A.

A discussion about the methods and the value of the B.B.C.'s daily educational programmes for school children.

FROM the tone of Lord Eustace Percy's Foreword to the Central Council's pamphlet entitled "Broadcasts to Schools" it would seem that much satisfaction is felt by that Council in what has already been achieved by these broadcasts, and in their future possibilities. For instance, Lord Percy says, with considerable confidence, "It is obvious that the time has come for broadcast lessons to be tried seriously . . . as a new instrument for education in a changing world."

### The New Time-Table.

Had the Council not stressed the point that broadcast lessons were only intended to supplement the work of the teacher, Lord Percy's remark might have sounded like the death-knell of the teaching profession. Happily, we of the profession have no fears on that score, at least for the present, nor do we derive one consolation from the Council's assurance (we read this assurance between the lines, by the way) that they intend only to help and not displace the schoolmaster.

Lord Percy also says that already 4,000 schools are using broadcasting at the present time.

I wish he could have found space for more detailed information on this point. He doesn't say what the total number of schools is in the country, nor the number of public, secondary, elementary or perhaps preparatory schools that go to make up the 4,000.

A perusal of the proposed time-table for the year 1932-33 helps me to this conclusion. Among the 4,000 there cannot possibly be any public schools; there may be a few secondary, and the rest must be elementary and preparatory schools.

Why no public schools? For the simple reason that the scheme offers only about 1½ hours a week for them. As long as there are public examinations to be passed, and entrance exams. to the professions, the public schools haven't the time to devote even 1½ hours a week to broadcast lessons.

### Expert at the Microphone.

The syllabus of work which preparation for these examinations involves is too big to leave time for something (although it may be very interesting and of educational value) which is mainly outside the requirements of these examining bodies.

These remarks apply equally to the secondary and grammar schools, as they have the same examinations to prepare for, and need just as much time for them. Whence I conclude that "Broadcasts to Schools" is hardly explicit enough, and in truth should be "Broadcasts to Elementary and Preparatory Schools."

As such I say without hesitation that these broadcast lessons must be an inestimable boon, but especially to the elementary school teacher.

I've always marvelled at his ability to enthuse over the vast number of subjects he is expected to teach, even though they may

not reach a very high standard. He cannot be an expert in all these subjects.

On the other hand, all the public schools and most of the secondary schools have their own experts nowadays, who are responsible for the teaching of one or perhaps two subjects only in the school curriculum. The expert, then, at the microphone is a greater necessity to the elementary than to the higher types of schools, and his expert knowledge will relieve the teacher of some of his endless preparation.

The Council's time-table is also remarkable for its omissions. The inclusion of Advanced French and German readings, however, does suggest that the public and secondary schools have been thought of, and indeed catered for, although only in a half-hearted sort of way.

If this is so, then why are Latin and Greek ignored? Surely the Central Council

part, do not include these subjects in their time-tables?" Here I am stuck for an answer—the situation is too complex.

This brings me to my main purpose. The situation I have tried to describe sums up my impressions and opinion of the "Broadcast for Schools" programme. There seems to be no set purpose about it, apart from general education.

It seems to have been drawn up by people who are aware of one side only of the schoolmaster's job; there is no suggestion of a leaving certificate or, in the case of some boys, of a job at the end of it all.

### A More Ambitious Programme.

And because of these serious omissions, higher schools in general cannot yet think of treating the broadcast lessons seriously.

I do not suggest for a moment that the old methods of the schools are ideal, but under present conditions of examinations, etc., such methods of education are forced on them.

I imagine the Central Council's answer to this would be: "We only hope to supplement the work already going on in the schools; that is, by supplying 110 minutes per week for pupils of the A class, 150 per week for the B's, and 100 for the C's."

To this I would reply, that such meagre fare couldn't have anything like a set purpose about it, and it couldn't be said to have anything more than entertainment value. As such, I fear the public and secondary schools wouldn't look at it.

What do I propose then? While I admit the value of broadcasting, I would like to see a more ambitious programme, one with a more worth-while suggestiveness about it, one that has been framed with the public and professional examinations in mind, attractive to all schools.

### Those Exams.

As long as examinations remain the test of ability, and as long as they are the only means of entry to the professions, they cannot be ignored. Not till the Central Council has considered these, will all the schools, it seems to me, be tempted to take broadcast lessons seriously.

But if such a comprehensive programme were drawn up, what will happen to the

scholastic profession, you may ask? Surely this would sound its death-knell!

Not a bit of it! As long as the average boy (I do not speak for girls) is unable to learn anything by hearing it once only, as long as boys stubbornly refuse to believe they are not working for a master, but for themselves, as long as boys (or some boys, at any rate) have to be spoon-fed, encouraged, or bullied into learning something, the schoolmaster need never fear extinction in favour of the new instrument.

(Continued on page 173.)

## SOMETHING TO SING ABOUT!



David and Bertie Kidd, the Scottish schoolboys who have been giving a turn at the London Palladium. Jack Hylton, who is shown listening, thinks David's voice is the best he has heard for broadcasting.

aren't aware that Cambridge still insists on the one, and Oxford both in their initial examinations. They can't have forgotten this! Whence I conclude again that "Broadcasts to Schools" are not intended for the public and secondary schools, but primarily for the elementary and preparatory schools.

### Too Complex!

If this conclusion is right, here the question arises: "Why broadcast French and German to schools which, for the most

# CAPT. ECKERSLEY'S QUERY CORNER



Under the above title, week by week, our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers.

## INDUCTANCE AND RESISTANCE—METHODS OF COUPLING—GRID BIAS —STATIC DISTURBANCES.

### Non-Inductive Resistances.

R. L. A. (Slough).—"In a number of adverts for resistances I have noticed that certain makers claim that their resistances are non-inductive. I do not understand this, as surely a resistance is only purely a resistance and does not possess inductance."

Any conductor possesses inductance, more or less. Self-inductance of a conductor means that one point of the conductor produces magnetic lines of force which couple or link with another part of the conductor.

Coiling a wire facilitates this mutual linking of different parts of the same circuit, and even a straight wire has self-inductance. Every conductor has resistance, too.

So every conductor has both resistance and inductance. But by avoiding coiling the conductor, and by making it of suitable material, the resistance is much greater than the inductance, and we say it is a "non-inductive resistance."

If we coil the conductor but make it resistive, we get an inductive resistance. By winding a coil of low-resistance wire over iron, we get a non-resistive inductance, or, as we say, an inductance. It's all a matter of degree and which quality most predominates.

### Better than L.F. Choke ?

T. P. L. (Muswell Hill).—"As the impedance of an L.F. choke used for parallel feeding the anode current of a power output valve varies considerably with frequency, is there any reason why a resistance should not be used in place of the choke, and should not this arrangement give superior results to the L.F. choke ?"

Provided the minimum value (say 50-cycle value) of the impedance of the iron-cored choke is sufficient, its value can rise and rise to very large amounts without spoiling the performance of the circuits.

A resistance gives, however, no frequency discrimination whatsoever, and is therefore valuable for "ultra-good" circuits (what a word!).

The disadvantage of the resistance is that it wastes the volts available for the actual anode of the power valve. It absorbs power, in fact.

A choke has a D.C. resistance of perhaps 500 ohms, and the loss of anode volts is negligible. A choke gets its useful impedance electromagnetically, the resistance gets its "impedance" by resistance and so wastes power.

In "ultra-good" circuits waste of power can't be avoided.

### Automatic Grid Bias.

A. C. (Lee).—"I am building a mains three-valver, but I am not sure how to work out the values of the resistances for automatic grid bias on the S.G. and L.F. valve. Will you please give me the formula because I am keen to work out the figures for myself ?"

In the first place, you must fix what H.T. current you expect, in steady conditions, through the valve. I have often explained how to do this with an anode volts/anode current diagram, but if you haven't seen these explanations you will find out from experience or the makers what feed your valve takes in working conditions. Let this feed be  $I_a$  milliamps.

You now want to know what negative volts to put on the grid for steady working. Again find out in either of the ways I have indicated. You should find out for anode currents what value you require.

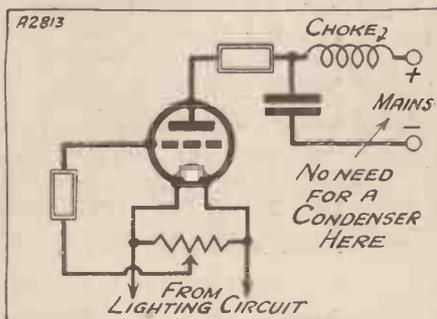
Then if  $R$  is the resistance for the automatic grid bias,  $E_g$  the negative grid volts, and  $I_a$  the anode current. Obviously:

$$R = \frac{E_g \times 1,000}{I_a}$$

If  $E_g = 2$  volts and  $I_a = 5$  milliamps,

$$R = \frac{2 \times 1,000}{5} = 400 \text{ ohms.}$$

## BALANCING IT OUT



If hum is experienced when using a directly-heated valve in a mains set, it can generally be reduced by using a potentiometer scheme as illustrated above.

### Earthing Causes Hum.

G. T. (Hornsey).—"I have recently built a three-valve D.C. mains set, and I find that with the earth removed from the set hum is non-existent. With it connected, however, the hum is very marked.

"Is it in order, therefore, to run the set without an earth ?"

Yes; but I think there are certain

Don't address your letters direct to Capt. Eckersley; a selection of those received by the Query Department in the ordinary way will be answered by him.

regulations which say the set must be earthed. It is impossible, without a diagram, to give you any good advice as to how to earth the set and yet eliminate hum; but, in general, use a choke in series with the H.T. supply and, if you are using the mains to light the filament circuits, bring the grid back to filament, as shown in the diagram.

You ought to find one spot on the potentiometer where the hum is a minimum.

### Atmospherics.

B. L. (Birmingham).—"Is there any remedy for atmospheric disturbance? I ask this because I have often wondered how a commercial station which has to maintain continuous communication manages to overcome this trouble. In the Tropics conditions must be impossible at times."

If you are to receive the signal you must receive the atmospherics. The atmospherics are apparently less, as (1) the signal strength is greater; (2) the band width of response of the receiver less (there is a limit, otherwise, if too narrow the signal is not received); (3) as the strength of the atmospherics is less.

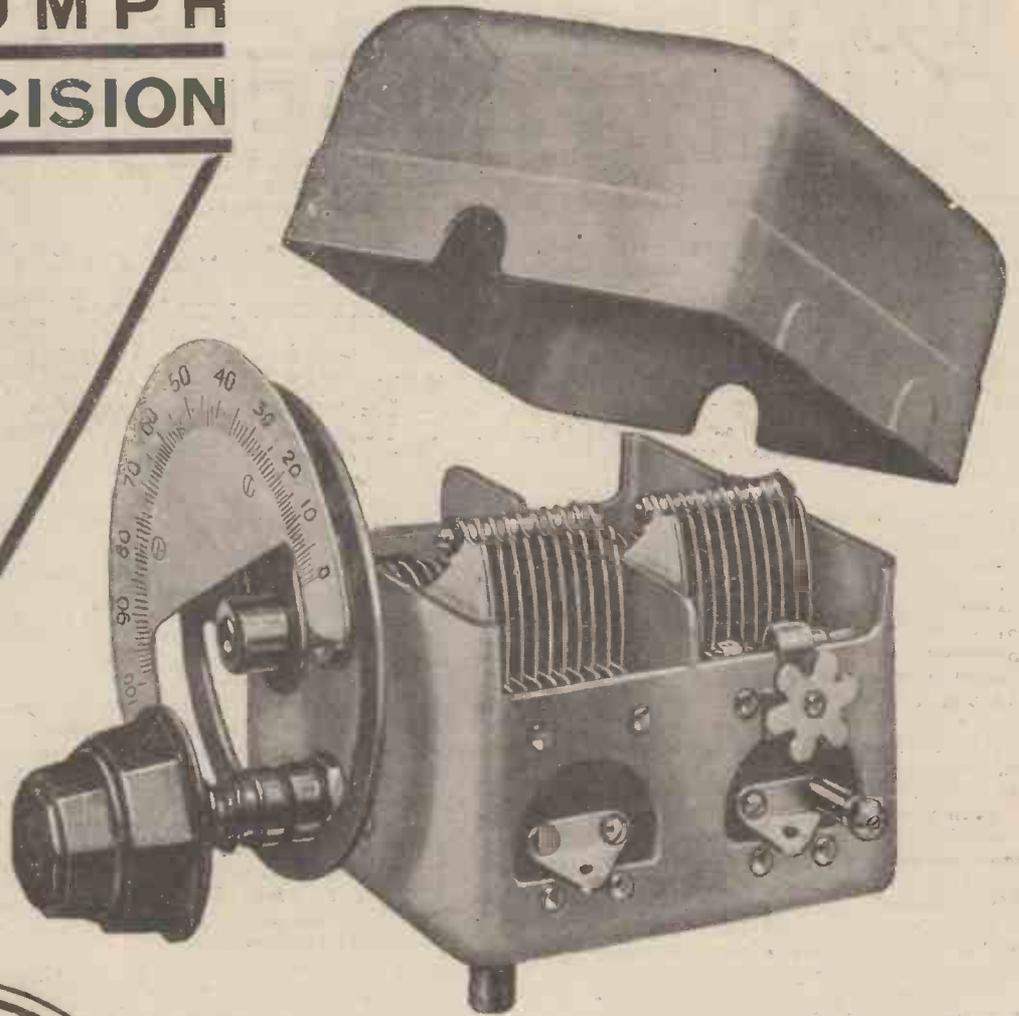
The strength of atmospherics is, as you say, generally greatly increased in the Tropics. Atmospherics are weaker, on the whole, the shorter the wave.

Commercial stations using long waves are frequently unable to work because of atmospherics. Ship stations and shore-to-ship stations are equally frequently prevented. The coming of the short waves has, however, greatly reduced the ratio atmospheric to signal, but short waves fade and are at times tricky.

Long waves are steady but constantly interrupted by atmospherics. By combining the two methods—long and short waves—the ordinary commercial station has greatly increased its efficiency.

Atmospherics can't be eliminated. Only their ratio to signals may be adjusted.

# A TRIUMPH OF PRECISION



**PRECISION  
INSTRUMENTS**

With the J.B. Unitune you get the highest selectivity of which your set is capable, together with *all* the advantages of one-knob tuning.

Similar in construction to the "NUGANG" Condensers, but the trimmer of front section is operated from the receiver panel by means of a second knob concentric with the main tuning knob.

Rigid one-piece chassis, very robust construction. Trimmer to each stage. Heavy gauge wide spaced aluminium vanes. Special bearings to rotor ensure permanent accuracy. Capacity, .0005.

**MATCHED TO WITHIN  $\frac{1}{2}$  mmfd. PLUS  $\frac{1}{2}$  PER CENT.**

Complete with disc drive and bakelite escutcheon plate.

2 gang - 18/6                      3 gang - 27/6

Other new J.B. products include:—J.B. Nugang Condensers, Super-het. Gangs, Illuminated Disc Drive, Short-wave Condensers, Air-spaced Differential Condensers, etc. Write for particulars.

# NEW J.B. UNITUNE



## THE "MAGITONE."

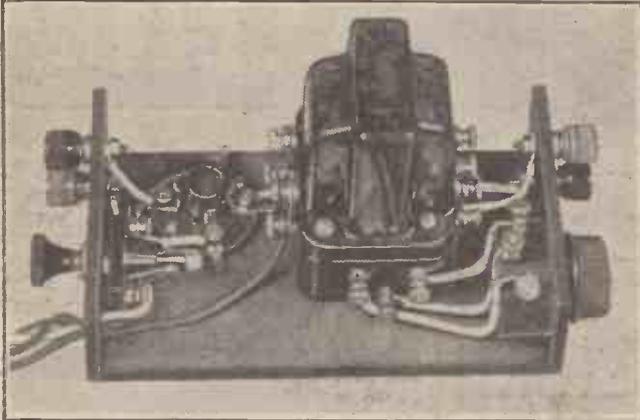
(Continued from previous page.)

amplification would be wanted than that given by two stages.

The question of the number of H.F. valves, however, does not come into the matter. The main point is that the set should either have only one L.F. stage (and that should not be a pentode) or none at all.

The second consideration is whether an output filter is included in the receiver.

### RAISE OR LOWER THE TONE AT WILL



There is only one control, the potentiometer seen on the right-hand ebonyite strip. When it is turned one way the bass notes are strengthened, and when turned the other the high registers are increased in volume.

It is desirable that there should not be one, and in any case it is easily disconnected and fitted after the unit, where it would be quite desirable.

Apart from those two considerations there is nothing to worry about, and so long as the L.T. is supplied by accumulators it does not matter whether the H.T. comes from batteries or from mains unit. Now for the connecting-up process.

#### Output Filter If Necessary.

First of all the input. The bottom input terminal goes to the L.S. terminal on the receiver that is joined up to the anode of the last valve, and the other input terminal to the remaining L.S. terminal. In the case of a set without any L.F. stages, the telephone terminals would be used instead of the L.S. terminals.

The loudspeaker is joined up to the L.S. terminals on the unit just as though they were the L.S. terminals of the set, an output filter or transformer being used if desired or if necessary.

The L.T. positive and negative flex leads go to the L.T. terminals of the set, or direct to the accumulator if that is more convenient. Put H.T. positive in the maximum H.T. tapping available.

#### Apply Suitable Bias.

In the case of a set with an L.F. stage the power valve is now put into the unit, and the grid-bias voltage applied to the G.B. flex of the unit should be the same as was applied to the power valve when it was in the receiver. A new valve will be required for the vacant holder in the set.

So long as this valve has an impedance around 10,000 ohms it will do, and suitable

G.B. should be applied to it via the G.B. lead that previously supplied the power valve. In the case of a set without an L.F. stage, the new valve should be a power valve, and should be placed in the unit. Any small power valve is suitable.

#### Separate L.T. Switch.

There is just one final point concerning the metal strap that runs between the "G" terminal of the transformer and the "G" terminal of the compensator. When this is connected, the filter that cuts out record scratch and heterodyne whistles is in circuit.

But quite often the results will be preferable without the filter in operation, and it is put out of circuit simply by disconnecting the strap from the terminal of the compensator, leaving the G.B. lead still on the transformer. You should try with the filter in and with it out, to see which you like better.

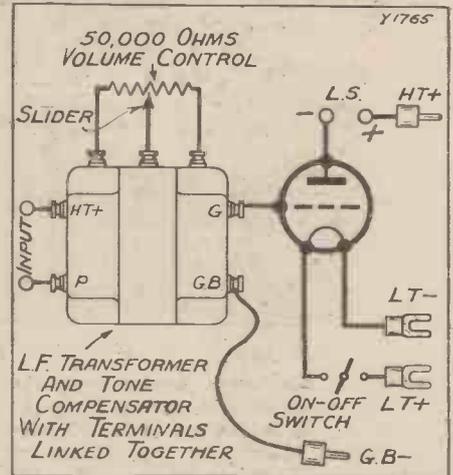
Oh, and there is one other little point. There is a separate L.T. switch on the unit for controlling the filament of its valve, and the filament is controlled by this switch quite independently of the switch on the set itself. When you switch on, both receiver switch and unit switch must be operated, and also when you switch off.

You are not likely to forget either of the switches when turning on, but it would be an easy matter to overlook the amplifier

switch when closing down for the night. Particularly is this so when you have got so used to having the switch on the receiver only, and there will be no sound to indicate the amplifier is left on. So don't forget it!

Tone is so largely bound up with the personal preferences of the individual

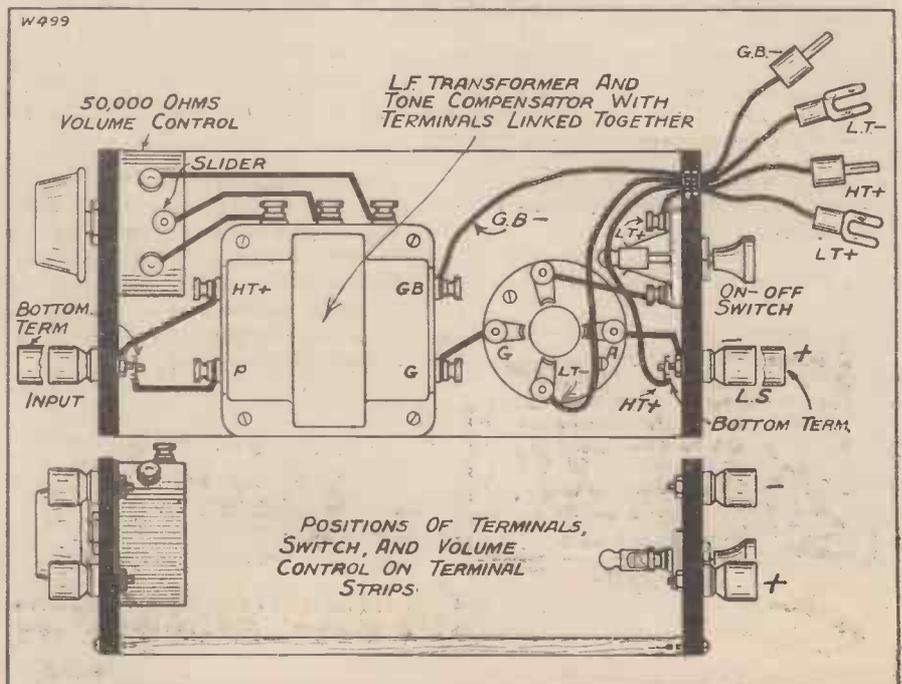
### FROM INPUT TO OUTPUT



The tone compensator and L.F. transformer act as the inter-valve coupling between the last valve of the receiver and the valve which goes into the unit, and serve as an extra L.F. amplifier.

listener that for a set to suit everyone, or for you to be able to please every listener to your receiver, some form of tone-control is necessary. It is amazing how one person will condemn one particular speaker as being unbearable while another will think it is absolutely ideal. As a matter of fact, I do not envy the loudspeaker manufacturer who has to try and please everyone. He is not in the happy position of the user of a "Magitone" in being able to go in a split second from prominence in the high stuff to power in the bass registers.

### PRACTICAL DETAILS OF A PRACTICAL UNIT



There is nothing in the layout to bother anyone, and the wires are short, direct and few, so you will have it connected in a few moments. Just follow the black lines—you can't go wrong.



**MOST SUCCESSFUL SET EVER BUILT  
 MOST SUCCESSFUL CHART EVER PUBLISHED—  
 THOUSANDS BUILDING  
 "THE SKYSCRAPER"**



**The ONLY set you can  
 build yourself employing  
 METALLISED S.G.—HIGH MU DETECTOR & ECONOMY POWER PENTODE**

There never has been the equal of this set within the range of the home constructor—this new Lissen Skyscraper is the only one on the market that you can build yourself, employing Metallised Screened Grid, High Mu Detector and Economy Power Pentode Valves. No factory—however well-equipped—can build a better receiver. No manufacturer, however large, can produce a receiver whose results will surpass those you will get from the Lissen Skyscraper you build yourself. It is the *only* battery set that can deliver such power—yet the H.T. current consumption is far less than that of the average commercially-designed 3-valve set.

Yet the Lissen Skyscraper is made simple for you to build. Elaborate care has been taken to ensure your success by giving—in the Skyscraper Constructional Chart—such detailed instructions and such profuse illustrations that everybody, with no technical knowledge or skill at all, can build it quickly and with complete certainty of success.

You buy the Lissen Skyscraper Kit complete with valves—a Lissen Metallised S.G., a High-Mu Detector, and a Lissen Economy Power Pentode Valve—and the price is only 89/6. Or you can buy the Lissen Walnut Consolette Skyscraper Cabinet and Loudspeaker combined as illustrated. It holds all batteries, and accumulator and loudspeaker as well. It makes everything self-contained. A special Pentode Matched Balanced-armature Loudspeaker of great power is supplied with the cabinet and the price of the Skyscraper Kit complete with valves and this cabinet and loudspeaker is only £6 5s.



**LISSEN  
 SKYSCRAPER 3  
 KIT**

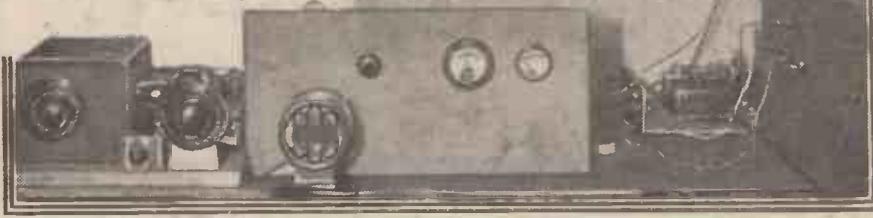
**KIT INCLUDING METALLISED  
 S.G.-VALVE HIGH MU  
 DETECTOR & ECONOMY  
 POWER PENTODE **89/6**  
 COMPLETE WITH  
 WALNUT CABINET &  
 LOUDSPEAKER **£6 5****

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TO "POPULAR WIRELESS" READERS  
 Send Coupon below for your copy of  
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 P.W.4

# Short-Wave Notes *By* W.L.S.



LAST week I mentioned the arrival of some notes from "A. M." (Middlesboro'), and promised to deal with them this time. He mentions several interesting points, the first being the choice of a detector for short waves. He finds—and in this I entirely agree with him—that a low-impedance valve gives greater sensitivity but a prohibitive amount of background noise.

A high-impedance valve, while giving weaker signals, is much more effective because with it the background is practically nil. "A. M." also mentions the way in which people still brag about the terrific volume at which they receive stations, whereas they probably miss the really weak ones on account of their high background level.

## Was It Personality?

That, incidentally, was just what drove me on to one valve; and the letters from users of my one-valver certainly back me up splendidly. Everyone seems amazed at the ease with which comparatively weak stations are tuned in.

Another point that "A. M." mentions is that when he has his short-waver working and a friend touches the detector valve a "hoot" results, whereas he himself can do the same thing without any effect of the kind. I think the catch here is the positions in which the two people are standing. Or perhaps one of them had the 'phones on and the other didn't?

As a result of this he makes the very intriguing suggestion that some bodies have a higher H.F. resistance than others, which may account for the fact that certain readers are always troubled with hand-capacity effects while others are not. I am afraid I can't agree with him, because to avoid hand-capacity effects one must build a set that is completely "dead" about the front panel. Once this set has been rigged up, it should be impossible to produce "hand-capacity" at all, for the simple reason that there is nothing live to play with.

## The Baseboard Secret.

I must say here most emphatically that I have *always* found a metal baseboard more effective than a metal panel in curing these troubles. The wiring is more than half the battle, and a metal or metal-covered baseboard enables one to make all earth-return wires dead short. That is the crux of the whole matter.

"A. M." makes a further suggestion—that the manufacturers should produce a special short-wave detector valve. Here I am afraid I don't agree, as I have always found the indirectly-heated H.L. type excellent.

I don't think the efficiency of this type

can be approached in a directly-heated valve, and I should hardly think it could be improved upon in the indirectly-heated class.

## The Five Teasers.

"Stop Press" News, from the same source, informs me that CTIAA is probably closed down now for improvements and rebuilding. I am afraid that that news is rather stale by now, on account of the time that elapses between the writing of a letter by a reader and its mention in cold print! But that is unavoidable.

## "THE MAN FROM LONDON"



Have you ever tuned in to a short-wave Yankee programme and heard them introduce "The Man From London"? He is Nat Ayer, and is a favourite turn in Philadelphia, where this portrait was taken.

Many thanks, "A. M.," for all the other points you raise. And now to the Five Teasers. This week I suggest the following: Buenos Aires (LSY) on 14.5 metres (Sundays, 10 p.m.); Tokio on 19.36 metres (11 a.m. to 2 p.m.); Belgrade on 30 metres (Monday evenings only); Long Island (W2XV) on 34.7 metres; and Halifax (VE9HX) on 49.6 metres.

The third and fifth of these stations have not, to my knowledge, been reported yet in this country.

An interesting letter from "N. T." (Hawkes Bay, New Zealand) throws some sidelights on radio "down under." He finds they have had a bad winter compared with previous years, but he has made the best of it with his receiver built from British parts. Unfortunately, his British parts don't help him to get G5SW, although Madrid and Moscow are always very fine. So perhaps Russian and Spanish parts would be better, "N. T."

## On 36 Metres.

The latest New Zealand regulations inflict a penalty of £10 or one month for the possession of a receiver in an oscillating condition to the detriment of other listeners! "N. T." says, "I am afraid the jails around here will be full soon, and I'll be there."

He sends me a specimen of a "tube-base" short-wave coil, that type being very popular in N.Z. Whether wound on the bases of defunct valves, or on one-inch ebonite formers, they are very compact and he claims them to be very efficient.

Of course, they were well known here some time ago, but they have never been very popular. This is largely due to the fact that they have acquired a bad reputation for efficiency.

Personally, I have never found them very good compared with space-wound coils of larger diameter.

Many thanks, though, "N. T." Good luck and Kia Ora.

"A. H. C. T.'s" mysterious transmitter on 36 metres has been logged by several West Country readers, but no one else mentions him. Is he a pirate in that direction?

Coming back to the question of background noise, I have temporarily gone off my one-valver in favour of a set with a very similar detector and one "gentle" stage of resistance-coupled L.F. After two days' listening on it I must say that I like it very much.

## One v. Two.

I definitely agree with those who have suggested that most of the mush generated by L.F. stages comes from the transformer. With this little "two" I don't think the proportion of "mush" to signal is altered at all,

and the slight gain in strength on weak stations certainly makes things a little more comfortable for the operator.

I have not scrapped the "one," but built a separate set, and am working the two side by side. After another week or so spent in comparing the two sets, I will tell you exactly what I think about things. Just at the moment I must say that resistance-coupling pleases me greatly, and that I am thinking of making a loudspeaker set with two stages of this kind.

# FACTS YOU

# SHOULD KNOW

# ABOUT THE MAZDA RANGE OF RECTIFIERS

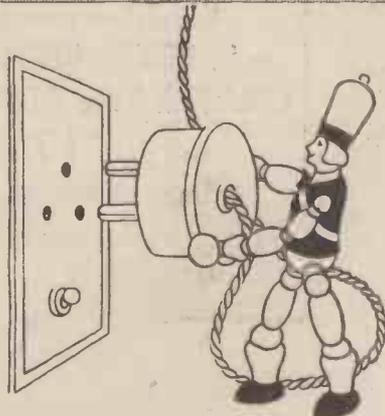


If you are using valve rectification on your A.C. mains receiver, there is a definite advantage to be gained by using Mazda indirectly heated rectifying valves. You are safeguarding the condensers, chokes and valves of your receiver.

When an ordinary rectifying valve is switched on, its operating temperature is reached considerably before that of the receiving valves. This causes a voltage surge and damage is frequently done to components. Mazda filaments are designed to heat up **with** the receiving valves, the voltage thus being gradually applied.

Full details of Mazda indirectly heated rectifiers will be found in the Mazda catalogue, sent **FREE** on request.

Mazda valves are fitted by all the leading receiver manufacturers. All good radio dealers stock them.



LOOK FOR "EDDY" IN YOUR DEALER'S WINDOW

*Full-sized constructional models (Battery or A.C. Mains) of the "Sunday Express" S.G.2 Radiogram, specifying Mazda Radio Valves, are obtainable at W. H. Smith's bookstalls and radio dealers, price 1/-.*

## The amazing

# MAZDA THE BRITISH VALVES

### EDISWAN RADIO

### 100% BRITISH — Designed by British Engineers

The Edison Swan Electric Co. Ltd.



155 Charing Cross Rd. London, W.C.2

*Mazda Radio Valves are manufactured in Great Britain for*

*The British Thomson-Houston Co. Ltd., London and Rugby.*

V.170

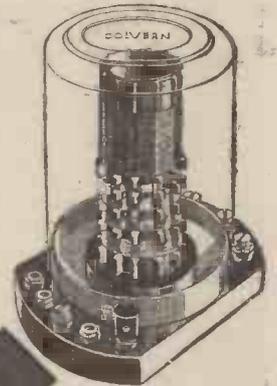
# SPECIFIED FOR THE "APEX"

## TWO COLVERN T.D. COILS

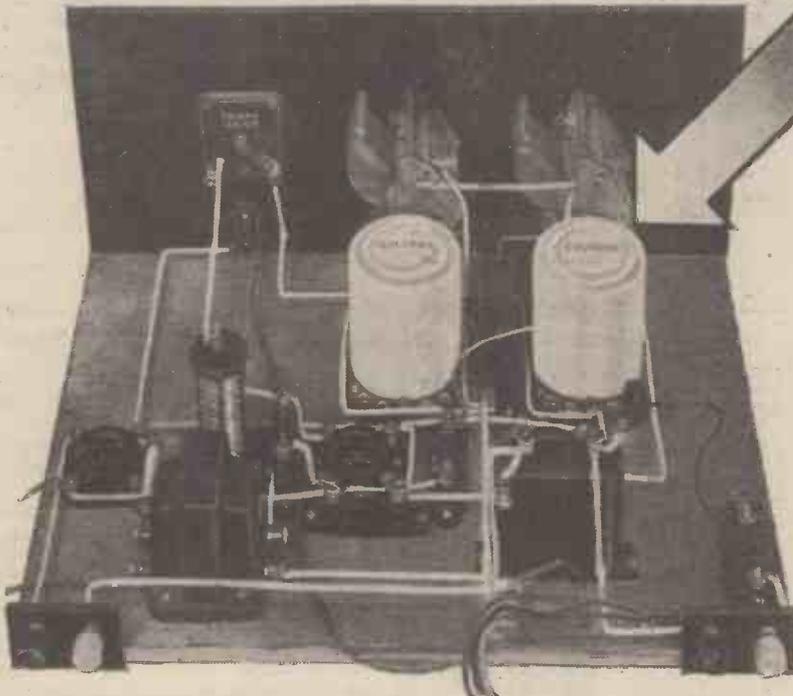
The Colvern T.D. Coil is completely screened and incorporates tapped aerial coupling and reaction. Four alternative aerial tapplings are arranged as sockets with a wander plug.

The first two tapplings give aerial couplings similar to those normally employed but with greatly increased selectivity.

Numbers 4 and 5 give a high degree of selectivity with weak aerial coupling suitable for use in a swamp area. There is no break through on the long wave band from B.B.C. Stations.



**SUPER  
SELECTIVITY  
ON BOTH  
WAVE-BANDS**



Specified for the  
"APEX" RECEIVER  
COLVERN Type T.D. COILS  
one pair, 17/-  
One 30,000 ohm  
STRIP RESISTANCE  
2/3

*Our 1933 Booklet Radio List No. 10 is now available and free on request.*

# COLVERN LIMITED

MAWNEYS ROAD

ROMFORD, ESSEX.

# AT THE BERLIN SHOW

Germany's annual Radio Show always contains features of immediate interest to British listeners. This review shows how German manufacturers have faced the situation caused by the springing up of high-power stations all over Europe, and have scrapped all their last season's designs in favour of entirely new circuit arrangements.

FROM A SPECIAL CORRESPONDENT.

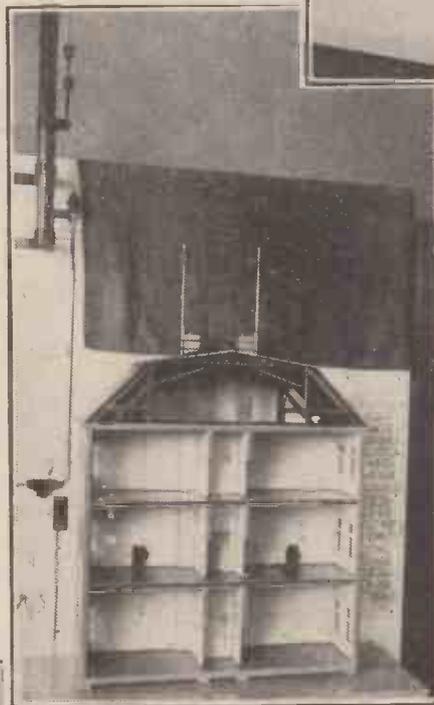
**T**HE 1932 Berlin Radio Show was remarkable for more points than one. The German press had never devoted so much space to the radio exhibition, and it certainly was an exciting opening, with a Communist trying to broadcast instead of the Secretary of State, and with the National Socialists in uniform voicing their political creed at the close of the opening ceremony. This took place, as usual, in the gardens immediately beneath the Berlin Funkturm.

### Special Features.

The gramophone industry was represented by just a few stands, of which the most attractive (to the eye) proved to be the stand of the National Socialist Party gramophone company. Last year and the year before the exhibition was a combined radio and gramophone exhibition, this year it returned to its purely radio character.

The German Post Office and the R.R.G. took the extra space becoming free, so that it was possible to announce that the exhibition was the same size as the year before.

Everybody of importance was represented. As well as the usual radio receiver



### THE HOUSE THAT HANS BUILT

Above you see a model house built for the Berlin Show to depict how interference from electric wiring, vacuum-cleaners, irons, etc., can be avoided by fixing an aerial outside the field of interference and screening the lead-in.

On the left is a radio installation suitable for a car or motor-boat, and controlled from the steering column.



show the exhibition had several very interesting special features. The television show and the electric music show organised by the Heinrich Hertz Institute, and last, but certainly not least, Berlin's new ultra-short-wave transmitter.

### Olympia Might Copy This!

Within the first hour and a half of the opening of the show no less than 12,000 persons passed the gates! A record for Berlin. The entrance fee had been reduced to one mark (about 1s. 4d.), instead of a mark and a half as in previous years.

Every evening the admission tickets sold that day were balloted and the winning numbers got valuable presents, parts for sets, batteries, valves, and even whole sets! No wonder it proved a very popular exhibition.

The German radio industry complains of large export turnover losses. Britain alone buys 85 per cent less from German radio manufacturers than hitherto. Other European countries buy 50 per cent less. The home market is poor in the actual sense of the word. The people have little or no money to spend on expensive radio receivers.

But, in spite of this first depression which the radio trade has had to bear, the German manufacturers are up to the moment as regards technical development and low prices.

### Fuilt-In Loudspeaker Sets.

Two-valvers with reaction have been developed to bring in most foreign stations. The receiver combined with loudspeaker seems to have won the day, although there is still a large percentage of receivers without loudspeakers.

Most manufacturers market their receiver alone, and combined. Britain has received

(Continued on page 139.)



HOW STUDIO  
SOUNDS ARE  
PRODUCED

## The wind is rustling the tree-tops!

What wonderfully expressive things are trees—their swaying branches, their rustling leaves make Nature's music in accompaniment of Nature's moods . . . and yet the Effects Studio produces all the characteristic sounds of gale force wind or gentle zephyr breeze by merely rustling torn pieces of paper in a bowler hat. The result is realism itself. . . . Realism too that you can retain in your reproduction by using the pure power of the Lissen High Tension Battery in your set. There is a process used *exclusively* in this Lissen Battery which produces power of remarkable purity; power so sustained that over prolonged periods of time it remains steady, noiseless and abundant always. Every radio dealer sells the Lissen High Tension Battery; ask for it firmly by name.

# LISSEN H.T. BATTERY

lasts longest and provides a pure high tension current  
that will give stage realism to your radio drama!

## AT THE BERLIN SHOW

(Continued from page 137.)

one very serious blow: the German manufacturer has learnt to make permanent-magnet moving-coil speakers.

Only last year I spoke with a well-known German manufacturer and he said the British permanent magnets were too expensive to use in his loudspeakers, but this year the Germans have solved the problem, and a number of sets already incorporate permanent-magnet moving-coil speakers with the German magnets.

### Loudspeaker Developments.

Electro-magnetic loudspeakers are still to the fore, though the moving coil seems to have won the day now that prices are right down for the cheapest and smallest type.

Before discussing complete sets, I would like to give some details as to parts for the home constructor. A number of stand-owners told me that home construction was seemingly slightly more popular in Germany again as they had been selling more parts during the last three months than before.

Ganged condensers are now in better form. They all have the last plate sectioned so that one can alter the capacity by pressing one of the sections in or out.

High-frequency coils with magnetic centres are new. I even saw new crystal receivers in which the receiver was in one earphone and the second earphone was used for its proper purpose. Thus, one only needs to switch on to the aerial with the double earphones.

Kits for a super-het. cost about £11 17s. and a number of firms market the complete instrument, with moving-coil speaker, for about £13 16s. So it actually becomes a luxury to construct one's own set. The firms making sets do not sell parts to the amateur. They leave it to much smaller firms.

Passing round the stands I noticed one interesting feature: Kits for home-construction are all made for one-knob tuning. One maker was showing a novel tuner. The name of the station appeared in one slot, while the wavelengths were shown in another. Both were illuminated from behind.

### Super-Hets.

The super-het. has won the day. If it has come to stay I do not know, but super-het., automatic volume control and tone corrector are the features of most manufacturers' best sets.

Telefunken, the big German firm, have produced what certainly can be considered one of the best receivers. It costs over £20 with valves and moving-coil speaker, but it

is worth the money. The automatic volume control, worked over resistances on to variable-mu valves, equalises differences in volume due to fading.

There is another special knob for a general all-over volume control, and a tone corrector to alter the pitch of the sound to suit individual surroundings.

Most of the German firms have three types of receivers. The cheap two-valve with reaction; two screened-grid valves with or without L.S.; the three-circuit, three or four-valve, and very often the super-het.

Lorenz, the well-known transmitter firm (the same people who built Germany's highest power station, Leipzig, which will be working by the time this appears in print, with 150 kw. in the aerial) have decided not to market a super-het. They stick to a three-circuit receiver, and say that it will give the same results.

Dials seem to have vanished, so also have portable receivers. Instead of dials vertical or horizontal lists of wavelengths and station names appear.

Either a streak of light or a thin shadow from behind moves with the knob, and the moment the shadow or the light exactly covers the name of the desired station, as the set is tuned. Other firms have just made large dials, and have set the names of the

stations on the dials, as these are not large enough, this does not make tuning easier.

One set had the usual large-sized dial with wavelengths and below a special slot in which the name of the station appears automatically. Over eighty names are printed on a long strip of fabric, and this is rolled and coupled to the tuner.

Television has made a big stride forward.

## NEWS-PICTURES BY RADIO



The Fernseh A.-G. Company, of Germany, partners of the British Baird Company, exhibited a new television scheme at their show. By means of this apparatus any scene can be photographed on a film, which is then automatically developed, fixed, and transmitted, all in 15 seconds! By this means events all over the country can be seen in the home almost as soon as they occur.

All the firms, Telefunken, Tekade, Loewe (Ardenne has seemingly left as the televisors now only appear under the name of Radio Loewe) and Fernseh A.-G. are showing receivers for the new 90-line scanning system adopted by the German Post Office for further tests.

It was new to see actual television reception of a film broadcast by the 7-metre ultra-short-wave transmitter. At previous exhibitions only direct line connection between transmitter and receiver had been demonstrated.

Telefunken were showing a combined radio and television receiver with cathode-ray tube together with a projection mirror drum receiver. Tekade were showing their mirror screw receivers that are now much better. They are also working on a new type of cathode-ray tube receiver based on a principle also being used by a well-known English inventor.

### An Ingenious Televisor.

Fernseh A.-G., of course, had the largest stand. They were showing mirror screw receivers, Nipkow-disk receivers, and two transmitters. One for direct scanning of heads, and one sensational new development: A televisor for all scenes and lights.

It consists of an ordinary film camera with which a film is taken of the scene to be televised; this is then developed and fixed, and then scanned in the usual way. The reversion from negative to positive takes place in the amplifier.

It sounds simple, and when I state that the whole delay due to developing and fixing of the film is only from 12 to 15 seconds, readers will realise the possibilities of the new televisor. Hitherto it had been difficult to televise outdoor scenes in bad light, and the moment a higher number of scanning lines was necessary this became impossible.

## "RADIO UNITES THE WORLD"



An interesting piece of sculpture by the well-known German artist, Hans Schellhorn. Its motif is the great power for peace and international friendship wielded by radio and broadcasting.

(Continued on page 172.)

# THE MOST SENSATIONAL

# The TELSEN

**SUPER-SELECTIVE!**  
**HYPER-SENSITIVE!**  
**ULTRA-MODERN!**

Build it with the aid of the full size 1/- Blue Print given FREE with the New Telsen Radiomag!

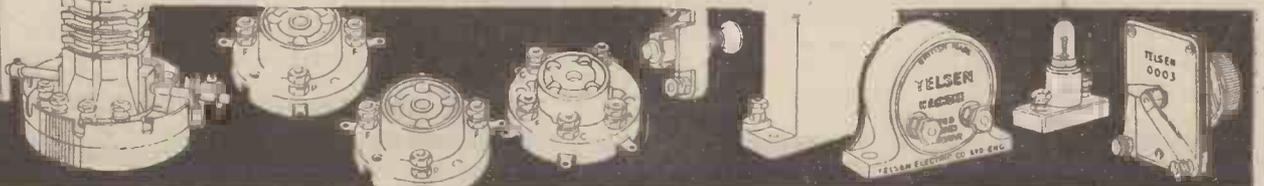
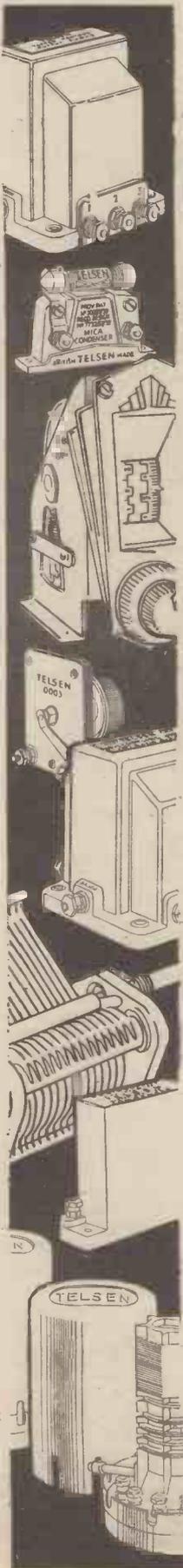


Not only has it never before been possible for the home constructor to build so powerful a 3-valve receiver with standard easy-to-buy components—not only is the actual construction almost child's play—but the brilliant results obtained, coupled with the delightful simplicity of the single-knob tuning, operating a scale marked in actual wavelengths, enable even the absolute beginner to obtain a large number of stations at full volume, and with the utmost tonal realism, the number naturally increasing still further with experience!

Meeting every requirement of the expert, the Telsen Jupiter S.G.3 incorporates Ganged Condensers, Ganged Coils, Tuning Dial calibrated in wavelengths, and Matched Output, the circuit providing for absolute control of selectivity, with entire prevention of L.F. oscillation. The revolutionary 10-1 Coupling Unit specified gives a stage gain on the L.F. side equal to that of a two-stage amplifier, this ensuring (in conjunction with the low-loss coils) an overall amplification of a magnitude never hitherto approached in a three-valve battery-operated receiver. But the Jupiter S.G.3 is not a "kit" set which you have to buy complete, and it is therefore quite possible that amongst the components specified are some which you already have, and will therefore not need to buy.

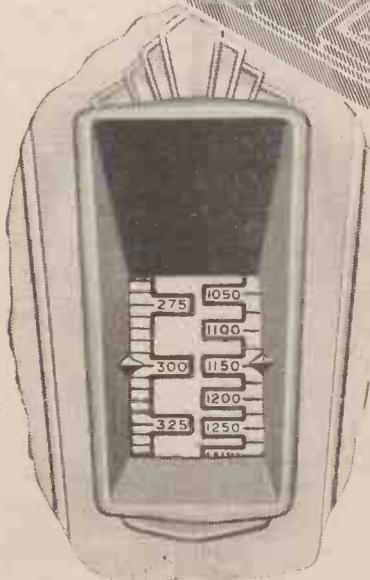
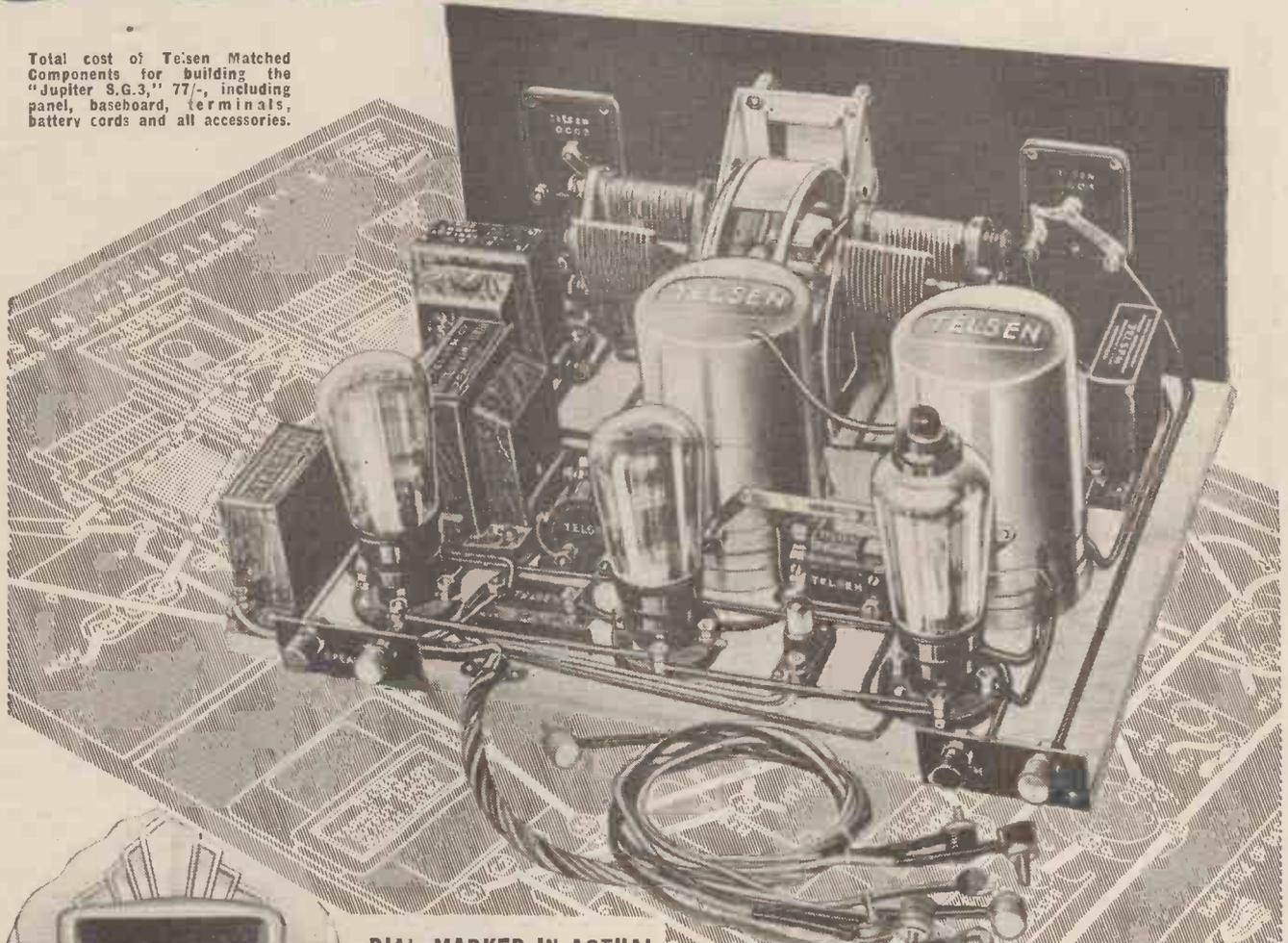
Free full-size 1/- Blueprints of this and other brilliant Telsen circuits, together with full constructional details, are contained in the new and enlarged edition of the Telsen Radiomag, price 6d. from all radio dealers and newsagents. Get your copy now!

Make sure you get your **TELSER RADIOMAG No. 3.**



# SET OF THE SEASON / ... JUPITER S.G.3

Total cost of Telsens Matched Components for building the "Jupiter S.G.3," 77/-, including panel, baseboard, terminals, battery cords and all accessories.



### DIAL MARKED IN ACTUAL WAVELENGTHS—SINGLE KNOB CONTROL . . .

A joy to operate. The essence of simplicity; turn the dial to the wave-length of the station required, and there it is. Anyone can obtain a large number of stations. But so clever is the design that, as experience is gained, the large catch of the beginner is increased day by day.

**Special Separator Control.** A unique device of extreme value for adjusting the degree of selectivity when receiving both local and distant stations with the unusual advantage that neither the tuning nor the fidelity of reproduction is affected. This control is also a valuable adjunct for varying the volume from maximum to a whisper even on the local stations.

This handsome Drum Drive escutcheon adds dignity and simplicity of operation to your "Jupiter S.G.3."

# TELSEN

## RADIO COMPONENTS

THE MIRROR OF THE B.B.C.

By O. H. M.

## EMPIRE SERVICE PLANS.

TELEPHONING THE WORLD—BIGGER AND BETTER NEWS  
BULLETINS—AMATEUR THEATRICALS.

I AM glad to be able to record sure signs that the B.B.C. means business about its Empire broadcasting service. There is great and growing activity about this round at the "House." Captain Cecil Graves, the Empire Service Director, has the full support and encouragement of Sir John Reith and Mr. Whitley.

There is to be no "minging" of money or of talent and, having examined some of the plans, I have no hesitation in prophesying that the new transmissions starting at the end of the year will be worthy of the best B.B.C. traditions. The engineers, I gather, are anxious to avoid giving the impression that all will be well right from the "kick-off," because they feel that there will be a good deal of technical adjustment necessary in the light of early experience.

### A World-Communication Stunt.

One of the features of the great Birthday Week of programmes in November will be a world-communication stunt which is being worked up by Mr. Gerald Cock, the energetic director of Outside Broadcasts. There will be a concentrated orgy of distant telephoning which will bring in the whole world.

### News Bulletin Development.

I hear that Mr. Charles Siepmann, the Director of Talks, and his able assistant, Mr. Rose-Troup, are busy planning bigger and better news bulletins, in agreement, of course, with the news agencies and press interests involved.

We are likely, I gather, to have some news items announced "outside hours," in other words, before six o'clock in the evening. There will not be many occasions of this sort, but the development will be widely welcomed by listeners.

### Visitors to Broadcasting House.

The growth in the number of applications to go round Broadcasting House continues, and provides a problem of embarrassing proportions for the "Visitors Section" which has been set up to deal with it. I understand that it will take nearly two years to deal with the applications already accumulated, and others are still pouring in.

If the B.B.C., as it appears, is in some doubt about meeting this demand, I suggest that this need not be entertained. The public is immensely interested, and rightly so, in the new Palace of Broadcasting, and it is up to the B.B.C. to gratify the curiosity

if only to confirm and strengthen latent goodwill.

### B.B.C. Amateur Effort.

A very ambitious programme of amateur theatricals by B.B.C. staffs is being planned for the coming winter, and it is probable that the main productions will be staged at a West End theatre.

### Better Vaudeville.

Mr. Sharman, the new chief of B.B.C. vaudeville, has now reorganised his work, and his plans provide for an all-round improvement this season.

Mr. Compton Mackenzie's visit to Poland with an entourage of young Scottish artists and writers representing Scottish Nationalism has caused comment on the Continent, chiefly because of the inclusion in the party of Mr. Cleghorn Thomson and

Mr. Moray McLaren, the two principal officers of the B.B.C. in Scotland. It is regarded as remarkable that the B.B.C. should be identifying itself with the Scottish Nationalist movement. Mr. Thomson, however, was careful to dissociate himself from the political nationalism for which Mr. Compton Mackenzie stands.

### Favoured Candidate.

Mr. Reginald Stewart, the distinguished young Canadian conductor who has been doing research work in Paris this summer, and occasionally conducting B.B.C. concerts, may stay in this country. He is likely to be considered as one of the favoured candidates for the conductorship of the new Scottish National Orchestra which is being organised under the auspices of the B.B.C.

Captain Cecil Graves, the recently-appointed Director of the Empire Broadcasting Service, has completed his plans for the "Round the Empire" Christmas programme, and is shortly sending a representative to visit all parts of the Empire to co-ordinate the new service.

### Back From The Conference.

Vice-Admiral Sir Charles Carpendale and Mr. Noel Ashbridge have returned from representing the B.B.C. in the early stages of the World

Wireless Conference at Madrid. No official progress report has been issued, for the reason that it is impossible to foresee what actual conventions will emerge. Broadcasting, however, is being ably sponsored by Mr. F. W. Phillips, the principal British Post Office delegate, whose attacks on the various Continental stations that pirate wavelengths and survive on advertisements caused something of a sensation in the early stages of the Conference.

## MEN OF THE MOMENT AT MADRID



The great Wireless Conference at Madrid is now "on." The Great Britain and Northern Ireland delegation included representatives of the Admiralty, War Office, Board of Trade, Post Office, and the B.B.C., and they are here caught by the camera before embarking for home.

## THE LISTENER'S NOTEBOOK

A rapid review of some of the recent radio programmes.

THE Saturday night Football Talks were very appropos, and came at the right time. Mr. Allison gave the series a good kick-off in his inimitable microphone manner. Mr. T. Crew followed up with a discourse on the Trials and Tribulations of referees, though his plea for sympathy from spectators was almost pathetic.

Apart from one or two epigrams (almost worthy of inclusion in the "Observer's" "Sayings of the Week"), he didn't rise to the heights one would have expected of a man who had "reffed" a Cup Final at Wembley.

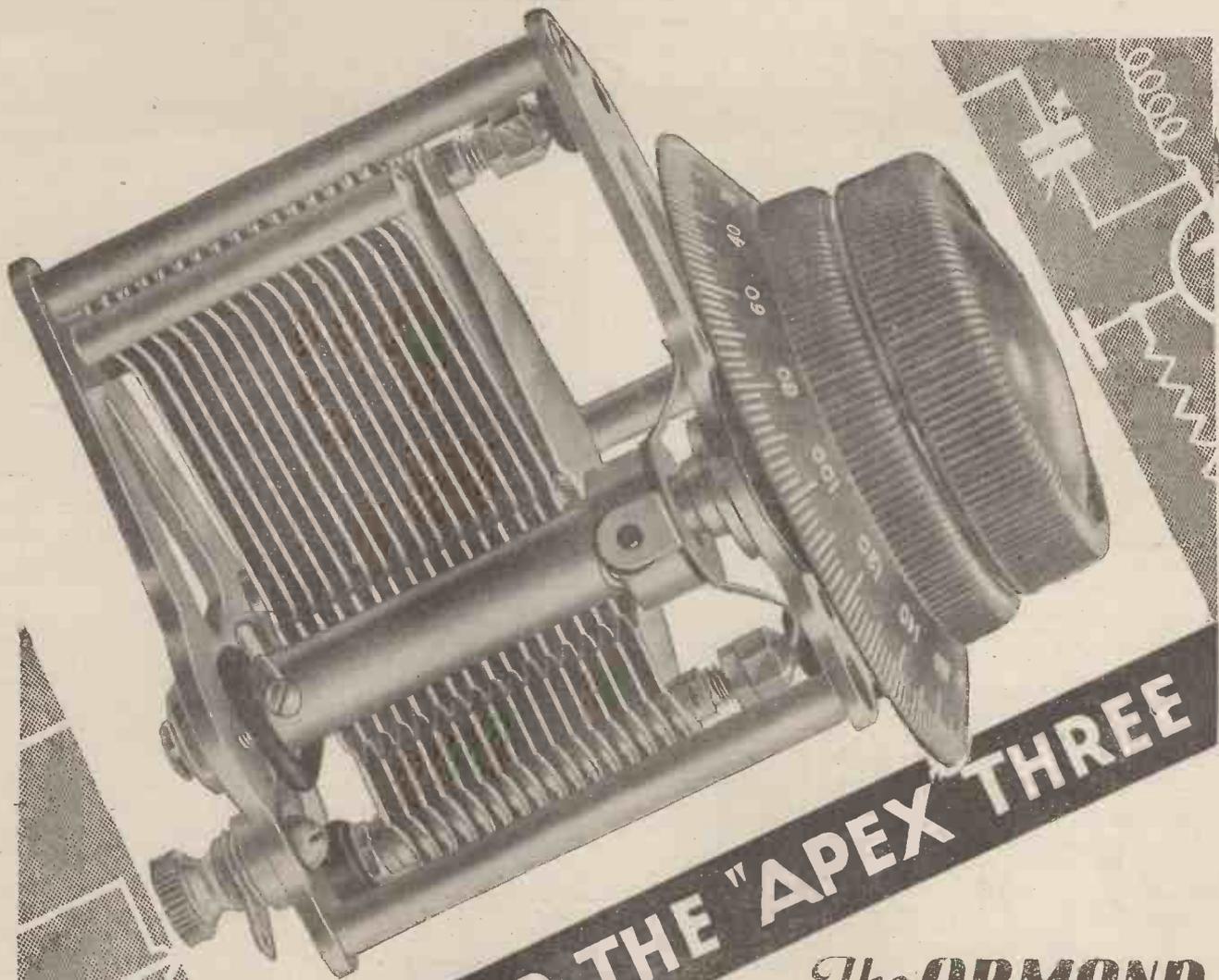
I suppose the Welsh interlude immediately following the Football Talk was intended to be educational, but does it justify its place

in the National programme? I cannot for the life of me understand how such a talk has crept into such a place at such a time and on such a wavelength.

### Making Comparisons.

May I remind the B.B.C. what the National Broadcasting Co. and the Columbia Broadcasting System are doing over in the States in connection with their Educational Talks? They invite listeners to inform them, on specially printed forms supplied by the company, to say whether a particular talk was as interesting and as instructive as its predecessor, whether the voice mannerisms, etc., of the speaker were a

(Continued on page 175.)



**SPECIFIED FOR THE "APEX" THREE**

*The* **ORMOND**  
**Nº 6 SLOW MOTION**  
**CONDENSER**

The expert knows that Ormond Components will pull their weight in making his circuit a success. That is why he uses them himself and recommends them to others.

The Ormond condenser is designed to follow the Logarithmic law. The construction is of brass and is very robust, the whole being a precision instrument. The vanes are perfectly rigid, being firmly secured to slotted spindles.

A slow-motion device, ratio approximately 9 to 1, is incorporated in the condenser and is controlled by the upper small knob, direct drive being obtained on the dial, which is engraved 0 to 180 degrees.

Easy to mount, "one-hole" fixing. Terminals and soldering tags for connections. Complete with 2½ in. dial and slow-motion control knob.

Cat. No.	Capacity	Price
R/484	.00025	6/6
R/485	.00035	6/6
R/486	.0005	6/6

**The**  
**ORMOND ENGINEERING**  
**CO., LTD.,**

Ormond House, Rosebery Ave.,  
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Telephone: Clerkenwell 5334-5-6 and  
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**FOR STRENGTH-ACCURACY**  
**& DEPENDABILITY**

## FROM THE TECHNICAL EDITOR'S NOTE BOOK.

# Tested and Found-?



facilitate wiring and shorten the lengths of leads needed.

The trimmers can be adjusted with the fingers, and they give adequately wide control.

The dial, which is of the disc pattern, is marked with bold figures and sharp degree lines, and the slow-motion movement is in perfect keeping with the smooth action of the condenser's

ball bearings.

Altogether, the "Utility" Ganged Condenser is a fine example of the best practice in modern condenser technique.

## A UTILITY GANGED CONDENSER

A CLOSE examination of a new Utility Ganged Condenser reveals the fact that there are practically no nuts and bolts in the whole of its interesting construction.

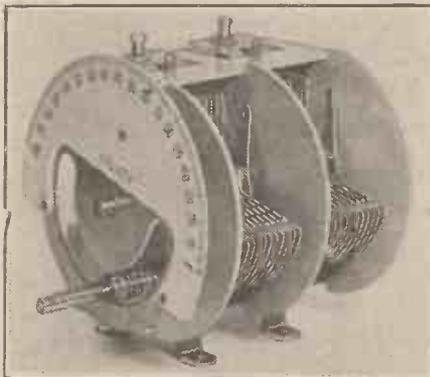
The vanes are held rigidly in position by means of a "locked compression" method, and the steel chassis is solidly riveted.

This ensures the complete rigidity which is necessary to preserve accurate matching between the two sections, and enables Messrs. Wilkins & Wright to give a guarantee that this will remain permanent in their condenser under all conditions.

The Utility "Gang" is designed for universal mounting, and fixings are provided for mounting it with the trimmers at either the side or top.

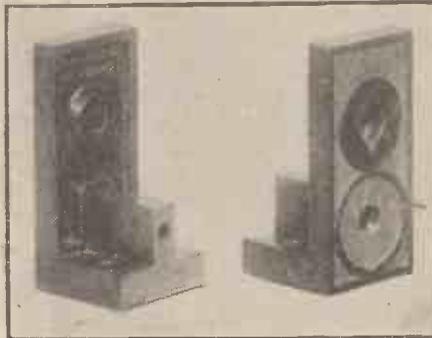
Constructors will appreciate that thoughtful aspect of design, as also they will the facts that the spindle projects at both ends and that additional fixed plate lugs greatly

## UNIVERSAL MOUNTING



Constructors will appreciate the universal mounting potentialities of this Utility gang, as well as the special features in its design.

## GOLTONE TERMINAL BLOCKS



These useful articles can be mounted either vertically or horizontally.

## USEFUL GADGETS

Sometimes I receive new components without any descriptive notes at all; sometimes the notes are too scanty to be of much use. In a few cases the makers provide very lengthy descriptions of every theoretical and practical aspect of their products, including all the claims they make for them, and I'd rather read every word of them than have no literature at all, for no one knows better what an article is supposed to be and do than the makers of it.

The Ward and Goldstone method is as close to the ideal as I have met. They always enclose letters with their samples in which the components are very clearly but succinctly described.

For instance, this is what they say about their new Goltone terminal block.

1. The block can be mounted vertically on a baseboard.
2. Mounting can also be horizontal.
3. When affixed to a wall or wood surround of a window, the terminal indication or insert points outwards conspicuously.

4. Ridges on the moulding grip the material to which the block is screwed, thereby preventing slipping and turning.

5. The block is suitable for Belling & Lee fully engraved terminals, for the "Goltone" Tripartite, coloured, or plain brass types.

6. A round recess in the front of the block accommodates an indicating line. This can be a plain matt white Ivorine, suitable for marking by a constructor, or a black disc engraved white with plain, unmarked terminals.

7. An important point is that the distance between centres of terminals on adjacent blocks is exactly one inch. Where a number of terminals have to be accommodated in a row this is of considerable value as space is not wasted, while terminals are put as close together as can be safely allowed.

The retail price will be 9d. per pair, packed in a neat box complete with screws and illustrated instructive folder.

Well, that tells the story without waste of words, doesn't it? And I can't think of anything they have left out, except that it is a beautifully moulded article, and that is better left for someone else to say for them.

## THE READY RADIO VALVEHOLDER

Modern moulding methods have almost entirely eliminated one of the troubles which was once frequently encountered. I refer to serious leakages and losses in valveholders.

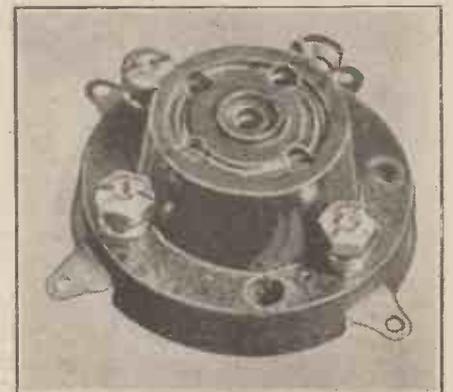
Nevertheless, present-day high-efficiency circuits demand a higher standard than that of mere adequacy in their component parts, and the Ready Radio valveholder is an example of the successful way in which a really high-grade article can be mass-produced.

Comprising a clean moulding of bakelite, it achieves mechanical strength with a minimum of material, and in that it is good material, the efficiency of the component is, of course, of a high order.

There is also rather less metal than is usually employed even to-day, so that its self-capacity is negligible. The advantage of this in short-wave and triple-wave sets will be well known.

The socket contacts are positive with any valve and both terminals and soldering tags are fitted.

## "STRAIGHT-THROUGH" SOCKETS



The sockets and terminal tags of the Ready Radio valveholder are each fashioned from one piece of metal.

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

We should like to point out that we prefer to receive production samples picked from stock, and that we cannot in any circumstances undertake to return them, as it is our practice thoroughly to dissect much of the gear in the course of our investigation!

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

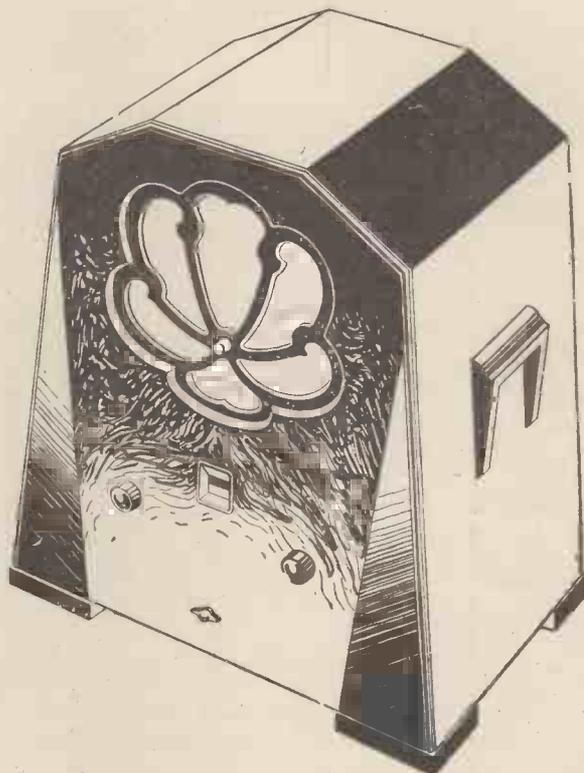
# "Amazing to those who know the difficulties of combining selectivity with high quality"

The Ferranti 7-valve Super-Heterodyne has received praise from all sections of the Press. The following brief extract is quoted because it refers to a problem which is known to all listeners who take a technical interest in radio.

∞ Selectivity is certainly wonderful, and what is more amazing to those who know the difficulties of combining selectivity with high quality, the standard of reproduction is astonishingly good. ∞

Every detail of the Ferranti Super-Heterodyne has been designed to meet the exacting standards of "those who know." Examine it—test it—and you will agree that this is the greatest of all the super-hets.

INSIST on the FERRANTI Super Het.—If your dealer is out of stock, he can get one



The design incorporates the most modern features, including INITIAL H.F. AMPLIFICATION, preventing interference with other sets; VARIABLE MU VALVES, providing the best form of volume control, GANGED CONDENSERS, giving one knob tuning; BAND PASS COUPLING, ensuring high selectivity without loss of high notes; MOVING COIL SPEAKER, for high quality reproduction; TONE CONTROL, to provide sharp or mellow tone at will; ILLUMINATED WAVELENGTH SCALE, giving instant station identification; AUTOMATIC MAINS AERIAL DEVICE, enabling the Receiver to be moved easily from room to room and used wherever an A.C. light or power socket is available; and provision is made for GRAMOPHONE PICK-UP.

**STANDARD MODEL,** as described in specification, with wavelength indicator.

**22 GNS.**

or Deposit 42/- and 12 Monthly Payments of 38/6.

**STATION DIAL MODEL,** 23 GUINEAS or Deposit 43/- and 12 Monthly Payments of 40/4d.

**CLOCK MODEL,** incorporating Ferranti Electric Clock and Station Dial— for time controlled frequencies only—25 GUINEAS, or Deposit 45/- and 12 Monthly Payments of 44/-.

# FERRANTI 7-VALVE SUPER-HET

Suitable only for 200/250 volts A.C. supplies having frequencies between 40 and 100 cycles.

Ask your dealer for literature, or write to:—

FERRANTI LTD., HOLLINWOOD, LANCS. AND BUSH HOUSE, LONDON, W.C. 2.

# NATION SHALL NOT SPEAK PEACE UNTO NATION!

Some notes on the avowed policy of the B.B.C. to promote international goodwill.

By THE EDITOR.

**P**ROUDLY emblazoned upon the cover of every issue of the B.B.C.'s official programme organ, is the motto: "Nation Shall Speak Peace Unto Nation."

It is a good motto, indicating vision and idealism on the part of its originator, Sir John Reith. Correctly interpreted, it means that, thanks to broadcasting, the nations of the world can establish closer contact with each other; that peoples of all races have an opportunity of getting to know and to understand each other's fashions and foibles, good and bad.

Despite the curse of Babel, broadcasting is to-day the greatest enemy of the evils of national insularity, suspicion, hatred and war.

## Fireside Travel.

Within the brief span of ten years the B.B.C.'s motto has become more than a motto—it has become a living, powerful force, put into practice, by the development of broadcasting, in practically every country in the world, and made comprehensible to every citizen by the improved technique in transmitting and receiving apparatus.

Owners of wireless sets in this country may hear with little initial cost, and for a minute yearly outlay, music, speeches, plays, etc., reflecting the national characteristics of neighbours like France, Belgium, Germany, Holland, Denmark, Sweden, and of more remote countries like Spain, Italy, Austria, Hungary, and even America and Japan.

Thanks to a scientific development of etheric communication we of this generation have unique opportunities for studying "the foreigner" without leaving our native shores—just as peoples of other nations have similar opportunities of studying the characteristics of the inhabitants of "perfidious Albion."

## The International Aspect.

Ignorant suspicions must inevitably wane with the growth of the consciousness of the humanity of civilised peoples. Distrust and dislike of "foreigners"—largely based on ignorance—is giving way to a tolerant, cosmopolitan outlook which, without detracting from the Britisher's natural pride in his own race, stimulates his wits and his sympathies towards a realisation that "unfortunate devils not born in this country" are not necessarily half-civilised eccentrics to be feared and kept at arm's length!

In short, when nation speaks unto nation, half the stupidities of racial prejudice are scotched, better understanding is created, and the prospect of European nations imitating a bunch of mad dogs made more and more unlikely.

It is said that travel broadens the mind, but it seems that people forget nowadays how broadcasting broadens,

and quickens the faculty of sympathetic understanding.

"Prejudice," wrote Hazlitt, "is the child of Ignorance." Broadcasting—from the international viewpoint at any rate—is helping to throw ignorance overboard by the ton; and to the fact that millions of people alive to-day are able to listen to the broadcasts of at least a dozen different nations may surely be credited the growth of a more tolerant and friendly spirit.

## A Staggering Suggestion.

If the antics of the politicians in, say, Ruritania inflame our political passions, and make us think longingly of "teaching

## RADIO AS A WEAPON



The fighting services have found that radio—the greatest enemy of insularity, suspicion and war—can be pressed into effective use for defensive and offensive operations.

them a lesson," surely the effect of, say, Ruritania's premier soprano broadcasting on an evening when our own B.B.C. offers us a talk on "The Family Life of a Flea," must be one which tends to quench war-like feelings, and plant instead seeds of good will and gratitude for the entertainment efforts of foreign broadcasting concerns?

And so it was with considerable surprise, and no little dismay, that we read in a newspaper report of the Madrid conference, that one of the B.B.C. official delegates had urged a reduction of power in transmitting stations to such a degree that each nation should confine its broadcast service to its own nationals.

## The Logical Conclusion.

Carried to a logical conclusion, this would mean the death blow to foreign listening, and we in this country would have to put up with the efforts of the B.B.C. without any reasonable possibility of finding relief by an etheric tour abroad.

Of course, set technique could be altered to meet the new conditions—but inevitably,

circuits would have to be devised capable of much greater sensitivity and power, and consequently foreign listening would tend to become more expensive.

A correspondent to the "Daily Telegraph," writing on this very point, stated: "We got on quite as well in the era when no station used more than 10 kw. as we do now with stations of 120 kw. in operation, and even bigger ones contemplated. But the suggestion comes rather late in the day. Besides, the B.B.C. are open to the retort that they began it with their 50-kw. Regional transmitters." (Here we would interpolate the fact that 120-kw. stations are very rare. Prague, Warsaw, and one or two of the Russians, about fill the list.)

## Russian Wreckers.

"Reduction of power," continues the "Daily Telegraph" writer, "will not prevent the reception of these stations." Possibly not; but if the B.B.C. delegates suggestion be logically interpreted, it would mean that Prague would broadcast on a power sufficient, and only sufficient, to serve listeners in Czecho-Slovakia. The result would be that a very different sort of average home radio set would have to be used in order to get Prague clearly, and at decent loudspeaker strength.

No: the suggestion, as a cure for the interference problem, is a poor one, because, in any case, Soviet Russia has made it clear that she will not come into line with the pooled plans of other countries. And that is why the Madrid conference will probably end in smoke—and why the interference problem will still be with us this time next year.

And finally, is it not disgraceful—apart from practical considerations for curing the interference evil—that the B.B.C., a corporation bearing the proud motto, "Nation Shall Speak Peace Unto Nation," should sponsor a plan which would not only deprive the British listener of getting easy reception of foreign stations,

but, incidentally, aims a blow (however innocently) at the British Radio Industry?

For who can doubt that, without the relief of foreign programmes, thousands and thousands of British listeners would give up their sets in despair and, when the time came, fail to renew their wireless licences?

The B.B.C.'s broadcast fare to-day is a long way from being so delectable and so enticing that 5,000,000 licensees would remain supporters minus the attractions of foreign stations!

## Another Magnificent Gift NEXT WEEK

There is sure to be a huge demand for next week's "P.W." containing

ECKERSLEY'S QUERY HANDBOOK

Make Sure of Yours. Order Now.

**THE BATTERY THAT  
POWERS THE SET  
CONTROLS THE TONE**

**EVER READY**  
**99**  
VOLTS

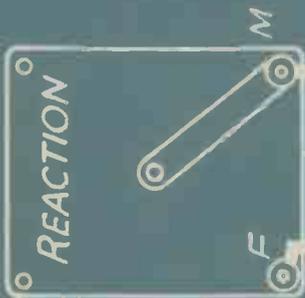
**WINNER**  
H.T. BATTERY  
MADE IN ENGLAND

**9/-**  
PRICE

The advertisement features a black and white photograph of an Ever Ready 99 Volt H.T. Battery connected to a vintage radio set. The battery is the central focus, with wires connecting it to the radio's internal components. The text is arranged in a clear, bold layout, emphasizing the battery's role in powering and controlling the tone of the radio set. The background shows the internal wiring and components of the radio set, providing a technical context for the product.

# FULL SIZE BLUEPRINT OF THE P. W. "APEX"

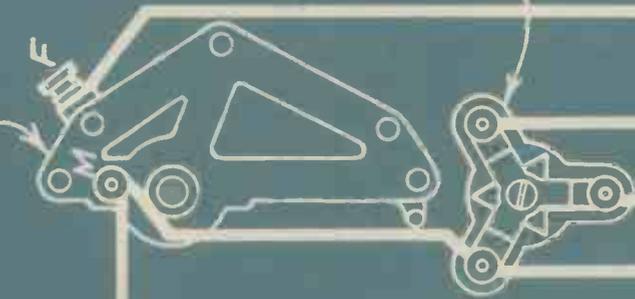
·0003 MFD..



·0005 MFD..



·0005 MFD..



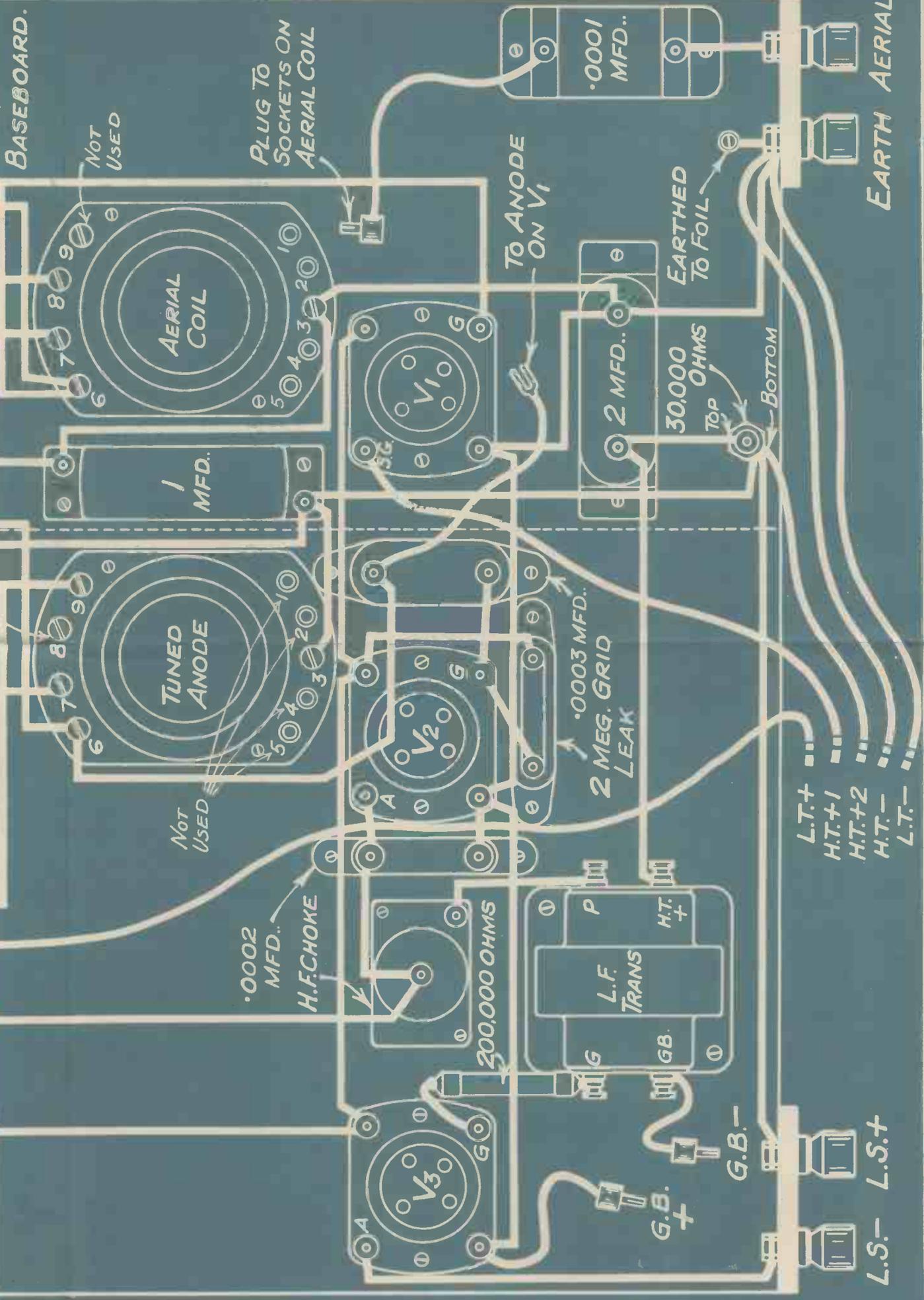
ON-OFF  
SWITCH

Price 1/4

5 3/4"

COPPER FOIL  
10" X 5 3/4"

NOT  
USED



BASEBOARD.

NOT USED

PLUG TO SOCKETS ON AERIAL COIL

AERIAL COIL

TUNED ANODE

NOT USED

.0002 MFD.

H.F. CHOKE

200,000 OHMS

2 MEG. GRID LEAK

.0003 MFD.

L.F. TRANS

P

H.T. +

G

GB.

G.B. +

G.B. -

L.S. - L.S. +

L.T. +  
H.T. +1  
H.T. +2  
H.T. -  
L.T. -

TO ANODE ON V1

EARTHED TO FOIL

30,000 OHMS

TOP

BOTTOM

.0001 MFD.

EARTH AERIAL

THE home constructor of to-day is uniquely placed; never before were there so many first-class set designs available. But the differences between the majority of these numerous designs are not, perhaps, as great as those which differentiated the fewer designs of four or five years ago.

**A Quality Set.**

Nevertheless, the general standard is vastly higher, for "weeds" stand little chance of surviving long these days.

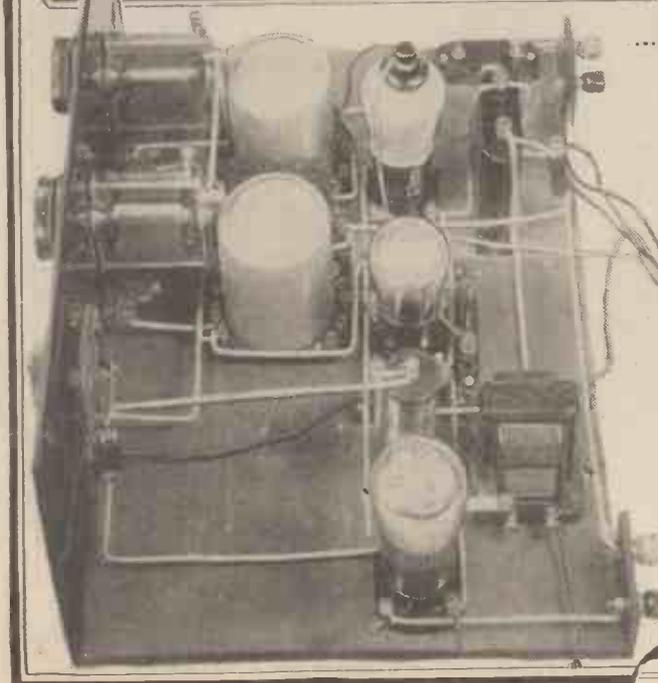
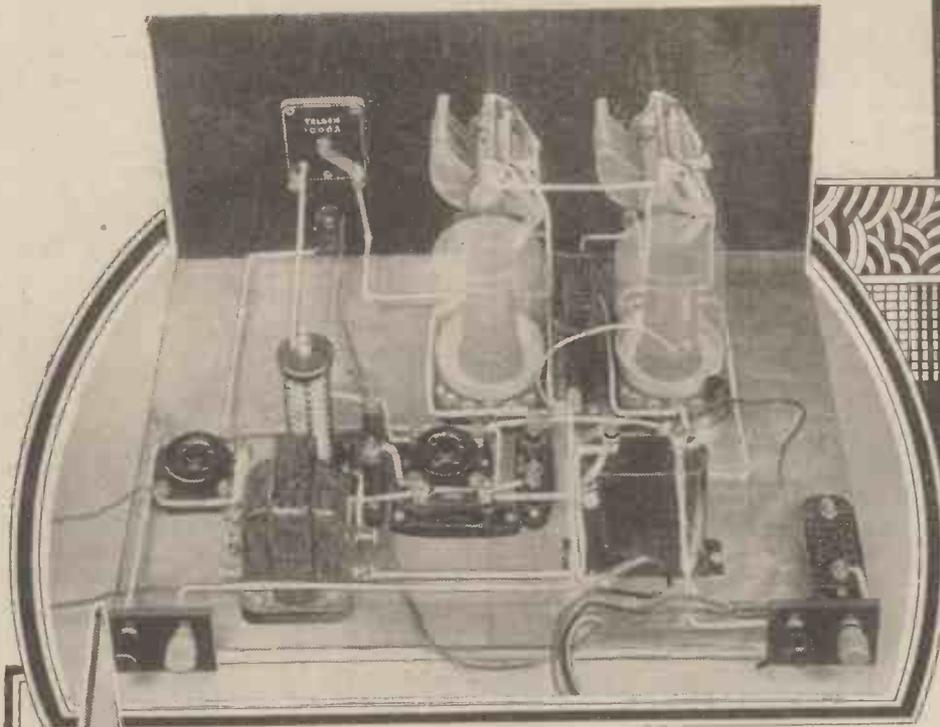
Therefore, I shall not urge readers to build the "Apex" on the grounds that it is the only trustworthy receiver of its class that has been evolved during the past twelve months.

We know of several other excellent S.G. Three's which are perfectly satisfactory examples of modern radio technique.

But there are certain qualities that are expected of such an instrument as a matter of course these days, and which cannot or should not be presented as claims for high distinction, unless other merits (such as unusual cheapness), which normally militate against them, have been simultaneously achieved.

Any receiver worth talking about at all ought to be sufficiently selective to enable its operator easily to separate programmes and, at the same time, be powerful enough to present a fairly attractive selection of programmes to select from.

**A MINIMUM OF WIRING**



**EXTREMELY EASY TO BUILD**

There is no soldering to be done and, as you can see, the layout of the few components is arranged on a simplified symmetrical basis. There are no screen partitions or any sub-baseboard work of any kind. The "Apex" is, indeed, a triumph of home-constructor design.



An S.G. Three loudspeaker set for all knowledge is required to build it, an assembly you will be possessed of a 7 and circuit developments. Later w add a few parts and introduce an eff short waves v

By G. V. DOW

The "Apex" is a star POPULAR WIRELESS set design for the very simple reason that it is able to offer all the conventional qualities plus something we do not believe any others have.

As I explained on a previous occasion, during the course of the year POPULAR WIRELESS places before its readers receivers of all kinds for all purposes and pockets which represent up-to-the-minute reflections of modern radio at its best. And we do not hesitate to draw ideas from all available sources in order to keep abreast with progress, although we freely give acknowledgment where acknowledgment is due.

**The Result of Research.**

But two or three times a year (seldom more and sometimes less) we are able to present a "star"—not a "star" manufactured to order as it were, but a design embodying new schemes carefully tried-out and earmarked for release at the first convenient opportunity.

The theoretical side of the "Apex" was first thought of four months ago, and it was steadily worked upon until, in its practical perfection, it was ready for public "release."

Now performance claims are largely

**YOU CAN EXTEND THE "APEX"**



...having several unique features. No special  
...d by spending an evening on the interesting  
...receiver employing all the latest components  
...e will show you how you can, if you desire,  
...ective tone-control and facilities for receiving  
...without coil changing.

DING, Associate I.E.E.

expressions of opinion, and you may  
or may not believe me if I say that  
the "Apex" is capable of provid-  
ing loudspeaker results considerably  
superior to those given by many S.G.  
Three's of tried repute.

But you will all no doubt agree  
that, with our long individual and  
collective radio experience, we should be  
able to handle the comparatively simple,  
though rather expensive, apparatus neces-  
sary scientifically to test the qualities of a  
wireless receiver.

Many Good Points.

I will only add that we have tested the  
"Apex" and found that it is more selective  
and powerful than the average S.G. Three.

And now we come to the more tangible  
qualities, qualities which the most inexpert  
of all our readers can at once appreciate. I  
will tabulate them.

1. The "Apex" is inexpensive. Choose  
your makes of components from the accom-  
panying list, cast up the cost, and make any  
comparison you will.

2. It is easy to build. Glance at the photos  
and note the absence of partition screens  
and other such complexities.

3. It has a compact, tidy layout. The  
components are not haphazardly grouped

on the baseboard, but conform to an orderly  
symmetry which is achieved without com-  
plicating the wiring. (On the contrary, the  
wiring has been greatly simplified.)

4. It is easy to operate. There are only  
three panel controls—two for tuning and one  
for reaction. The on-off switch is of dis-  
tinctive form and cannot be confused with  
the wave-change switches. (Ganging would  
have reduced these controls by one, but  
would have put up the cost and rendered  
the initial adjustments rather difficult.)

5. The latest and best types of com-  
ponents have been chosen. The alternative  
makes specified were selected with great  
care after careful tests. (Note, we are in  
favour of as many alternative makes as  
technical considerations permit, so that

constructors can employ suitable com-  
ponents already in their possession, and so  
that parts for the sets are readily obtainable  
at any good shop.)

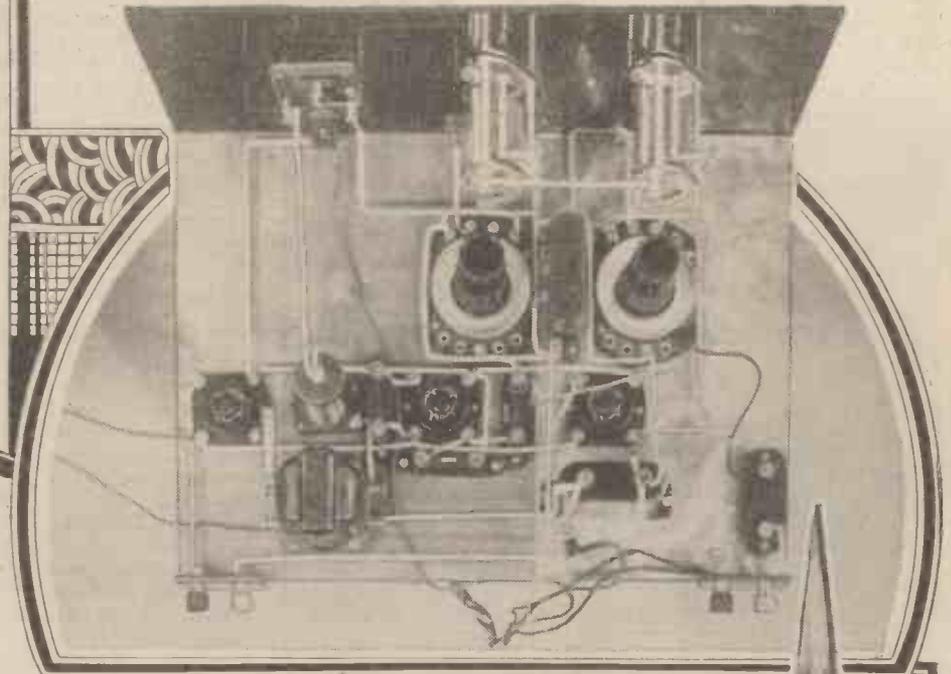
Optional Additions.

If the "Apex" were to stop here, it  
would still be worthy of the attention of all  
constructors desiring to build a good three-  
valver, and we would feel justified in giving  
it an enthusiastic presentation in POPULAR  
WIRELESS. But—and it is at this juncture  
we come to that "something" I previously  
mentioned.

Quite optionally, at any time and with-  
out in any way interfering with the existing  
structure, either or both the following things  
can be added to the "Apex."

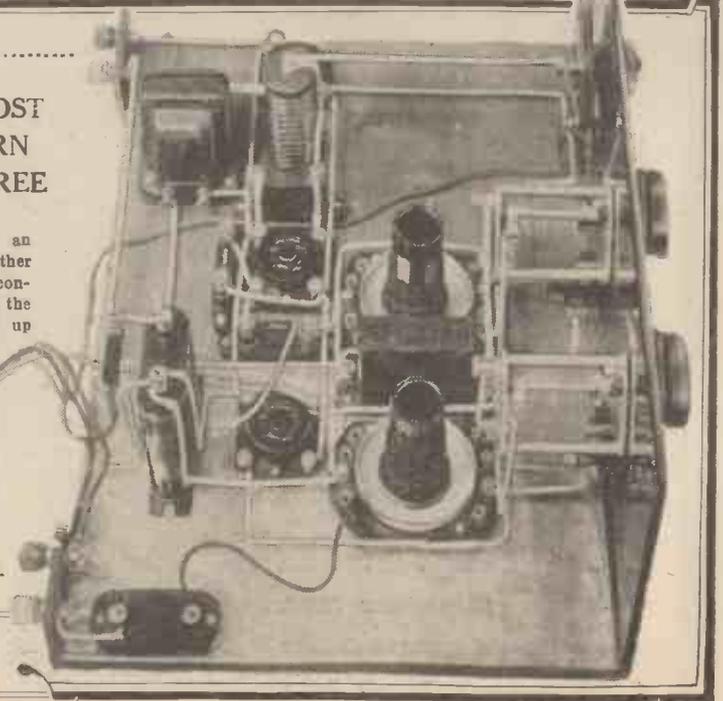
(Continued on next page.)

A MAXIMUM OF RESULTS



THE MOST  
MODERN  
S.G. THREE

Screened coils, an  
S.G. valve, and other  
modern items con-  
tribute to bring the  
"Apex" right up  
to the min-  
ute in every  
respect.  
And there  
is no gauging  
or other such  
complexities to  
necessitate in-  
tricate initial  
adjustments.



' FOR WORLD-WIDE RECEPTION

A  
FULL-SIZE  
BLUEPRINT  
OF THE  
ACCOM-  
PANYING  
LIST  
THIS  
ISSUE

## THE "APEX"

(Continued from previous page.)

1. A third wave-band. Fundamentally the "Apex" is a dual-band set. It can tune in medium and long-wave stations without the necessity of coil-changing. Panel switches accomplish this changeover.

There is ample room on the baseboard (though a casual inspection would not lead you to think so) for one or two extra components costing only a few shillings, that will transform the set into a tri-bander for tuning in the short waves as well!

### World-Wide Reception.

With this addition the short waves are available also without introducing coil-changing. World-wide reception is made almost as simple as the picking-up of the popular continentals. The "Apex" on

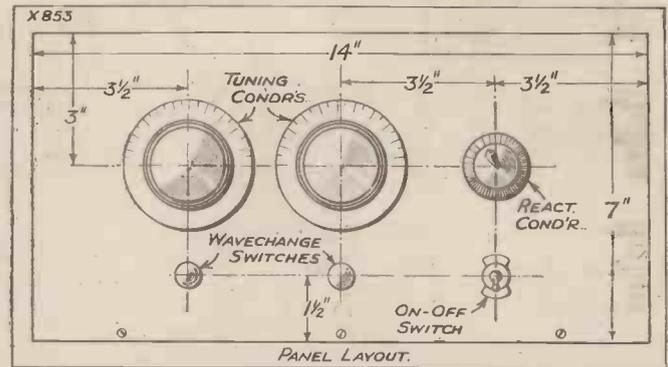
short waves is as efficient as many specialised short-wave sets.

Even though you feel no immediate interest in short-wave reception, you cannot ignore this aspect of the "Apex," for who is to say what even our own B.B.C. may not do on the short waves any time in the future?

The "Apex" provides insurance against any possible B.B.C. adventures of this kind!

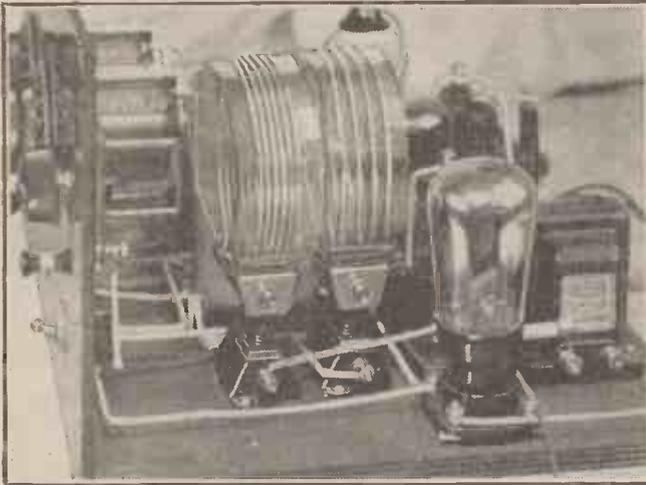
2. An effective tone control. This is as easily added as the short-wave components, and every bit as optional. The tone control permits you to

## FLEXIBILITY PLUS GREAT POWER



There are only one or two panel controls, but these enable you to obtain a performance equal to the best yet accomplished with this type of set.

## SHORT WAVES WHEN YOU LIKE



Showing how the short-wave coils are accommodated. Full details regarding this are to appear in an early issue.

compensate for the inherent failings of the majority of loud-speakers, for transmission restrictions and for the general tone decline that is apt to be evinced in any reception apparatus.

### Tone Control.

Without it, the "Apex" will, given a good speaker and a correct valve team and H.T., etc., give quality equal to the best that can be obtained with an S.G. Three. But add the tone control and the perfection of one hundred per cent radio realism is approached. (By the

way, we are employing a Lissen, and this has to be used in conjunction with a Lissen Hypernik L.F. transformer. This is a point to remember when selecting your components.)

### An Interesting Circuit.

I must insist, however, that minus either or both the above additions the "Apex" can stand uncompromisingly on its fundamental qualities as a first-class dual-wave three-valve set.

The circuit is an interesting one, and if you will glance at the theoretical diagram of it I will briefly outline its main features.

The aerial is joined to a .0001-mfd. fixed condenser which has the task of sharpening the selectivity and of reducing aerial damping on the first tuned circuit. There is a separate aerial winding on the coil unit, and this has taps allowing an initial adjustment for suiting individual local conditions.

An S.G. H.F. valve is coupled to the detector by means of the tried and proved tuned-anode method.

You will note that a .0002-mfd. fixed condenser is joined across the plate and the filament of the detector, and the primary

(Continued on page 152.)

## WE RECOMMEND THESE MAKES OF COMPONENTS AND ACCESSORIES

### "APEX" COMPONENTS

- 1 Panel, 14 in. × 7 in. (Peto-Scott, Goltone, Permcot, Wearite, Becol).
- 2 Screened coils (Colvern, type T.D.).
- 1 .0003-mfd. solid dielectric reaction condenser (Telsen, Ready Radio, Polar, Graham Farish, Lotus).
- 1 3-point push-pull wave-change switch (Telsen, Lissen, Ready Radio, Tunewell, Goltone, Wearite, Bulgin, Keystone, Ormond).
- 1 2-point wave-change switch (push-pull) (Telsen, or see above).
- 1 On-off toggle switch (Bulgin, Igranic).
- 3 Valve holders (Benjamin, Lissen, Lotus, Telsen, W.B., Graham Farish, Igranic, Wearite, Ready Radio, Bulgin, Ferranti, Clix).
- 1 .0003-mfd. fixed condenser (Ferranti, Dubilier, Lissen, T.C.C., Telsen, Ready Radio).
- 1 .0002-mfd. fixed condenser (T.C.C., or see above).
- 1 .0001-mfd. fixed condenser (Dubilier, or see above).
- 1 2-mfd. condenser (Ferranti, Telsen,

- T.C.C., Lissen, Dubilier, Peto-Scott, Igranic).
- 1 1-mfd. condenser (Telsen, or see above).
- 2 .0005-mfd. slow-motion variable condensers (Ormond No. 6).
- 1 2-meg. grid leak (Ferranti with holder, Graham Farish, Lissen, Dubilier, Telsen, Igranic, Ediswan, Ready Radio, Mullard, Watmel).
- 1 30,000-ohm resistance (Graham Farish, Dubilier 1-watt type, Sovereign, Ready Radio "Thermium," Colvern strip, Wearite).
- 1 200,000-ohm resistance (Dubilier 1-watt type, Graham Farish).
- 1 S.G. H.F. choke (Ready Radio, Lewcos, Slektun, Peto-Scott, Telsen, Sovereign, Tunewell, Wearite, Goltone, R.I., Lotus, Varley).
- 1 L.F. transformer (Lissen Hypernik, R.I., Slektun, Ferranti A.F.10, Graham Farish, Tunewell, Ready Radio, Varley Niclet, Telsen, Lotus, Lewcos).
- 4 Indicating terminals (Belling & Lee, Bulgin, Clix, Igranic, Ealex).
- 2 Terminal strips.
- Wire and sleeving.

- 1 5-way battery cord (Goltone, Bulgin, Belling & Lee).
- 1 Piece of copper foil, 10 in. × 5½ in. (Peto-Scott, Ready Radio, Magnum). Plugs, screws, etc.

### THE "APEX" ACCESSORIES

THREE VALVES.—(See separate table).

BATTERIES.—L.T. Accumulator: Oldham, Ediswan, Pertrix, Lissen, G.E.C., Exide.

H.T. Battery. This should be of ample size to deal with the requirements of the valves chosen. Lissen, Pertrix, Magnet, Ediswan, Ever Ready, Marconiphone.

G.B. Battery: See above list.

LOUDSPEAKERS: Blue Spot, Marconiphone, Celestion, R & A, Epoch, H.M.V., B.T.-H., W.B., Ormond, Lanchester, Igranic, Clarke's Atlas.

RECOMMENDED AERIAL AND EARTH EQUIPMENT.—Electron "Superial," Graham Farish "FILT" earthing device.

# This 1/- Book of PRIZE CIRCUITS FREE!

Mr. G. P. Kendall, B.Sc., the designer of many famous sets, and his assistant, Mr. H. D. Price, the famous short-wave experimenter, have written a book containing complete instructions, photographs and diagrams of ten modern-circuits, both battery and mains-operated.

It shows you how, at a cost of a few shillings, you can bring your present set right up to date. At its published price of 1/- it represents remarkable value for money.

Post coupon now and we will send you a copy FREE.



## These are the 10 PRIZE CIRCUITS

### KENDALL-PRICE S.G. FOUR

1. Gives 40 or 50 stations on the speaker after dark, with ease and great volume. S.W. stations from all parts of the world.

### KENDALL-PRICE S.G. THREE

2. Minimum of 30 stations. S.W. stations from all parts of the world.

### KENDALL-PRICE S.G. THREE -A.C. MODEL

3. Performance as battery model, but gives also quite a number of extra stations with more punch and reserve of power. S.W. stations from all parts of the world.

### KENDALL - PRICE ALL - WAVE THREE

4. Ten to twenty programmes on the speaker. Usually more. S.W. stations from all parts of the world.

### KENDALL-PRICE THREE

5. At least fifteen stations on the speaker, and usually many more.

### KENDALL-PRICE TWO

6. Gives quite a good selection of the more powerful foreign stations on the speaker.

### KENDALL - PRICE S.W. TWO

7. America and Australia are well within its reach.

### KENDALL-PRICE S.W. ADAPTER

8. Converts any set with one or more L.F. stages into a high efficiency short-wave outfit, capable of picking up stations in any part of the world.

### KENDALL-PRICE A.C. POWER UNIT

9. Converts any set for use on A.C. mains.

### KENDALL-PRICE D.C. POWER UNIT

10. Converts any set for use on D.C. mains.

## ANOTHER GREAT OFFER

The sets described can be built from the diagrams in the Book, but if you require full-sized dimensioned blue-prints of the ten circuits, enclose 1/- with your coupon.

Go to your Dealer or fill in coupon NOW

The Kendall-Price Book has 36 pages and is the size of a normal issue of "Popular Wireless."

To **READY RADIO LTD.** (Book Department), Eastnor House, Blackheath, S.E.3.

Please send me the 1/- Kendall-Price Book of Ten Circuits—FREE. I enclose 1ld. stamp for postage.

Name .....

Address .....

Please quote the number of the Set in which you are interested .....

If you wish to have, with your free book, ten full-sized blue prints, enclose 1/- in stamps with this coupon. P.W.6.

# READY RADIO

## THE "APEX"

(Continued from page 150)

purpose of this is to by-pass stray H.F. currents. The grid-circuit system of detection is employed.

There is a 30,000-ohm resistance in series with the primary winding of the L.F. transformer. In conjunction with the 2-mfd. fixed condenser, this acts as a decoupling device and prevents any linkage in the H.T. supply.

Additionally—and perhaps this is of more vital interest to constructors—it cuts down the voltage to the detector from the maximum which is needed for the L.F. valve and plate of the S.G. valve, and so enables one H.T. terminal to serve three valves. The second and remaining H.T. terminal feeds the screening grid of the H.F. valve.

The components required are all of an inexpensive and easy-to-obtain nature. Nevertheless, as I have said, you will be well advised to restrict your choice to the makes we recommend.

### Choosing Components.

This is of prime technical importance and is not an advertising quid pro quo "stunt" on our part, I can assure readers that there are brands of various of the parts which definitely do not suit the "Apex."

It is not so much a question of individual efficiency, for all makes not specified are not necessarily regarded by us as "duds."

More probably they just don't "team up" and achieve the overall effectiveness which we consider is possible, providing you confine your selection to our list.

There is also the question of size. One of our aims in the "Apex" has been compactness, and we have had to ignore the claims of quite good makes of some of the components because they are in the nature of outsizes or are of awkward form.

The coils and the condensers were chosen with the object of attaining a highly efficient combination. The condensers are of the same make so that their readings shall have a chance of matching, and the similarity of dials is only an incidental advantage. (That is, from a technical point of view, though, no doubt, the builder of the set will regard it as of prime importance, and quite rightly so.)

### Variable Condensers.

Perhaps it is not generally known that variable condensers differ quite a bit among themselves as to their vane-shaping, though there is greater standardisation these days than was once the case.

The majority of modern variable condensers conform more or less with a "log mid line" law, or perhaps I should say most manufacturers make this type even if they have others.

Two of the others quite commonly encountered are straight line wavelength, in which equal movements of the dial are supposed to give equal changes of wavelength; and straight line frequency for placing the stations at equal intervals round the dial in accordance with their frequencies.

The second is the more modern, and the effect of its use is to eliminate a crowding

of stations at one end and a wide separation of the stations at the other end of the dial.

The "log mid line" conforms to a logarithmic law about halfway between the S.L.W. (straight line wavelength) and S.L.F. (straight line frequency), and is also designed to compensate to some extent for the capacity inherent in the associated components and wiring.

### Variations with Make.

You can easily see from this, that the condenser products of two different factories are very likely to place the stations on the dial differently, and fail to give the same readings for the same stations. Further, it is quite possible that one will be scaled 0-100 and the other 0-180!

It is useless to match the condensers if the coils differ. Identical coils are, as a matter of fact, an even stronger requirement for matched dial readings. Even given the ideal conditions of similar coils and condensers, there is apt to be a little departure from perfect matching, but

### VALVES FOR THE "APEX."

	H.F. Stage	Detector	Output Stage
Mullard ..	P.M.12	P.M.1H.L.	P.M. 2 A
Cossor ..	220 S.G.	210 H.L.	220 P.A.
Mazda ..	S.G.215	H.L.2	P.220
Marconi ..	S.22	H.L.2	LP.2
Osram ..	S.22	H.L.2	LP.2
Tungsram	S.210	H.210	P.220
Lissen ..	S.G.215	H.L.210	P.220
Six-Sixty ..	215 S.G.	210 H.L.	220 P.A.
Eta ..	B.Y.6	B.Y.1814	B.W.1304

The S.G. valve chosen should preferably be of the metallised type.

differences of twenty degrees are by no means improbable with a haphazard selection of these vital components.

### Solid Dielectric.

The reaction condenser is specified as of the "solid dielectric" type. That means to say its vanes are separated by a solid insulating material instead of air.

This form of construction results in compactness and cheapness, but tuning

condensers are not usually made in this way, because an air dielectric is preferable for them.

It is, however, rather an advantage to have a "solid" dielectric in a reaction condenser, because it frequently happens that it is directly in an H.T. circuit.

This is not quite the case with the "Apex," but even here a short-circuit between the vanes of the reaction condenser, which would happen with an air type if the vanes got bent and scraped, or if some odd piece of metal got between them, would cause some H.T. wastage and also introduce alarming noises.

Therefore, there is no case at all for the more expensive air type and the cheaper "solids" are entirely satisfactory. That is, of course, so long as they are properly designed and made, and good materials are employed.

Reaction condensers are still to be encountered which do not answer to this description. But you will be quite safe if you buy one of those we have included in our component list.

### About the Switches.

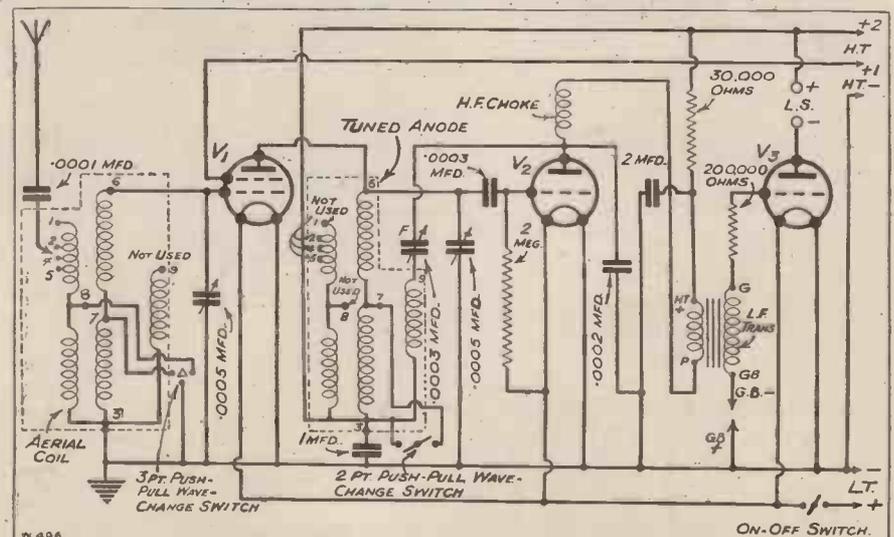
The wave-change switches are specified as "Three Point" and "Two Point," and although the terms are well-known to the trade, it may be as well if I explain them here.

A "Two Point" wave-change switch has two terminals, and these are joined together and separated as the switch is operated. A simple "make and break" on-off switch such as is used for switching the L.T. of the set on and off is a "two-point."

We have deliberately chosen a quite different form for the "on-off" of the "Apex," so that it won't be confused with the wave-change switches. I say "quite different from," but although it is different, in its mechanical action and appearance, it is, nevertheless, fundamentally the same as any other "two-point" switch and could be used for wave-changing.

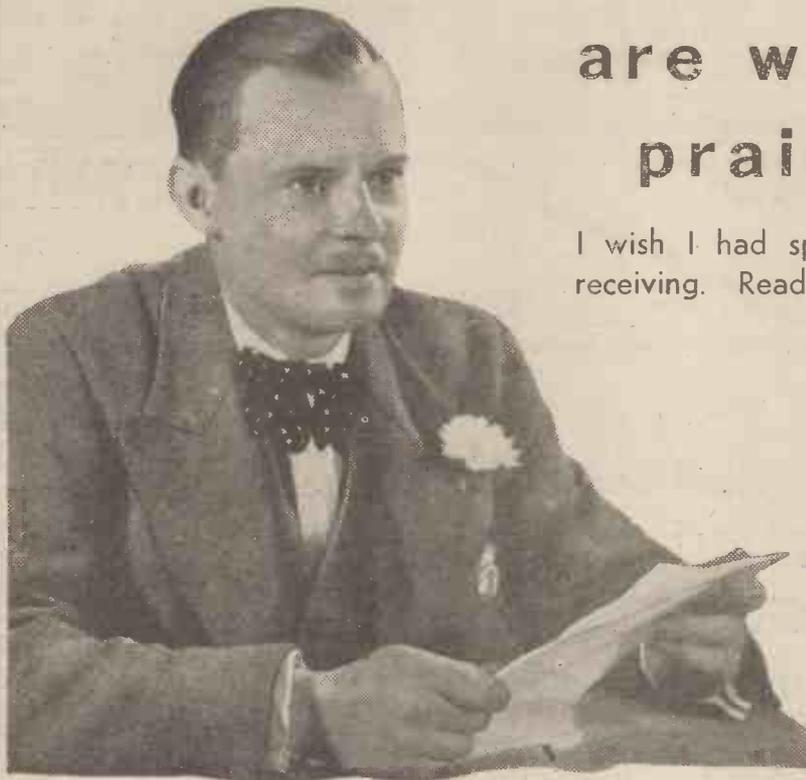
Being of the "snap type," though, you are not likely to think of it as anything else but an on-off. Here, I am afraid I must leave you until next week, when I will give the concluding constructional details.

## "APEX" ARRANGEMENTS AT A GLANCE.



The fundamental straightforwardness of the circuit will be clear from this diagram, which contains all the essential facts depicted symbolically.

*Graham Farish says:-* "So many people are writing to me praising **FILT**"



I wish I had space to print all the letters I am receiving. Read this from Norwood, London:

"I purchased one of your Filt Earths at the Radio Exhibition and am writing to tell you of the perfect reproduction now obtained from my set.

"Previously I had been denied the pleasure of vocal items as the top notes were always 'cut off.' To-night I have been able to listen to the duets in the Promenade Concert and appreciate them. Range, too, has been improved, as Moscow (Trades Union) comes in much stronger.

"Friends have already remarked on the improvement. Surely a great testimonial."

I feel tempted to paraphrase the old joke and say that good sets *deserve* FILT and poor sets *need* FILT! It ensures you an earth connection of the highest efficiency at all times and under all conditions.

Before you listen to another programme fit FILT. Crackling and other troubles that you thought were due to worn out valves or batteries will disappear and you will get better reception than you thought your set was capable of.



Simply bury the copper receptacle containing the wonderful FILT chemical, which at once begins to spread through the earth, attracting moisture and making a PERMANENT highly conductive area to the depth of several feet. FILT keeps moist and highly conductive. It spreads like a tentacle, earthing your set perfectly and giving you every ounce of power, range and purity, no matter what set you use.

# GRAHAM FARISH FILT PERCOLATIVE EARTH

Get a FILT to-day from the nearest radio dealer or direct (post free) from the sole manufacturers.

**2/6**  
COMPLETE

Graham Farish, Ltd.  
Masons Hill, Bromley,  
Kent.



**159  
BORO  
HIGH  
STREET  
LONDON  
BRIDGE**

# Direct Radio

**RANGE!**

**SELECTIVITY!**

The  
**PINNACLE  
OF PERFECTION**

**"APEX"**

**CASH — C.O.D.**

The **"APEX"**

	£	s.	d.
1 Permeol Panel 14 ins. x 7 ins. . . . .	4	0	
2 Colvern Screened coils, type T.D. . . . .	17	0	
1 Ready Radio '0003-mfd. solid dielectric reaction condenser . . . . .	2	3	
1 Ready Radio 3-pt. wave-change switch . . . . .	1	6	
1 Ready Radio 2-pt. wave-change switch . . . . .		10	
1 Bulgin on-off switch. Snap type S.80 . . . . .	1	6	
3 Valve holders . . . . .	1	6	
1 T.C.C. '0003-mfd. fixed condenser "S" . . . . .	1	3	
1 T.C.C. '0002-mfd. fixed condenser "S" . . . . .	1	3	
1 T.C.C. '0001-mfd. fixed condenser "S" . . . . .	1	3	
1 T.C.C. 2-mfd. condenser . . . . .	3	10	
1 T.C.C. 1-mfd. condenser . . . . .	2	10	
2 Ormond '0005-mfd. s.m. variable condensers No. 6 . . . . .	13	0	
1 2-meg Grid Leak, wire ends . . . . .	10		
1 Dubilier 30,000-ohm resistance, wire ends, 1 watt . . . . .	1	0	
1 Dubilier 200,000-ohm resistance 1 watt . . . . .	1	0	
1 Ready Radio H.F. Choke . . . . .	1	0	
1 R.I. L.F. Transformer, Dux . . . . .	6	9	
4 Belling & Lee indicating terminals . . . . .	10		
2 Terminal strips . . . . .	1	0	
1 Coil Glazite . . . . .	6		
1 Belling & Lee 5-way battery cord . . . . .	2	0	
1 Piece copper foil 10 ins. x 5 1/2 ins. . . . .	1	0	
Plugs, screws, etc. . . . .		7	
3 Mullard valves. PM12A, PM1HL PM2A . . . . .	1	12	3
1 Blue Print . . . . .			
	<b>£5</b>	<b>1</b>	<b>3</b>

**BUT**

**IT MUST BE A  
DIRECT RADIO  
Guaranteed KIT**

**"APEX" ACCESSORIES**  
**SIEMENS 120-volts H.T. Battery 13/6**  
 " 9 volts G.B. 1/-  
**OLDHAM 0.50 L.T. Accumulator 9/-**  
**EPOCH 20th century M.C. 35/-**  
 (chassis only)  
 or in Epoch Oak Cabinet **£2-7-6**  
**ATLAS A.C. 244 H.T. Unit £2-19-6**  
**ATLAS A.K. 260 H.T. Unit £4-10-0**  
 With trickle charger.  
**R & A Type 50 magnetic type speaker chassis 16/6**  
**GRAHAM FARISH Filt Earth 2/6**

**EASY PAYMENTS**

The **"APEX"**

<b>KIT - £3. 9. 0</b>	
<b>Model 1</b>	or 10 equal monthly payments of <b>7.6</b>
<b>KIT - £5. 1. 3</b>	
<b>Model 2</b>	or 12 equal monthly payments of <b>9.6</b>
<b>KIT - £5. 18. 0</b>	
<b>Model 3</b>	or 12 equal monthly payments of <b>11.0</b>
<b>KIT - £9. 10. 6</b>	
<b>Model 4</b>	or 12 equal monthly payments of <b>17.0</b>

Complete with "159" Walnut Consolette Cabinet, Siemens Batteries, Oldham Accumulator, Epoch m/c 20th Century speaker



**CASH, C.O.D. AND EASY PAYMENT ORDER FORM**  
 To: Direct Radio Ltd., 159, Borough High Street, London, S.E.1.

Please dispatch to me at once the following goods .....

for which (a) I enclose  
 (b) I will pay on delivery {Cross out line} /  
 (c) I enclose first deposit of {not applicable.} /

NAME .....

ADDRESS .....

**TO OVERSEAS CUSTOMERS.** We specialise in Radio for Export. Goods to your exact specification are very carefully packed and insured, all charges forward. Terms: Cash with order, or deposit one-third with order. Balance C.O.D.

# Direct Radio

**159  
BORO  
HIGH  
STREET  
LONDON  
BRIDGE**

**PICKED KITS & COMPONENTS  
SPECIALLY TESTED FOR YOU  
BY DIRECT RADIO'S CHIEF ENGINEER**

### "TELSEN"

**"AJAX THREE" KIT - £3-1-6**  
Deposit 10/- and 8 monthly payments of 7/6.  
Valve Kit £4-4-3. Deposit 10/- and 11 monthly payments of 7/6.  
Valve Cabinet Kit - £4-15-0  
Deposit 15/- and 11 monthly payments of 8/6.

**"JUPITER THREE" KIT - £3-17-0**  
Deposit 10/- and 10 monthly payments of 7/6.  
Valve Kit £5-18-0 - Deposit 15/- and 11 monthly payments of 10/6.  
Valve Cabinet Kit - £6-0-0  
Deposit 20/- and 11 monthly payments of 10/6.

*The cabinets are the new type "159" Model in hand-polished Walnut.*

### "RADIO FOR THE MILLION"

**"STATIONMASTER THREE" SEALED KIT**  
**BATTERY MODEL "A"** with Table type Cabinet and Valves £5-11-0. Deposit 15/- and 11 monthly payments of 10/-.

**BATTERY MODEL "B"** with Console type Cabinet, Valves and Celestion Speaker £7-10-0. Deposit 20/- and 11 monthly payments of 13/-.

**A.C. MODEL "C"** with Walnut Console Cabinet, Mains Valves and Magnavox Moving Coil Speaker £14-0-0. Deposit 35/- and 11 monthly payments of 25/-.

**A.C. MODEL "D"** Chassis only with Mains Valves £10-0-0. Deposit 30/- and 11 monthly payments of 18/6.  
Instruction book free with each kit.

### READY RADIO

**THE "303" Model A** (with valves, cabinet and moving coil speaker)  
Price £6 : 17 : 6. 10 monthly payments of 16/-.

**Model B** (complete kit with valves only). Price £3 : 10 : 0. 7 monthly payments of 11/9.

**METEOR S.G.3 Model A** (with valves, cabinet and moving coil speaker).  
Price £8 : 17 : 6. 12 monthly payments of 17/-.

**Model B** (complete kit with valves only). Price £5 : 7 : 6. 10 monthly payments of 12/6.

### LOUD-SPEAKERS

**R & A BANTAM** - £1 7 6  
**R & A Challenger** - £1 15 0  
**R & A Victor** - £3 10 0  
(10 monthly payments of 7/6)

**ORMOND Type R475** - £1 18 6  
**EPOCH Super Junior** - £1 7 6  
**EPOCH A2** - £3 3 0  
(10 monthly payments of 7/-)  
(Moving Coil Type Chassis only incorporating Input Transformers.)

**"159" Walnut Cabinets** can be supplied for any of the above 27/6 extra.

**MOTOR "YORK"** magnetic type in walnut cabinet - £2 12 6

### BATTERIES & UNITS

**H.T. ACCUMULATOR.** Oldham 120-volt 5500 m/a hour capacity £4-1-0  
12 monthly payments 7/6

**ELIMINATORS.**  
Atlas A.C. 244 (H.T. only) - £2-19-6  
9 monthly payments of 7/6

A.K. 260 H.T. and trickle charger - £4-10-0  
10 monthly payments of 10/-

**A.C. 300** - £6-10-0  
12 monthly payments of 12/-

**D.C. 15/25 H.T. only** £1-19-6

**Siemens 150-volts Super Radio** £3-9-0  
6 monthly payments of 12/6

### GRAMO ACCESSORIES

**BOWYER LOWE A.E.D. Mark III**  
Pick-up - £1-10-0

**BOWYER LOWE special** pick-up volume control - 8/6

**COLLARO AUTOMATIC** Spring motor - 32/-

**COLLARO AUTOMATIC A.C.** Induction motor - £2-10-0

**"159" RADIOGRAM WALNUT CABINET** - £5-5-0  
10 monthly payments of 12/-

**COLLARO COMBINED A.C** induction motor, Pick-up and volume control in one unit - £4-0-0  
12 monthly payments of 7/6

### OSRAM

**OSRAM THIRTY THREE.** Battery Kit with Cabinet and Valves £9-9-0  
Deposit 20/- and 12 monthly payments of 15/-.

### SLEKTUN SCOUT

**S.G.3** (complete kit with Mullard Valves and "159" Cabinet) - £7-0-0  
12 monthly payments of 13/-

### KENDALL-PRICE CIRCUITS

**ALL WAVE THREE** (complete kit with Mullard Valves and "159" Cabinet) - £5-0-0  
12 monthly payments of 9/6

**S.G.3 A.C.** (complete kit with Mullard Valves and "159" Cabinet) £16-7-6  
12 monthly payments of 30/-

**S.G.4** (complete kit with Mullard Valves and "159" Cabinet) - £7-10-0  
12 monthly payments of 14/-

### COSSOR

**NEW COSSOR MELODY MAKERS** All Mains Kit No. 357 £11-15-0. Deposit 25/- and 11 monthly payments of 21/-.

Battery Kit No. 335 £7-17-6. Deposit 17/6 and 11 monthly payments of 13/6.

### SUNDAY EXPRESS S.G.2 RADIOGRAM

**A.C. MODEL** with valves, speaker, cabinet, gramophone-motor, pick-up and all accessories - £17-19-0  
or 12 monthly payments of 33/-

**BATTERY MODEL** with valves, speaker, cabinet, batteries, gramophone-motor, pick-up and all accessories - £15-7-5  
or 12 monthly payments of 28/-



**USE COUPON OPPOSITE  
FREE BLUE PRINTS  
AND CONSTRUCTIONAL  
DETAILS WITH EVERY KIT  
CASH—C.O.D.—EASY PAYMENTS**



AS I write these notes long-distance enthusiasts are revelling in a period of complete freedom from atmospheric. The rather bad outburst that took place during the last week in August and the first ten days in September was unquestionably due to a single huge sunspot which was then crossing old Sol's face. Let us hope that it will preserve a school-girl complexion from now onwards!

Though all-round conditions are wonderfully good, there have been certain ups and downs lately on the long waves. Huizen's is generally a splendid transmission, but once or twice recently he has been a little below the mark.

The Eiffel Tower and Warsaw have both suffered to some extent from heterodynes of Russian origin. It is a thousand pities that the Russian broadcasting authorities cannot be brought into the fold of the U.I.R., but this is probably too much to expect.

**Wandering Relays.**

Vienna Experimental is frequently to be heard, though he does not yet seem to be using any great amount of power. Reykjavik is not strongly received, but you are pretty sure to pick him up if you try for him on a good night.

Down at the very bottom of the medium-wave band, the small French stations and the Swedish relays are still causing a



Some practical distant programme notes compiled by a special contributor who nightly searches the ether in order to obtain really up-to-the-minute information for "P.W." readers.

good deal of trouble by the way in which they wander about. On the latest U.I.R. charts, for instance, the month's records of Gävle, Fécamp, Liege, Lyons and Radio-Vitus look like Alpine Peaks on a contour map.

The shortest wave station worth trying for is Budapest No. 2 on 208 metres, who is lucky in having, as a rule, a clear channel. Next comes Nürnberg on 239 metres. This station, though very strongly received, is sometimes heterodyned by Stavanger on the next wavelength above.

**Six Splendid Continentals.**

Above 240 metres there are some fine stations, such as Trieste, Toulouse P T T, Hörby, Leipzig, Moravska-Ostrava, Turin, Heilsberg and Hilversum. Gleiwitz is also good, but you must go for him at times when the second Barcelona station is not at work. For some unknown reason, this station has recently left its own wavelength and is using one only a metre or so below that of Gleiwitz.

Naples is good when Dresden is not treading on his heels, and just above

come a bunch of six splendid Continental stations. These are Göteborg, Breslau, the Poste Parisien, Milan, Brussels No. 2 and Strasbourg. Poznan is to be heard, but it requires a very selective set to do it.

Radio L L is often unkind to Hamburg, but would otherwise be very well received.

Toulouse shows fine volume, but the quality of the transmissions is not always so good as it might be. Frankfurt is not a certainty yet, but he is coming on.

**Try For Sundsvall.**

The two Swiss stations should always be tried for; Katowice is not usually difficult to find, and Berlin Witzleben is looking up.

Rome and Stockholm are, after dusk, now almost equal in strength and pretty good strength it is, too. Langenberg, Prague and Brussels No. 1 are completely reliable, and Florence is now almost as good. I occasionally hear Riga, and Munich has been stronger during the last few weeks.

I don't think it will be long before Vienna and Budapest move into the reliable class, for it is very seldom now that either of them fails to come up to good loudspeaker strength. Just below Budapest is Sundsvall, who used to be badly jammed by Palermo, but is now clear. Try for Sundsvall next time you are making a wireless tour.

WHEN it became known recently that television images were transmitted by wireless from the Marconi Works, at Chelmsford, Essex, to St. Peter's School, York, during the meeting of the British Association, considerable curiosity regarding the apparatus used was aroused.

The demonstration took the form of sending verbal messages from characters printed on a moving tape. This was passed through the transmitter at Chelmsford at speeds corresponding to 60 words per minute and upwards, the words being read like a moving sign on a ground glass screen in the receiver at York.

In order to show the transmitting equipment at work local demonstrations illustrating the complete process were also given to several groups of scientists at St. Peter's School.

Three different types of television receivers which had been installed by the Marconi engineers at York were inspected with particular interest.

**The Three Receivers.**

These were the Television "News" receiver, with its ground glass screen 25 in. by 3 in., for the reception of printed messages, the Television "Broadcast" receiver, giving a moving picture on a screen 8 in. by 8 in., and the Television "Projector" receiver, which is capable of throw-



ing a moving picture on to a white screen 4 ft. square.

**The Receiving Equipment.**

The television signals were received at York on 750 metres by means of a simple type of radio receiver designed to have a very broad frequency response curve. The receiver consists of one stage of high-frequency magnification, anode-bend detection, and one stage of low-frequency amplification. The output from this receiver was taken to a power amplifier for use on a 15-line tape scan "News" receiver.

The 15-line "News" receiver gives a picture on a ground glass screen 25 in. by 3 in. A sodium tube of the dumb-bell type is mounted close to an aperture, the modulated light being projected on to the screen by means of a mirror wheel, driven by a synchronous motor and giving a horizontal scan.

The speed of the mirror wheel is 1,200 r.p.m., and gives 20 pictures per second.

Synchronism is effected by a synchronising amplifier, A.C. mains operated, and consisting of two valves with large power output.

This amplifier is connected so as to follow the second stage in the television signal amplifier.

The 50-line "Broadcast" receiver gives a picture on a ground glass screen 8 in. by 8 in. A similar sodium tube is used as on the 15-line receiver, the light is projected on to the screen by means of a mirror wheel driven by a synchronous motor and giving a horizontal scan.

The speed of the mirror wheel in this case is 900 r.p.m., and gives 15 pictures per second. Synchronism is effected by the same amplifier as is used for the Television "News" receiver.

**Speed and Scanning.**

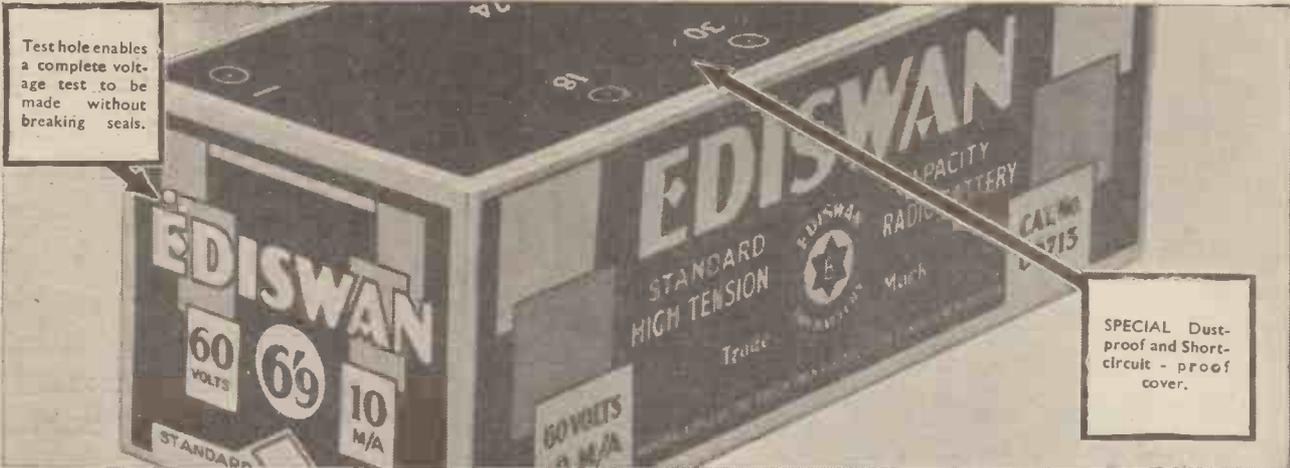
The 50-line "Projection" receiver gives a picture on a white screen 4 in. by 4 in. The light source is an arc modulated from a Kerr Cell, and is projected on to the screen by a mirror wheel driven by a synchronous motor giving a horizontal scan. The speed of the mirror wheel is 900 r.p.m., and gives 15 pictures per second.

Synchronism for this motor is effected by another synchronising amplifier similar to that used for the sodium receiver.



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"A life-test reveals the fact that their capacities well exceed those laid down as being the minimum for high-grade standard cells, and the cells discharge with consistent evenness" SAYS THE TECHNICAL EDITOR OF "MODERN WIRELESS"



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The Edison Swan Electric Co. Ltd. guarantees that Ediswan Batteries are of full voltage and capacity. Should any Ediswan Battery fail to give satisfactory service, we undertake to deal with customer's complaint within 24 hours of receipt of the defective battery.

STANDARD CAPACITY	STANDARD CAPACITY
60 6'9	120 13'
VOLTS	VOLTS

9v. grid bias 1/- 108v. incorporating grid bias tapping 12/-

**Standard Capacity.** Where the anode current required does not exceed 10 M/A these batteries will give highly satisfactory service. If super-power valves are used, the super-capacity type should be used.

**Super Capacity.** These batteries have twice the capacity of the standard type and, owing to their large reserve of power, last nearly three times as long when used as replacements to standard capacity batteries.

Look for the **EDISWAN AUTHORISED DEALER** sign when you buy.

Send for your **FREE** copy of "How to get the most out of your H.T. Battery." Full of useful data, hints and tips.

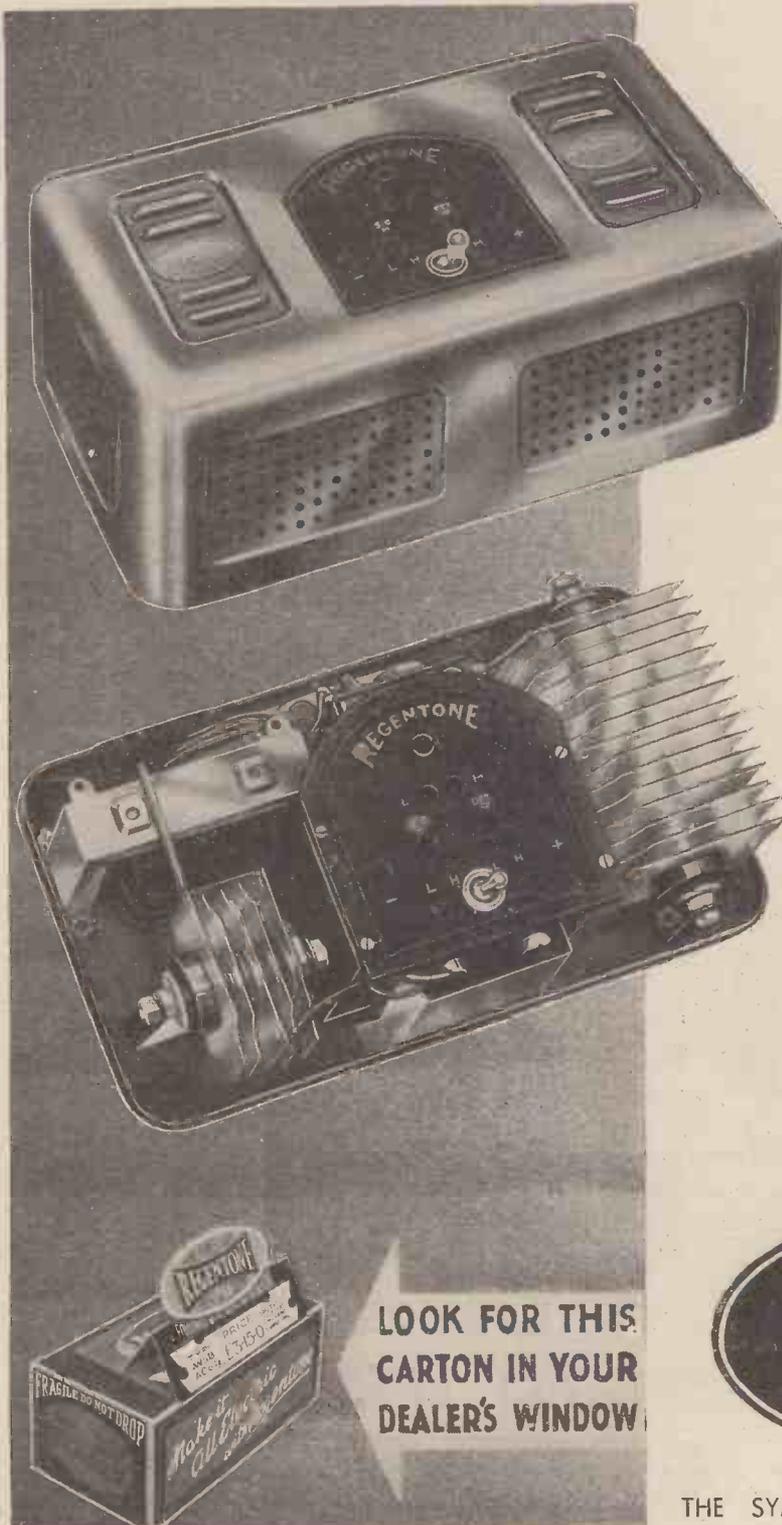
Now—H.T. Battery worries are things of the past, for this is the battery you've always looked for; the battery which you can buy with absolute confidence, the battery which is **GUARANTEED** to give you a good long life and the best of service. Every single cell in every Ediswan battery must successfully pass numerous tests before it leaves the factory, and special precautions are taken to ensure perfect internal insulation between cells.

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If you have a battery set or a battery kit set, why not enjoy the advantages of All-Electric Radio in the cheapest way possible?

Join up a REGENTONE Mains Unit in the same manner as a dry battery, connect to the electric supply socket, and your set becomes permanently powered by the mains at a cost not exceeding 6d. per month. Regentone mains units cost from 39'6, or 8'-down.

## SIX STAR FEATURES COMMON TO ALL REGENTONE MAINS UNITS

- ★ Seven voltage tapings
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# RECEIVERS OF RENOWN



## No. 4 THE "AERODYNE SCREEN-GRID 3" (BATTERY OPERATED)

"POPULAR WIRELESS" has always sought to champion the cause of those countless thousands of listeners who are without means of any description.

After all, however much we may be in sympathy with the ideals of all-electric radio, it is always necessary to remember that there are (and will be, possibly, for many years to come) many hundreds of thousands of listeners who can only interest themselves in receivers of the battery-operated type.

Not infrequently of late we have drawn attention to this fact, because, after a careful survey of the commercial set market, it became apparent that the amount of attention that was being given by manufacturers to receivers of the battery-operated type was inadequate.

But that was before the recent Show. This season it is gratifying to observe that considerably more attention has been given to the matter; indeed, several of our largest manufacturers have seen fit to include battery-operated models in their new season's range.

### Up-to-Date Design.

We, on our part, are only too pleased to welcome anything that is by way of being a worthy addition to what was an inadequate range, and that is why we welcomed the opportunity of testing the new "Aerodyne Screen-Grid 3," for, as a result of our tests, we have no hesitation in saying that it is a worthy contribution in every sense of the word.

In appearance, it is as handsome as anyone could wish for, in performance, it is more than adequate for all modern requirements, and in price, it is an achievement which reflects to the credit of the makers—Messrs. Hustler, Simpson & Webb.

### NEXT WEEK:

### THE MARCONIPHONE MODEL "252" RECEIVER.

The "Aerodyne Screen-Grid 3" is a completely self-contained S.G.-det.-L.F. three-valver, with all the desirable features of a really up-to-date design.

For instance, the S.G. valve is of the variable-mu type, detection is by the power-grid method, and the output stage—which incorporates a super-power valve—

supplies the permanent-magnet moving-coil speaker, which is built into the upper part of the cabinet.

At the front of the instrument, which has a pleasantly modernistic touch about it, there are four simple controls. The upper central one controls the ganged tuning condenser, and it is supplemented by a variable trimming device, the control for which is concentric with the main tuning knob.

### Operating Simplified.

Immediately below this is a three-position switch with a central off position, giving broadcast wavelengths to the right, and long waves to the left.

The knob on the left regulates the bias to the S.G. valve, and provides a steadily variable control of volume, while the one on the right takes care of reaction.

The workmanship throughout is of a high order. The cabinet is well finished and artistically grained, the set itself is neatly and efficiently arranged, and the baffling for the moving-coil loudspeaker appears to be quite adequate, and is arranged in a way which obviates any noticeable box-resonance effects.

Concerning the chassis, it is indicative of a high standard of workmanship, and it is obvious from the general layout of components that careful thought has been put into the design.

At the rear of the instrument sockets are provided for alternative aerial connection, for earth, and for the attachment of a gramophone pick-up.

On test, the results given by this new battery-operated three-valver were commendably good. In daylight, and in the heart of the city, we found that it was easily possible to receive the Midland and Northern Regional stations on the ordinary broadcast waves, in addition to several continental programmes.

### Sensitivity and Quality.

Indeed, our meter tests of the strength of the Northern Regional (which is one of the standards upon which our measurements are based) confirmed our opinions that the sensitivity of the set was decidedly above the average. That was when using aerial socket number one, which is the one that is recommended for all normal conditions.

When using aerial socket number two, selectivity was of a high order and adequate for all normal regional requirements.

On the long waves, the performance of this new "Aerodyne 3" was equally good. Eiffel Tower, Daventry 5XX, Radio Paris, and Huizen were all received at

excellent loudspeaker strength. There was a slight trace of break-through right at the bottom of the long-wave dial, but wavelength measurements proved this to be outside the range of normal long-wave broadcasting, and it is therefore of little consequence.

It isn't necessarily a condition of all sets incorporating moving-coil loudspeakers that the reproduction must be good.

But the quality of reproduction given by this particular instrument is good—very good; in fact, we are of the opinion that it would surpass many that are offered at twice the price. More than that there is no need to say.

### Clear Instructions.

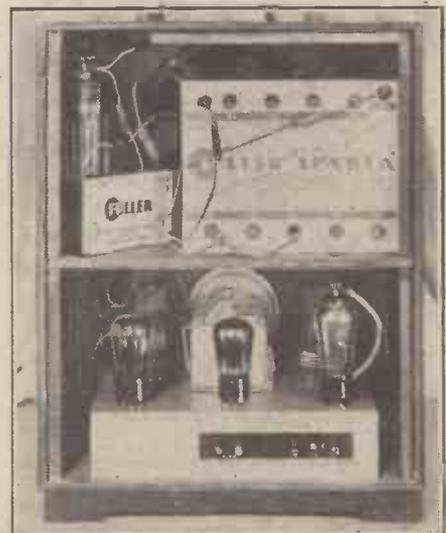
From the point of view of those who may not previously have handled a radio receiver, the instructions supplied for the installation and operation of the "Aerodyne S.G. 3" leave nothing to be desired.

All the battery leads of the set itself are clearly marked with ivorine labels, and if the instructions are carefully followed it is almost impossible to go wrong.

Summed up, the "Aerodyne Screen-Grid 3" is an instrument which, on merit alone, can be considered as among the best of the battery-operated S.G. threes at present available, and in our opinion it is symbolic of all that is good in present-day receiver design.

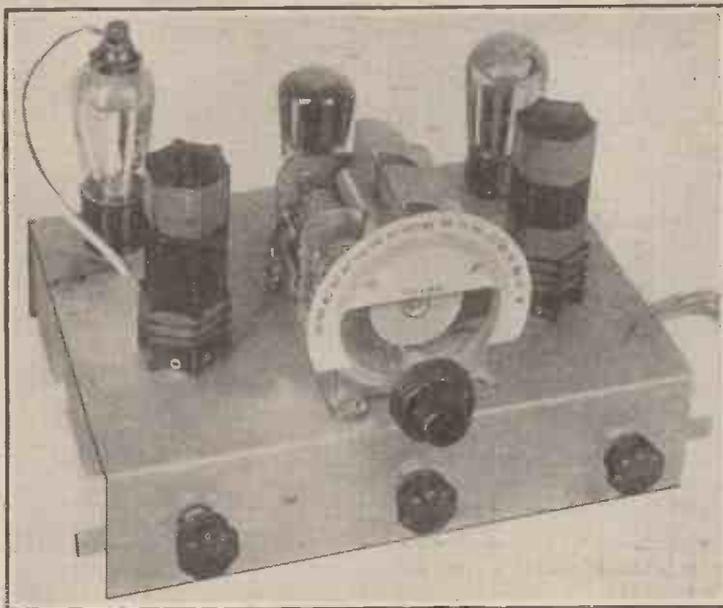
*(Continued on next page.)*

## COMPLETELY SELF-CONTAINED



Everything necessary for the operation of the set is contained in the handsome-looking cabinet that houses the "Aerodyne Screen-Grid 3."

# THE "AERODYNE SCREEN GRID 3" — (continued from previous page.)



## TECHNICAL SPECIFICATION

**GENERAL DESCRIPTION.**—Self-contained battery-operated receiver incorporating permanent magnet moving-coil speaker.

**NUMBER OF VALVES.**—Three (2-volt battery-operated type).

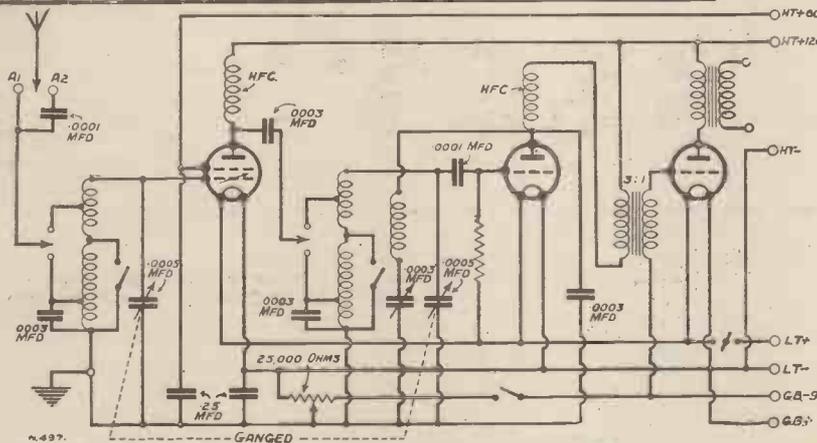
**CIRCUIT.**—Variable-mu S.G.; power-grid detector; transformer-coupled L.F. stage.

**ARRANGEMENT OF CONTROLS.**—One for tuning, with trimmer control on concentric spindle; one for volume control (left); one for reaction (right); and one three-position switch giving long-waves, broadcast waves and central off position.

**PRICE.**—9 guineas complete.

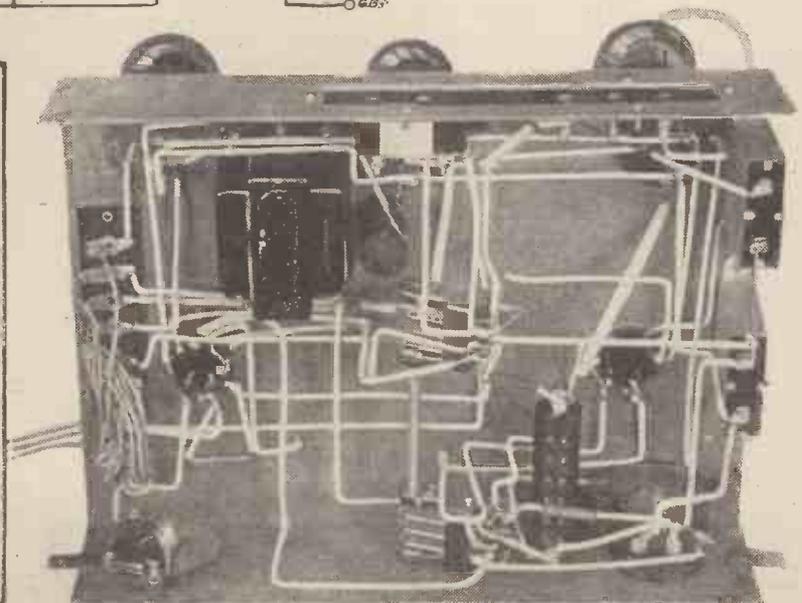
**DIMENSIONS.**—Height, 19 ins.; width, 14½ ins.; depth, 9 ins.

**MAKERS.**—Messrs. Hustler, Simpson & Webb, Ltd., 317, Hoe Street, Walthamstow, E.17.



The theoretical conception of the "Aerodyne Screen Grid 3" is essentially modern, and it conforms with all that is desirable in up-to-date receiver design. The bias to the screened grid valve is controlled by the 25,000-ohm potentiometer, which constitutes an efficient volume control. This is the knob seen on the left in the above photograph.

The neat and businesslike appearance of the "Aerodyne Screen Grid 3" chassis (above) is due in no small measure to the sub-chassis method of wiring employed. The controls are efficiently and symmetrically grouped, and they have been cut down to the bare minimum necessary for the satisfactory operation of the set. The picture on the right gives an excellent idea of the underside of the chassis. The ganged three-position switch clearly visible in the centre has a very positive action, and its control knob is distinctly marked to indicate the position in which the switch is set.



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...OR NOT  
SPECIFIED**

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*Complete Catalogue "P" free from*  
**WINGROVE & ROGERS, LTD.,**  
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Yet another circuit triumph  
 ..straight 3'  
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*Build the  
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**TELSIEN**

**FULL SIZE 1/- BLUE PRINT GIVEN FREE WITH  
 THE NEW AND ENLARGED TELSEN RADIOMAG!**



Telsen technicians have achieved a really sensational triumph of circuit design with the brilliant new AJAX 3! For here, at last, is a receiver which is as cheap to build, as economical to run, and as simple to operate as only a "straight" three can be, yet which is capable of such tremendous range and power, such hairline selectivity and such a superb quality of reproduction that it literally sets an entirely new standard of performance for receivers of its type! Yet it is not a "Kit" Set, but purely a circuit design using specified Telsen Components (some of which you may already have!) whose construction has been so tremendously simplified that even the absolute novice cannot help but make a perfect job of it! Free full size 1/- Blue Print of this and other sensational circuits, together with simply worded and clearly illustrated constructional details, are contained in the new Telsen Radiomag, Issue No. 3, price 6d. Get your copy now — from your radio dealer or newsagent.

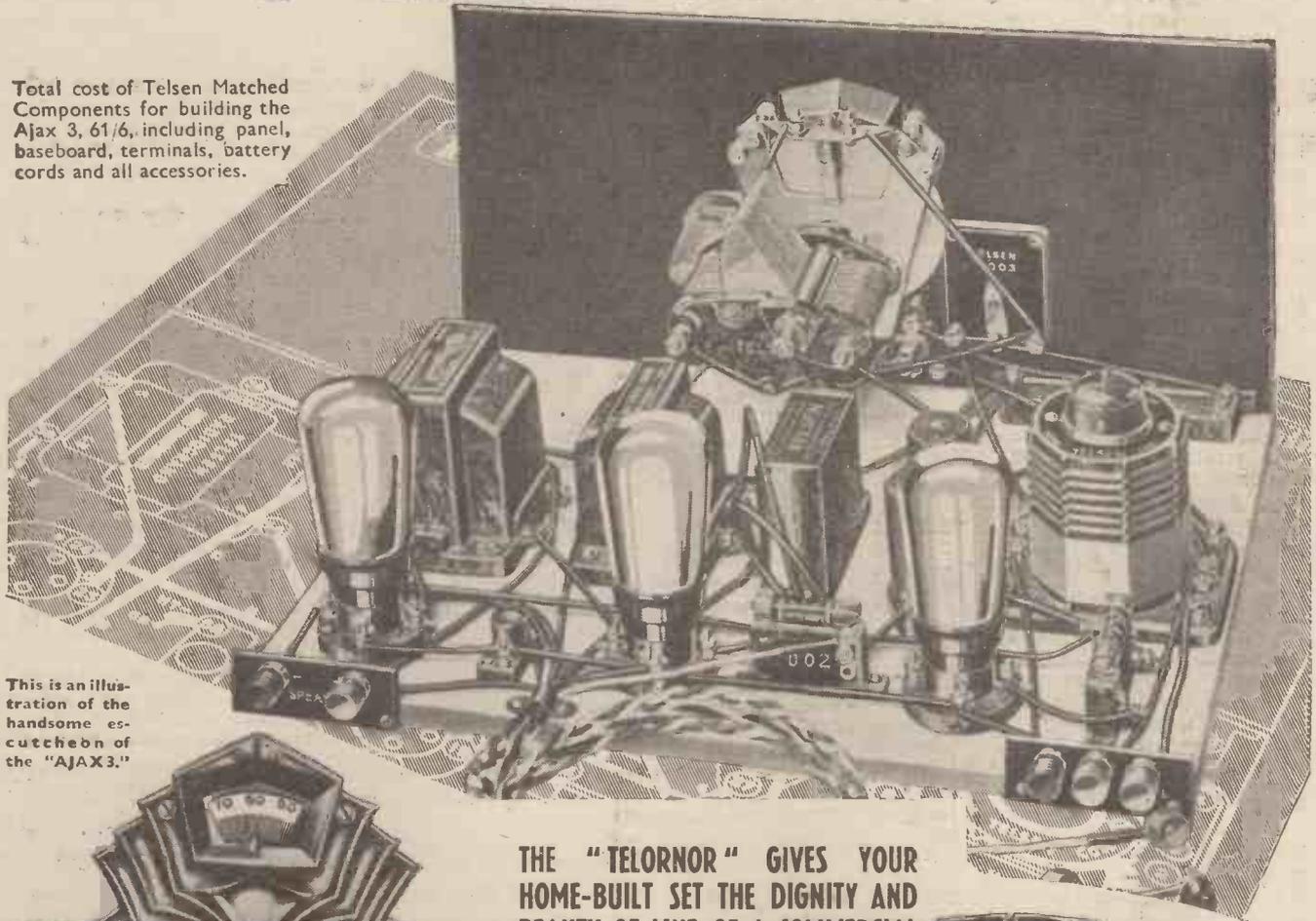
**Make sure you get your TELSEN RADIOMAG NO. 3**

by Telsen technicians !...

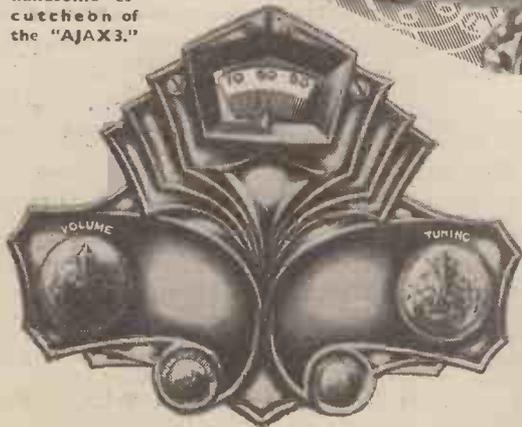
*economy*  
**grid** *brilliance!*

# AJAX 3

Total cost of Telsen Matched Components for building the Ajax 3, 61/6, including panel, baseboard, terminals, battery cords and all accessories.



This is an illustration of the handsome escutcheon of the "AJAX3."



**THE "TELORNOR" GIVES YOUR HOME-BUILT SET THE DIGNITY AND BEAUTY OF LINE OF A COMMERCIAL RADIO RECEIVER.**

The escutcheon plate embodies an illuminated variable ratio slow-motion disc drive which permits of exceptionally fine tuning for distant station reception.

# TELSEN

**RADIO COMPONENTS**



# QUESTIONS I am asked

**H**AVE you ever wondered what a day in the life of a Query Editor is like?

Believe me, it is not all "honey." Maybe you have conjured up in your mind's eye the mental picture of a person somewhat professorial in appearance—possibly benevolent—perhaps prosperous. One who starts the day late and finishes early, having in the meantime answered a few queries which to him are "as easy as shelling peas."

Just the kind of job you would like, you say?

#### Expert Staff.

Well, if your mental picture is on those lines, you are absolutely wrong! The query staff—there are three others in addition to myself; all of them practical, highly-trained radio experts, keen to track down your troubles and to give you every help—start the day early and finish late, and are hard at it endeavouring to solve your problems all the time. Many are seemingly unsolvable!

In dealing with queries, technical ability in itself is not sufficient. It is necessary to have a fairly well developed intuitive sense, because we fully appreciate that our querists cannot always put in a letter all that he intends to convey. To describe the symptoms accurately in the case of a faulty receiver is not an easy matter and we quite understand that.

#### Our Sets Guaranteed.

During our "peak" period, i.e. during the winter months, we get over a thousand letters a week, and these range from requests for special designs, including complete wiring diagrams of anything up to five or six valves, down to questions concerning the supplying of back numbers and blue prints.

General technical queries are more or less straightforward and present no difficulty, but set troubles sometimes involve a certain amount of correspondence and consequent delay, owing to the fact that the readers do not give us sufficient information to work on in the first instance.

To take an extreme, but by no means

By **A. JOHNSON-RANDALL,**  
"P.W.'s" QUERY EDITOR.

isolated case, let me quote a letter which I dealt with to-day. Here it is:

"Dear Sir, I have made up the set described in 'Popular Wireless' and I can't get any music. Can you tell me where to look? Please reply by return."

As I mentioned, this is an extreme case, but I have no doubt whatever that we shall be able to solve the trouble when we know which set our correspondent has built, and have some idea of the symptoms; also whether he has made the receiver strictly in accordance with the published design.

Let me say, here and now, that every design that appears in "P.W." is guaranteed. Every set undergoes exhaustive and stringent tests, and it has to pass these successfully before it is described.

Any receiver that is constructed exactly

punch and liveness that should exist is missing, and it is our job to find out why.

Now, in order to do this successfully, we require all the information we can get relating to the aerial and earth, local conditions, such as the presence of metal structures which might conceivably act as screens; the types of valves used, H.T. voltages, etc.

#### Free Service.

With this end in view, we have drawn up a questionnaire which we send to querists to guide them as to the type of information we want. This questionnaire is based upon our experience in dealing with thousands of queries, and from the valuable information that it gives us when properly filled in we are frequently able to locate the fault without further correspondence.

In many instances unsatisfactory results are due to modifications to the wiring or layout, and we cannot stress too strongly the importance of adhering to the original design.

With regard to requests for special designs, we are willing to draw up theoretical circuits or practical wiring diagrams to readers' own requirements. In cases where we consider the circuit arrangement to be unsuited to the reader's needs, we point this out to him and suggest modifications—when these are practicable—which will achieve the desired results.

#### A Generous Offer.

Commencing with this issue it is our intention to extend to all "P.W." set builders an entirely free query service, provided the design is built *exactly* to our published specification.

So, if you should make up a faithful copy of one of our sets, and it fails to give the results that it should, please do not hesitate to write in and tell us about it.

Our nominal fee of one shilling for queries of a general technical nature will be continued, and will now include those relating to any of our receivers which have *not* been constructed in accordance with our instructions

#### IMPORTANT ANNOUNCEMENT.

Commencing with this issue we are offering to those who make up "P.W." set designs an entirely FREE Query Service.

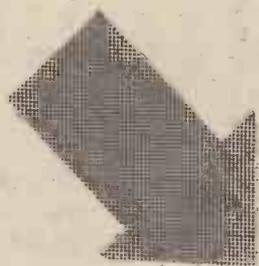
This offer extends to all queries relating to receivers built strictly in accordance with our published specifications, and incorporating any of the alternative components given in the lists.

(If the constructor modifies our design to suit his own ideas, his query must necessarily come within the regular scale of Queries Department charges.)

to our published layout and specification *must* work, unless by chance the builder is unfortunate enough to have got hold of a damaged component.

But actual complaints of receivers not working at all—the "can't-get-a-sound-out-of-it" type—are fairly easy to deal with, because the trouble must be either in the wiring, a component or accessory. Or—let me whisper it—perhaps the aerial is earthed.

No! The difficult queries are those in which the set is not quite up to standard. You know the sort of thing I mean. That



# Aerodyne Radio

*See Pages 159 & 160*

Send for full particulars  
of this wonderful set  
and Easy Payment Terms

## ENQUIRY COUPON

To Messrs. Hustler, Simpson & Webb, Ltd.,  
AERODYNE Works,  
Hoe Street, WALTHAMSTOW, E.17.

*Please send me full particulars of AERODYNE  
sets and Easy Payments Terms.*

Name.....

Address.....

P.W. 1-10-32.....



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

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

The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subjects 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

#### CURING THRESHOLD HOWL.

J. M. M. H. (Hanley, Staffs).—"This year I am embarking upon a scheme that I have had in mind for a long time, and that it should have provided me with a snag right at the beginning is a bitter disappointment.

"The scheme is a separate short-wave set. And the snag is threshold howl.

"Having quite a good stock of components accumulated from previous try-outs and hook-ups, I got down at last to short-wave working (in which I have always been interested since I saw what an Antipodes Adapter could do, on a friend's set.)

"First I got the one-valve section going good, and a taste of this on 'phones gave me the feeling that when I could get the Yanks

on the speaker I should be happy. I anticipated no difficulty, understanding that the great thing was to get the one-valve set going first and then simply add the L.F. But as soon as I put on even one stage, I get this confounded threshold howl.

"I suppose it is the genuine article, for it at first gives no trouble at all and the set sounds good—until I get to the application of reaction. At the beginning this sounds all right, too, but when I start pushing the dial (reaction) round towards the real "sensitive spot" there is a grunt and a squawk, and away goes that station.

(Continued on page 168.)

### DO YOU KNOW—

The Answers to the following Questions ?

There is no "catch" in them, they are just interesting points that crop up in discussions on radio topics. If you like to try to answer them, you can compare your own solutions with those that appear on a following page of this number of "P.W."

- (1) What is the approximate range of musical frequencies covered by a kettledrum ?
- (2) At what rate does the B.B.C.'s interval signal tick ?
- (3) What is Europe's most northerly official broadcasting station ?
- (4) What is the formula for calculating the theoretical voltage amplification obtainable from an R.C. amplifying stage ?

## DARIO PRICE REDUCTIONS & NEW RANGE



The new range of Dario valves recently introduced had amazing reception. Hundreds of satisfied users are telling their friends how pleased they are with the marvellous improvements of their sets after fitting Dario valves. Do not let worn-out valves ruin your reception. By fitting a new set of Dario valves, you can restore the original tonal quality and sensitivity of your set at very little cost.

FREE. A copy of the Dario booklet which illustrates the full Dario range of valves, together with slopes and all technical information, will be sent free by post on application. If you are in doubt as to the valves you should be using, write to us for free valve enquiry coupon, and we shall be pleased to tell you the correct valve. There is a corresponding Dario for every one in your set.

#### DARIO 2-VOLT.

DARIO Screenodion Bivolt	12/6
DARIO Screenodion Variable-Mu	13/6
DARIO Universal Bivolt reduced to	5/-
DARIO Super H.F. Bivolt-reduced to	5/-
DARIO Detector Bivolt (non-microphonic) to	5/-
DARIO Super Detector Bivolt reduced from	6/6 to 5/-
DARIO Super Power Bivolt reduced to	6/6
DARIO Hyper Power Bivolt reduced to	7/-
DARIO Polyodion (multi-grid)	12/6

#### DARIO A.C. MAINS VALVES (I.H.).

DARIO A.C. Screenodion	13/6
DARIO A.C. Super Screenodion (Steep slope)	13/6
DARIO A.C. Variable-Mu Screenodion	13/6
DARIO A.C. Super Detector reduced to	9/6
DARIO A.C. Super H.F. reduced to	9/6
DARIO A.C. Super Power	10/-
DARIO A.C. Polyodion (multi-grid)	13/6

#### DARIO D.C. MAINS VALVE 20-VOLT (I.H.).

DARIO D.C. Screenodion	15/-
DARIO D.C. Super Detector	11/6
DARIO D.C. Super Power	12/6
DARIO D.C. Polyodion (multi-grid)	15/6

#### FULL-WAVE RECTIFYING TUBES (4-VOLT A.C.).

DARIO F.W.1 (2x250 v-60 m.a.)	9/-
DARIO F.W.2 (2x350 v-120 m.a.)	11/-
DARIO F.W.3 (2x500 v-120 m.a.)	14/-

Also the usual 4-volt battery range.

IMPEX ELECTRICAL LTD., 538, High Rd., Leytonstone, London, E. 11

## DARIO VALVES FOR-PROGRESS, EFFICIENCY, ECONOMY

**WHEN  
YOU  
CAN  
BUY A**

**DUBILIER  
GRID  
LEAK**



**FOR**



**WHY trust to unproved  
GRID LEAKS ?**



In the past you may have been tempted into buying Grid Leaks and Resistances of unproved efficiency by the prospect of saving a copper or two. But with the arrival of Dubilier Grid Leaks and Resistances you need never again imperil the performance of your Set with components of unproved merit. For the Dubilier Grid Leak costs only 1/-. The famous Dubilier Metallized Resistance sells at the same price. Both are unmatched in performance and their dependability has been proved alike by technicians and public.

Use only Dubilier Grid Leaks and Resistances in your Set. You will never find better.

Have you seen the new Dubilier Component Booklet, "Choosing your Condensers and Resistances"? Ask your dealer for a copy or write to us.

**DUBILIER METALLIZED  
RESISTANCES**

1 Watt 1/-    2 Watt 2/-    3 Watt 3/-

**DUBILIER CONDENSER CO. (1925) LTD.  
Ducon Works, Victoria Road, North Acton, London, W.3**

## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 166.)

"As I say, I have a good lot of components, and I have tried nearly everything I can think of, with no luck. But there is a final gleam of hope from an acquaintance who writes me he is certain that I shall stop it if I try parallel feed, using a transformer. Do you advise me to try, or is there anything I can do with all the stuff I have already?"

"I should like to try it, I admit, but if it proves a washout I feel I shall have got such a sickener of short waves that I shall never read another W. L. S. article! So far, parallel feeding is about the only thing I haven't tried, and if that fails I feel I shall throw my hand in."

### HOW IS YOUR SET GOING NOW?

Perhaps your switching doesn't work properly? Or some mysterious noise has appeared and is spoiling your radio reception? Or one of the batteries seems to run down much faster than formerly? Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers its unrivalled service. Full details, including scales 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 post free immediately. This application will place you under no obligation whatever, but, having the form, you will know exactly what information we require to have before us in order to solve your problems.

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

### "P.W." PANELS.—No. 91. BERGEN, NORWAY.

The Bergen station works on a wavelength of 364 metres, with a power of one kilowatt.

Its announcement takes the form of "Bergen her," and, like the other Norwegian stations, its "Good-night" is "God-nat."

The distance from London is 647 miles.

Try it, by all means, as it is certainly one of the very best methods of solving threshold difficulties. And that is what you are up against.

The method is so promising, in fact, that we advise you not to bother to buy the special transformer named, but to try the ones you have on hand first. It is probable that, without much trouble, you will be able to add a parallel-fed stage without experiencing any more bother than is involved in the wiring up.

determines the distance separating them from the True-View. With weaker glasses than Focus 8, a somewhat greater separation between the viewing point and the picture will be necessary.

(Continued on page 170.)

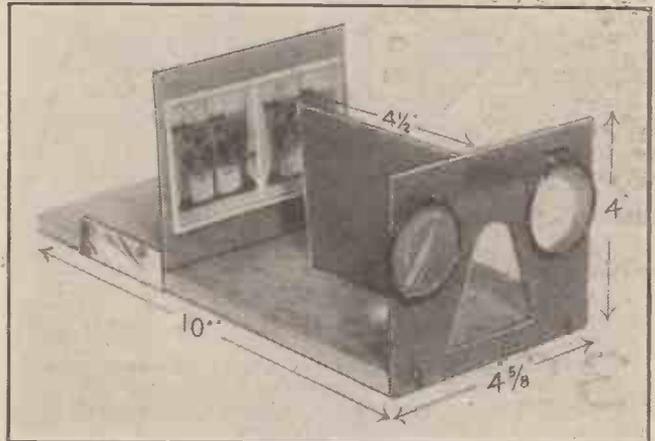
### A TRUE-VIEWER FOR SIXPENCE.

The fascinating "True-Views" giving stereoscopic three-dimensional representation of "P.W." sets, etc., need to be seen through a True-Viewer to produce the effect of solidity. Such a true-viewer can be made for a few pence as described below:

The main component is a pair of strong, long-sight spectacles. Maybe there is an old pair in the house, but if not, suitable ones can be purchased at any branch of Woolworth's Stores, price sixpence. Ask for "Focus 8."

The focus of the spectacle lens you use

### THREE-DIMENSION SPECTACLES!



Note how the spectacle lenses are removed from the common frame and suspended each by one fixing point, so that they can swing from side to side. The base is of wood and the viewing screen and partition of cardboard. The picture-carrier consists of a piece of cardboard tacked to a block of wood having aluminium (or other metal) side-pieces to keep it straight when it is slid backwards and forwards for focusing.

### Our Radio Consultant at Your Fireside!

**FREE NEXT WEEK**

a copy of

**"CAPT. P. P. ECKERSLEY'S QUERY HANDBOOK."**

to every reader of

**POPULAR WIRELESS**

Don't miss Your "P.W." next Thursday.

USUAL PRICE - THREEPENCE

### AN ENTIRELY NEW OSBORN RADIO CABINET



Osborn Super Acoustic Baffle Board prevents 90% speaker worry. Guaranteed no vibration even when attached to power full moving coil. Any size hole cut FREE. 18 x 18, 3/-; 24 x 24, 5/-; 30 x 30, 8/-; 36 x 36, 11/3.  
Carriage paid U.K.  
SEND FOR SAMPLE.

Model No. 234.—Beautiful Queen Anne style Radiogram Cabinet, 3' 3" high x 2' 6" wide x 1' 6" deep. Takes panel 19" x 12" or smaller. Ample room for any type of gramophone motor and H.P. L.T. batteries.—Storage for 35 records each side of set. If desired, panel 27" long by omitting records storage.

Write to-day for beautifully illustrated Catalogue. FREE, post free.

CHAS. A. OSBORN, Dept. P.W., The Regent Works, Arlington Street, London, N.1. Telephone: Clerkenwell 5095. And at 21, Essex Road, Islington, N.1. Telephone: Clerkenwell 5634.

**PRICES:** Machined Ready to Assemble—Oak £3.10.0. Mahogany £3.15.0. Walnut £4.10.0. Assembled Ready to Polish—Oak £4.10.0. Mahogany £4.15.0. Walnut £5.10.0. Assembled & Polished—Oak £5.10.0. Mahogany £6.5.0. Walnut £7.5.0. All Models Carr. Paid.

STAND No. 45, Northern National Radio Exhibition, City Hall, Manchester, Sept. 28—Oct. 8.

### "NEW RADIOS FOR OLD"

## RADIALADDIN EXCHANGE SERVICE. THE SUCCESS OF OLYMPIA.

(All orders placed at the Radio Exhibition are being dealt with in strict rotation.)

In purchasing by mail order, it is essential that the supplier's dealings, methods and bona fides should be subject to the strictest scrutiny, and it is, therefore, with pleasure that we have compiled a pamphlet illustrating numerous satisfactory experiences of those who have dealt with us—and also the press.

It will pay you to write for particulars of our amazing exchange offer, enclosing 1d. stamp, naming your old set which we buy, and the new set you fancy. A free quotation will follow. Balance payable in cash or hire-purchase.

**FREE WIRELESS SET** to introduce the Radialaddin Club.

Please forward this **INQUIRY FORM** (without obligation):  
Please quote me free your allowance for the new set:  
Make..... Model and List Price.....  
My Present Set is: Make..... Batteries or Mains.....  
Date of purchase..... Original cost of Set.....  
Balance of purchase price would be payable by me as follows:  
Plan A. Whole of balance in cash. Plan B. Whole of balance over Six, Nine, Twelve\* months.  
\*Delete unwanted words.

NAME, in Full (Block Letters) .....  
ADDRESS .....

**RADIALADDIN, Limited**  
THE LARGEST RADIO EXCHANGE IN THE UNITED KINGDOM  
(Dept. P.W.), 47/48, Berners Street, London, W.1.  
Museum 1821.

# 100% PURITY of TONE

—what a difference!



You'll say so—as soon as you hear it. What a difference the punch and pure tone of the MoToR Minor Moving Coil make to radio enjoyment! And it is a difference that you can afford. 100% purity of tone is reasonably priced in the

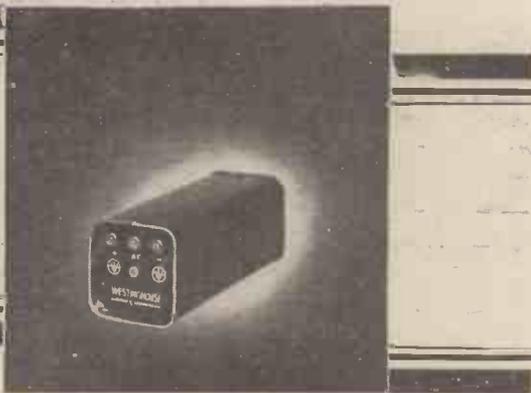
## MOTOR

### 39/6 MINOR P.M. Moving Coil

Complete with transformer and baffle-board.

See it and hear it at your nearest dealers—or write for complete list of MoToR loudspeakers.

TEKADE RADIO & ELECTRIC LTD.  
147 FARRINGTON ROAD, LONDON, E.C.1 'Phone: Clerkenwell 2486



**Build your eliminator with a metal rectifier** and ensure years of service without the annoyance of breakdown or falling-off in output. Prices from 12/6.

Full particulars, circuits and prices are given in the new and enlarged 1933 edition of "THE ALL-METAL WAY." Post the coupon now, with 3d. in stamps, and get a copy

WE ARE EXHIBITING AT STAND 73, MANCHESTER RADIO SHOW



### METAL RECTIFIERS

THE WESTINGHOUSE BRAKE AND SAXBY SIGNAL CO., LTD.  
82 York Road, King's Cross, London, N.1.

COUPON

Westinghouse Publicity, 82 York Road, King's Cross, London, N.1  
Please send me a copy of your 44-page booklet "THE ALL-METAL WAY, 1933" for which I enclose 3d. in stamps.

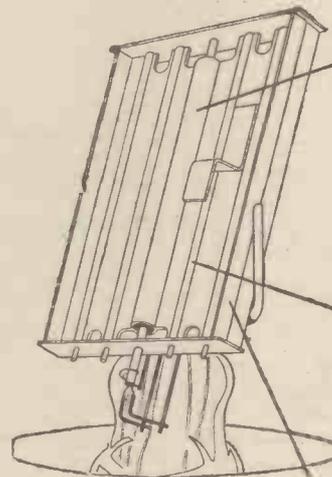
NAME.....

ADDRESS.....

P.W. 1/10/32.

# Micromesh

THE MODERN VALVE FOR MODERN RADIO.



Extremely close spacing of the electrodes, assuring high slope.

Large surface radiation fins eliminate distortion through grid emission and furnish extra cooling for anode.

Assembly, constructed as separate unit, gives unusual accuracy and rigidity.

The new methods employed in Micromesh construction assure a valve having really remarkable characteristics. The Detector (type H.L.A.1), for example, has a mutual conductance of 8.0 ma/v.

Leaflet giving details of the under-mentioned types will be sent on request.

**Detector, Type H.L.A.1, list price 13/6.**

**Power Output, Type P.A.1, list price 17/6.**

**Indirectly-Heated Full-wave Rectifiers:**

**Type R.1, list price 12/6.**

**Type R.2, list price 15/-.**

**Manchester RADIO EXHIBITION**  
Sept. 28th—Oct. 8th.

Visit the Standard Showroom at the corner of Peter Street, and Deansgate, Manchester.

# Standard Micromesh VALVES

Trade Mark

Standard Telephones and Cables Limited

Standard Telephones & Cables, Ltd.,  
(Radio Merchandise Dept.)

St. Chad's Place, 364 Gray's Inn Rd.,  
London, W.C.1. Tel.: Terminus 6255

## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 168.)

You can easily work out this distance approximately by looking through the spectacles at a page of print and varying the distance until the print is in sharp focus. If you constantly wear glasses keep these on.

A most important feature of the viewer is the cardboard partition which runs most of the way down the centre of it. This has to prevent each eye from seeing the True-View section intended for the other eye.

Without this partition you would see three pictures—the two separate ones with the merged "stereo" in the centre. Any leakage in the partition results in small pieces of overlapping picture bordering the stereo.

The partition must run right up against the viewer spectacles, and as close to the True-View as possible. It is an advantage if it is painted black, indeed, the whole of the viewer within range of the eyes should, if possible, be treated in this manner.

### THE ANSWERS

—TO THE QUESTIONS ASKED ON PAGE 168 ARE GIVEN BELOW:

- (1.) Approximately from 90 to 13,000 cycles per second.
- (2.) Sixty times a minute.
- (3.) Bodo, in Norway.
- (4.) R

$\mu = \frac{R + R_a}{R}$   
 where  $\mu$  = amplification factor of the valve.  
 R = external anode resistance.  
 R<sub>a</sub> = internal resistance of valve.

DID YOU KNOW THEM ALL?

The actual size and positioning is best seen from the accompanying illustration (which gives all the necessary details).

Incidentally, it ought to be mentioned that if you have uncorrected, faulty vision you may find it difficult to view stereos—just as you might find it difficult to view anything efficiently!

### USING THE SCALE ON THE WIRING DIAGRAMS IN "P.W."

"SET SQUARE" (Aylesbury, Bucks).—  
 "Before I left school I helped one of the masters to build a 'Cosmic,' and now I can't remember how he got the parts on the base-board in exactly the right positions. The scale which you print on the big diagrams seems to be different sizes, different weeks.

What is the method of using this to best advantage to get good spacing and accuracy?"

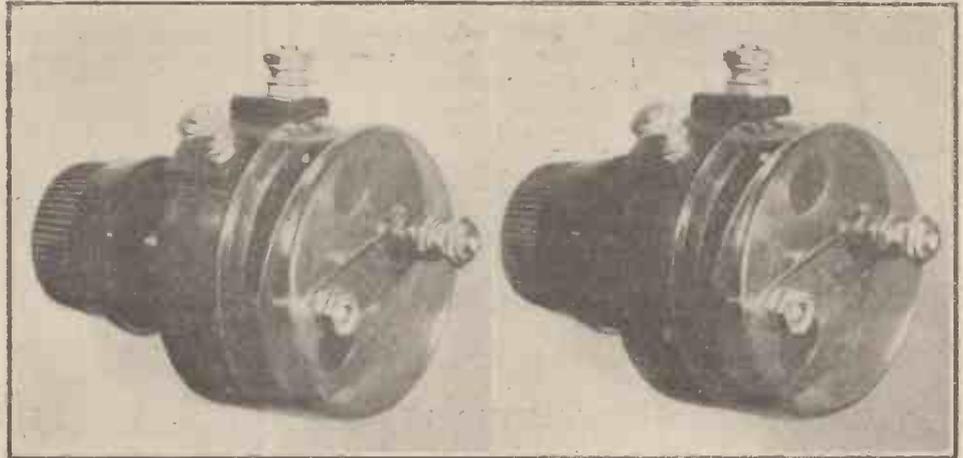
The scale on the wiring diagram allows you to make up a little ruler for use with each set. All you have to do is to get a piece of white-stiff paper or cardboard, lay it along the scale, and transfer the marking on the latter to the "ruler." Do it carefully, and make your new "ruler" some eight inches or so long, all carefully marked up in "inches" with halves and quarters if you like.

As soon as you have made your "ruler" you are on velvet, for you can then lay it on the "P.W." wiring diagram in question and see the distance between any two points, the whole thing being drawn to the same scale as the ruler.

If the H.F. choke comes "2 inches" in from the edge, and "1½ inches" from the plate pin of the nearest valveholder (just to give an example), then those are the proper distances in actual inches on the actual base-board.

Making the ruler is the only trouble involved—and that doesn't take more than a brace of shakes!

### SEE IT STAND OUT AS A SOLID COMPONENT



This ingenious high-resistance Lewcos potentiometer "comes to life" in amazing fashion when viewed through a "True-Viewer."

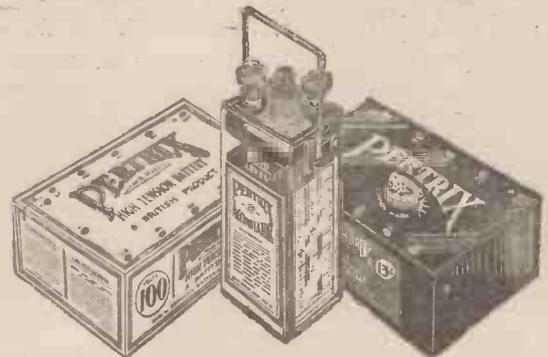
# YES! — A LONGER USEFUL LIFE

Exaggerated claims are often made about the life of dry batteries, but it can be claimed quite definitely for a Pertrix Dry Battery that it has an undoubtedly longer useful life.

## PERTRIX

TRADE MARK

### DRY BATTERIES & ACCUMULATORS



Advt. of Britannia Batteries Ltd., 233 Shaftesbury Avenue, London, W.C.2. Telephone: Temple Bar 7971 (5 lines) Works: Redditch (Worcs.)

H.T. BATTERIES . . . . . From 5/6  
 L.T. ACCUMULATORS . . . . . From 4/6



# IT CREEPS

it creeps on you every night

SLOWLY . . . . . INSIDIOUSLY

Valve deterioration is not sudden like switching out a light. It is so gradual in fact that you scarcely notice any difference until you realise that your wireless receiver is failing to give you really satisfactory reproduction.

If only it were possible to compare your receiver as it is now by placing it beside the same receiver when you bought it a year ago, you would be astonished at the loss in tone value, selectivity and clarity it has suffered.

If you have had your set for twelve months, or even less with some receivers, and only one set of valves, you can be sure that it has lost some of its original purity and crispness. Fit a set of ETA valves to-day and it will be as good as ever it was or even better. ETA valves give you the highest possible standard of reproduction. They deteriorate much more slowly than many other valves.

PRICES FROM  
**5/6**

YOU NEED NEW VALVES  
GOOD VALVES — ETA VALVES



# ETA

THE INTERNATIONAL VALVE

### SERVICE COUPON

To the ELECTRICAL TRADING ASSOCIATION LTD.,  
Aldwych House, Aldwych, London, W.C.2.

A. Please let me know the correct type of ETA valves to replace my present valves which are as under

1..... 2..... 3..... 4..... 5.....  
(Insert type letters and number)

B. Please advise me which ETA valves to use for the following receiver or circuit.

Specify Type No. and Name .....

Name .....

Address .....

P.W. 1/10/32.

## A WORD about FIXED CONDENSERS

The chief consideration in buying fixed condensers is service, and from this point of view Ferranti Condensers are a by-word. Add to this the fact that Ferranti are the lowest priced quality condensers on the market, and you'll decide on Ferranti — the Condensers you can 'fit and forget.'

Just consider these features in addition to those above:

## FERRANTI CONDENSERS

1 Their test pressures are higher than those of many other condensers of similar type and price, yet the dielectric material is not unduly stressed.

2 Their insulation resistances are much higher per 2 Mfd than can usually be claimed, and are maintained in service.

3 They are not of the "Mansbridge" pattern but are of the "rolled foil" type giving extremely low internal resistance. This facilitates the smoothing action and greatly reduces the possibility of back coupling.

4 They are easily capable of withstanding all service conditions for a long period, being designed and made by Engineers whose experience includes the building of condensers for working pressures of more than 1,000,000 Volts.



PRICES from 3/- to 9/8  
PACKS from 24/- to 30/-

It is only natural that Ferranti Fixed Condensers should be so often recommended when experts are designing a Receiver or Unit in which Quality is the dominating factor. There are types to suit your need *exactly*—detailed in Leaflet W.522/1.

Ferranti Ltd. Head Office & Works, Hollinwood, Lancashire  
London: Bush House, Aldwych, W.C.2.

## TRADE JOTTINGS

By G. T. KELSEY.

THE Igranic Range of Components is more comprehensive this year than ever. In addition to their well-known lines such as transformers, micro and pre-set condensers, short-wave coils and the famous Indigraph vernier dial, Messrs. Igranic are now manufacturing an attractive-looking screened dual-wave coil, a set of super-hot coils and an accurately matched 2- and 3-gang condenser.

There is hardly any need to add that these new lines are every bit up to the standard upon which Messrs. Igranic have earned their reputation.

Applications for copies of this new catalogue should be addressed to The Igranic Electric Co., Ltd., 149, Queen Victoria Street, London, E.C.4.

I have just heard of an interesting echo of the recent unfortunate 'plane crash at Croydon.

It appears that the Eta valve people, who were temporarily out of stock of a valve that was urgently required—made arrangements for a supply to be sent over from the Paris factory of the company, and the parcel containing the valves was in the ill-fated 'plane when it crashed.

As soon as the accident was reported, Mr. F. B. Carrodus, the Sales Manager of the Company, sent a technical representative over to Croydon to examine the badly-torn parcel that was retrieved from the wreckage, and when the valves were tested, it was found that every one was in perfect condition!

There was certainly no fake about that test, and that the valves should have emerged undamaged after such a severe battering, speaks well for the constructional features of Eta valves.

### Of Paramount Interest.

I understand that the Ekco "direct comparisons" demonstration, which created so much interest at Olympia, and later at the Forum Theatre, Fulham Road, London, is being shown at the Paramount Theatre, Manchester from September 26th to October 8th, which coincides with the run of the Northern National Radio Exhibition.

Among the artistes who are booked to appear during the week are Elsie Carlisle, Flotsam and Jetsam, Rudy Starita, Denis Mayne and Elsie and Doris Waters, and I recommend all our Northern readers to pay a visit to the Paramount.

### A Ferranti Offer.

Most keen constructors will need no introduction to the Ferranti Constructional Charts, which have attained a great name for themselves owing to the ease with which they enable a set to be constructed of all Ferranti parts.

Extremely clear, with working diagram and explicit instructions, they have been the basis of many a fine set—and now a new chart has been prepared for the "P.W." "Apex."

You can obtain one of these charts from your dealer—free, of course—or by post from Ferranti Ltd., "A" Charts Section, Hollinwood, Lancs. It doesn't matter which method you employ—the great thing is to get the chart!



## WILLS'S CAPSTAN CIGARETTES

They  
suit  
everyone

10 for 6<sup>d</sup>.

20 for 11<sup>1</sup>/<sub>2</sub><sup>d</sup>.

C.C.399A.

## THE BERLIN SHOW

(Continued from page 139.)

The new transmitter has solved the problem. Make a talkie of any event or scene you like and televise it exactly 15 seconds after the happening!

The Reichspostzentramt, with Dr. Banneitz as head of the television laboratories, were also showing different types of receivers, and, of course, they are responsible for the ultra-short-wave transmissions.

### Famous Voices "On Tap."

The R.R.G. was showing two films, one giving the public an idea of radio broadcasting and reception in 1923 and in 1932, and one showing a day at the Munich station. A special smaller exhibition of anti-interference means and aids was on show by the R.R.G., and also a number of works of art by artists having taken broadcasting for a theme.

Every visitor could go into a special cabin and ask the lady in charge to put on a record with King George's voice, or Mr. Shaw, or Briand, or Von Papen, and many other celebrities. These gramophone records were made by the R.R.G. at different occasions when these people actually broadcast.

The Heinrich Hertz Institute had a number of electric music instruments on show, the Neo-Bechstein, the Trautonium, the Hellertion, the new Theremin, the electric piano of Vierling's, and electric 'cello and violin. The effect of Trautonium accompanied by Neo-Bechstein was astonishing!

## SIXTEEN MILLION PIECES CAN'T BE WRONG!

Details of a Great New Factory  
at Enfield.

SOME of the tremendous business that has been built up in the production of such small things as terminals and wander-plugs may be gauged from the fact that Messrs. Belling & Lee now find it necessary to keep rather more than sixteen million tiny parts in their stores in order to cope with the demand!

This was only one of the many interesting things that a "P.W." representative learned on a recent visit to the new factory of Messrs. Belling & Lee on the Cambridge Arterial Road at Enfield.

### Up-to-date Machinery.

The factory itself, which is brilliantly lighted at night, is constructed on the most up-to-date lines, and it is evident all over of a considerable amount of forethought and attention to the comforts of those who are now working in it.

The various processes involved in the production of terminals, wander plugs, fuses, etc., are carried out on the most up-to-date high-speed machines obtainable, and the precautions taken to ensure perfection, both mechanically and electrically, of each tiny part produced is no doubt one of the main contributory factors to the reputation which Messrs. Belling & Lee have earned for themselves.

## FACTORY RELAYS

Some Interesting Industrial Broadcasts from the Midlands.

A CONSIDERABLE number of factories in the Midlands are to be wired up for broadcasts during the next few months, when relays from typical places of industry will form part of the series of Midland Counties' programmes arranged by the Midland Regional station. It is estimated that several miles of wire will be used in the works, and many factories have been visited by members of the programme and engineering staff from Birmingham, who explored the works and ascertained what noises were suitable for broadcasting.

Each relay from a factory will involve several days' work for the engineers of the Birmingham station.

As the factories will normally be closed during rehearsals and broadcast times it will be necessary for everyone concerned to be at the factory specially for these broadcasts.  
L. W. A. B.

OUT THIS WEEK:

## The October MODERN WIRELESS

It tells you how to get

BETTER AND THOSE RADIO FOREIGNERS

Also a big illustrated CONSTRUCTORS' SUPPLEMENT DON'T MISS IT. 1/- OUT THIS WEEK.

## BROADCASTS TO SCHOOLS

(Continued from page 128.)

the microphone, for this, no matter what striking personality appears before it, can do none of those things which the good teacher does to impart his knowledge successfully.

Yes, the broadcast lesson can be a great help to the boy who is out to learn, but once the novelty is worn off, I fear the masses would make it an occasion for sleeping. But here the schoolmaster would come in and justify his existence.

### The New Generation.

However, such considerations should not deter the B.B.C. from persevering with this new instrument. All the biggest things of the past have seemed within the bounds of impossibility at the outset.

Then, again, a generation born into the new broadcasting era will not have known the old, and so with a different outlook may not meet with the dangers that confronted earlier generations when the assimilation of knowledge (more superficial than expert, perhaps) was so much easier. For I am convinced that learning via the microphone is not a simple matter—to the child, at any rate.

# New Times Sales Co

NEW 1933

# RADIO ON EASIEST OF EASY TERMS

## QUICKEST DELIVERY

### MANUFACTURERS' KITS

**LISSEN "SKY-SCRAPER 3."**  
Chassis model with (Lissen) S.G. Detector and Pentode.  
Cash Price, £4/9/6.  
Complete with Lissen HIGH POWER Valves.

With order **8/3**

Balance in 11 monthly payments of 8/3 Carriage Paid.

**COSSOR MELODY MAKER.** Model 335. Complete with Valves, Speaker and Cabinet. Employs Cossor Variable-Mu S.G. H.F. stage, Detector and Power.  
Cash Price £7/17/6

With order **10/-**

Balance in 11 monthly payments of 14/10. Carriage Paid.

**SLEKTUN SCOUT S.G.3.**—S.G., Detector and Power. Pilot Author Kit "A" (less valves and cabinet). Cash or C.O.D. £8/8/6.

With order **8/1**

Balance in 11 monthly instalments of 8/1. Carriage Paid.

### ACCESSORIES

**COLLARD ELECTRIC GRAM-PHONE UNIT.** For A.C. Mains. 12-in. Turntable. Combined Tone Arm, Pick-up and Volume Control. Automatic Stop.  
Cash Price £4/0/0

With order **7/4**

Balance in 11 monthly payments of 7/4. Carriage Paid.

**B.T.H. SENIOR PICK-UP,** complete with Arm and Base.  
Cash Price £2/2/0

With order **3/10**

Balance in 11 monthly payments of 3/10. Carriage Paid.

**GARRARD INDUCTION MOTOR.** For A.C. Mains. Model 202. 12-in. Nickel Motor Plate fully automatic starting and stopping switch.  
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## NORTHERN RADIO EXHIBITION

(Continued from page 127.)

and were agreeably surprised to find that this year Messrs. Epoch are producing a very fine set which has been designed to enable the very best to be obtained from their speakers. We paused for a few seconds to examine the Ormond range of condensers—a display which no one should miss even if it is only to see their new speakers.

### A Set for Scholars.

Then we encountered Philips' stand, and I had literally to drag my colleague away from the fine range of receivers that was there displayed. I must confess that I shared his enthusiasm, but to me, at that moment, there were thoughts of only one thing—the press telegram!

However, we managed to pay several more visits before the entrance doors to the exhibition closed behind us.

First we came across R.I., where we were "introduced" to our first officially approved school set. It is really a standard three-valve R.I. Madrigal built into a simple, but serviceable cabinet.

Here, too, we were able to examine the new R.I. super-het., which is an achievement of which the firm can justly be proud. It is full of fine features, and it is built into an elegant-looking cabinet. Incidentally, and apropos my earlier remarks, this set also provides for the connection of an external pick-up.

The range of apparatus that we saw on the stand of the Edison Swan concern was both comprehensive and commendable. There was a special display of the Edison new process H.T. batteries, and we gathered from one of the executives with whom we spoke that they are proving tremendously popular.

In this matter of supplying power for your set, I noticed that Messrs. Heayberd were also well to the fore with a most comprehensive range of mains units, mains transformers and resistances—in fact, everything that the A.C. or D.C. man could possibly wish for.

### Go If You Can!

Before we finally left the show we paid our homage to the kindly-looking bears which were mounting guard over the Polar exhibit, and we also had a careful look at the products displayed on the stands of Igranic and the Whiteley Electrical Radio Co. They were all exhibits which compelled attention on grounds of technical merit, and we were only sorry that we couldn't spare time for a more detailed examination.

But Father Time is no respecter of persons!

There is no doubt in my mind as I draw these impressions to a close that this year's exhibition is the finest that has ever been staged in Manchester, and I strongly advise all our Northern readers to make a special point of seeing it. You have my word for it that you will not come away disappointed!

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## THE LISTENER'S NOTEBOOK

(Continued from page 142.)

pleasant as those of previous speakers, whether his vocabulary was as comprehensive, and whether the talk as a whole was as valuable as previous ones.

I cannot think that Mr. E. Morgan Humphreys or Mr. R. Williams Parry could hope for many compliments from outside the Principality if listeners in Great Britain were to have the chance of filling in such a questionnaire.

I dare say that what these speakers said was very sound and interesting stuff, but it was just wasted on us. I wonder, too, how many Welshmen listened and understood.

### Cannot Face Competition.

In spite of considerable concessions our Sunday programmes still cannot face the competition from abroad. Consequently, the B.B.C. can only be certain of a following that can't get anything else. The Continent can be relied on Sunday after Sunday for some really good musical entertainment, even though a lot of it is recorded music.

### NEXT WEEK

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Next week's "P. W." Order now.

We shall always have the Sunday Evening Service, I suppose, and I don't think I would like to see it discontinued. Church music, whether it comes from cathedral, parish church or mission hall will never lose its appeal to those who like it, but there is such a disparity in the sermons inflicted on us as to make Sunday Evening Services as a whole a very undependable item.

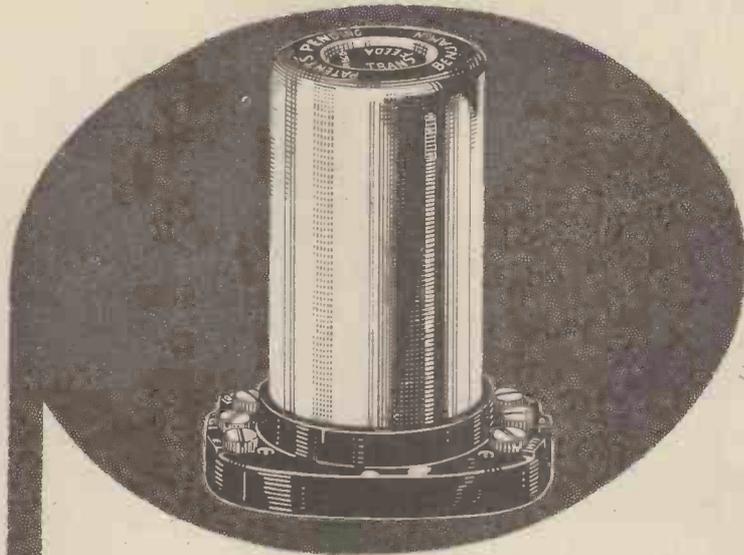
St. Martin's is consistently good, and one never doubts for a moment the sincerity of the big men there. Other denominations, too, have their big men who are always worth listening to.

I think immediately of Gipsy Smith, for his sermon and, especially, his remarkable singing a few weeks ago are still fresh in my memory. How splendidly his voice came through the loudspeaker! I don't think I have heard a better.

### Absence of Daring.

There seems to be a very definite plan about the Proms this year. I have already called attention to the predominance of classical music, and one wonders whether this year's programmes have set a fashion to be followed in future. Many deplore the absence of the daring programmes of previous years.

In the present series of concerts, however, the arrangement is such that listeners are able to compare or contrast one evening's music with that of the night before. For instance, a Brahms evening, consisting of an overture, a symphony and a concerto, has been followed by a Tchaikowsky evening, when the same three types of music were played. Such a procedure invites comparison, and this is an added interest.



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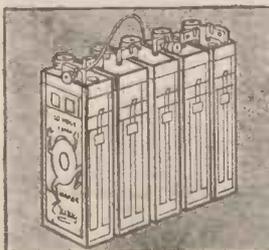
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## TECHNICAL NOTES

Some diverse and informative  
jottings about interesting aspects  
of radio technique.

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

### Pentode or Triode?

**WHEN** considering the choice between a pentode and a 3-electrode output stage, bear in mind that the impedance of the output circuit is more important in the case of the 3-electrode valve than in the case of the pentode.

In a general way you may say that the current supplied by the pentode valve does not vary very considerably with the impedance of the output—within reasonable limits, of course.

In the case of the 3-electrode valve, on the other hand, the voltage which is developed does not vary very much with frequency. Now the impedance of the loudspeaker will obviously be greater at high frequencies than at low frequencies, so that with increasing frequency and therefore increasing impedance the pentode has the advantage over the 3-electrode valve.

### Influence of the Speaker.

A good deal depends upon the type of loudspeaker which you are using. For instance, with a moving-coil speaker you want plenty of power in the upper notes in order to get a properly balanced reproduction. This means that, so far as possible, you want to have the current supply to the moving-coil speaker more or less the same whatever the frequency may be. This is the type of performance given by the pentode, and is one of the reasons why the pentode, as you know, is so often successfully used with a moving-coil speaker.

With an ordinary moving-iron type of speaker, on the other hand, the actual power required on the higher notes is less in order to give balanced reproduction, and therefore the 3-electrode output valve meets the case.

### Preparing a Cone.

When you are preparing a cone for a loudspeaker and want to give it a coat of some kind of varnish, you are generally advised to use celluloid dope. This is very good in some ways, since it is fairly waterproof when dry, and often has the property of tightening the paper of which the cone is made.

On the other hand, if the celluloid varnish is applied too thickly, there is a tendency for the paper to crack afterwards, which is very bad for the reproduction.

Some experimenters, instead of using celluloid varnish, make use of linseed oil. I should explain that linseed oil is largely used in the preparation of commercial products, such as Empire tape, so-called "oiled silk," and the materials used to interline rainproof coats. A fabric properly treated with linseed oil is not only waterproof, but is pliable and quite free from any tendency to crack.

### Danger of Cracking.

If a loudspeaker cone is treated with linseed oil it should be allowed to dry for at

(Continued on next page.)

### TECHNICAL NOTES

(Continued from previous page.)

least a couple of days. This process is called "drying," but in point of fact it is probably also an oxidising effect due to the influence of the air upon the oil.

You may find that a loudspeaker cone prepared in this way gives better all-round results than one which is varnished with cellulose. The oil is applied to the cone in the usual way by means of a small brush, and the only precaution necessary is to apply the oil thinly and not to allow it to accumulate at any particular part of the cone.

#### Condenser Voltages.

A reader has asked me why it is that paper condensers should be manufactured with only a relatively small margin of safety as regards voltage breakdown. Is it not just as easy, he asks, to use thicker insulation, so as to give a much bigger safety margin?

This seems a fairly obvious criticism, but as soon as you begin to examine the question, putting yourself in the position of the manufacturer, you will see why it is so necessary to keep the thickness of the insulating material as low as possible. It is not so much a question of material cost—after all, the actual cost of the paper is a small item in the total cost of the condenser—but if you increase the thickness you must increase the area in the same ratio.

As you know, the capacity of a condenser becomes less as the thickness of the insulating layer between the plates is increased. If you double the thickness of the paper it means that although you roughly double the maximum voltage which the condenser will stand, you have also to double the area of the plates in order to keep the capacity the same.

#### Effect of Dielectric.

From the practical point of view it is essential that fixed paper condensers should be kept as small as possible in overall dimensions, and this means that the manufacturer must use every effort to find an insulating material which will give a reasonable safety margin and yet which can be used in sheets as thin as ever possible.

The actual "thickness" of the condenser, and also the total area of the plates, depend upon the thickness of the insulating material. If you double the thickness of the material you also double the area which has to be used, therefore the total amount of insulating material used is four times what it was before. So you see the effect this will have upon the final dimensions of the finished condenser.

#### De-coupling.

When the low-frequency part of a set is not properly de-coupled—especially if the set is not a particularly up-to-date one—this fact will give rise to motor-boating. If the batteries are getting a bit ancient, their internal resistance may cause further coupling and so increase the motor-boating trouble.

Microphonic noises are often very troublesome and these point generally to a microphonic detector.

This particular type of interference generally begins with a fairly small noise, (Continued on next page.)

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**TECHNICAL NOTES**

(Continued from previous page.)

which builds up—sometimes gradually sometimes rapidly—until it becomes completely unbearable. You should try an anti-microphonic valve holder, if you are not already using one, and also protect the valve from vibrations and air waves reaching it directly. By the way, although the detector is usually blamed for microphonic noises, it is as well to bear in mind that it is sometimes the screen-grid valve that is the culprit.

Crackling noises in a set are almost invariably due to bad contacts; these may be in a coil, a valve holder, a variable resistance, or in a hundred-and-one places. Crackling may even be caused by frayed or partly broken insulated wire.

**Changing Over Speakers.**

A reader raises a query which probably may have occurred at some time to many others; it relates to trouble he experienced when he changed over from a moving-iron to a moving-coil speaker. I should explain before going farther that the set included two stages of low-frequency amplification, transformer coupled. When the moving-coil speaker was connected (with an output transformer, of course), mains hum became troublesome.

He got over the trouble by connecting smoothing condensers across the output of the mains unit, and this is an obvious remedy which any of you may try if you have similar trouble. At the same time, it is quite possible that if the set had used one stage only of transformer-coupled L.F. and one stage of resistance coupling, making, with the output, two transformers instead of three, the extra smoothing of the mains unit would not have been necessary. It is a bad plan—for several reasons, and quite apart from hum with a mains unit—to have too many transformers in the circuit.

**Iron-Core Chokes.**

Iron-cored choke coils often have a small piece of insulating material, such as ebonite, or even cardboard, in the gap of the core. The purpose of this is to maintain a constant gap so that when the choke is handled or fixed in any position there is not likely to be any appreciable variation in the size of the gap. I explained in these Notes a little time back, and also in an article in "P.W." the object of this gap in the iron core.

**The Gap in the Core.**

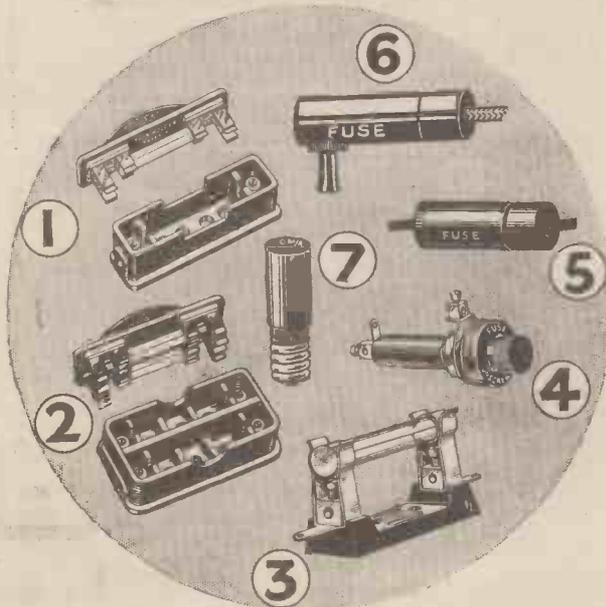
At first you would think that the best and most efficient magnetic circuit would be a continuous one. It is found, however, that owing to variations in the inductance of the choke with varying D.C. currents passing through, it is much better to have a broken core, that is, one with a gap instead of a continuous one.

In order to keep up the inductance value with the gap core, it is, of course, necessary to use more wire in the windings and a heavier core. But at the same time the gap has the effect of keeping the inductance of the choke more nearly uniform with fairly wide variations of D.C. current through the windings.

The actual size of the gap can be determined for any particular case by calculation and by actual experiment.

(Continued on next page.)

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**TECHNICAL NOTES**

(Continued from previous page.)

**Very Important.**

But once the size has been decided upon, it is necessary that it should not vary. A very small movement of the iron core might cause a large percentage variation in the size of the gap. This is the reason why some sort of a distance piece is often fixed in the gap so as to keep it a definite size.

**Steady Rectifier Conditions.**

I have more than once been told by experimenters that they find that the output of an all-mains set, or a set which is supplied by a mains unit embodying a metal rectifier, will increase gradually during, say, the first half-hour of working. The increase is not usually very considerable, but nevertheless, in some cases it is quite noticeable.

This effect is generally due to the gradual warming up of certain of the components in the set or in the mains unit, especially

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the metal rectifier. The method of operation of the rectifier causes a very slight warming—in fact, it is to get rid of the slight amount of heat produced at the rectifying surfaces that the copper fins or vanes are provided—and the efficiency, or rather the output, of the rectifier rises very slightly, perhaps a few per cent.

**Adjusting for Maximum Output.**

The mains transformer of a home-built mains unit should not be so adjusted as to give the maximum output when the set is first switched on. Matters should be so arranged that the maximum output is not attained until after the unit has been working for, say, half an hour, or even more.

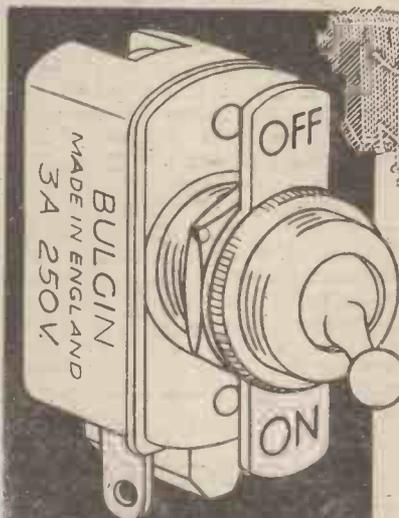
If adjustments are made in this way you will find that the output is a few per cent below the maximum when you switch on. It is much better to have it this way than to try to get the maximum right away before the rectifier has got properly into its stride.

**Earlier Rectifiers.**

Those of you who use the earlier types of rectifier, such as the tantalum rectifier.

(Continued on next page.)

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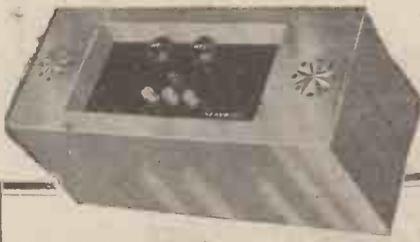
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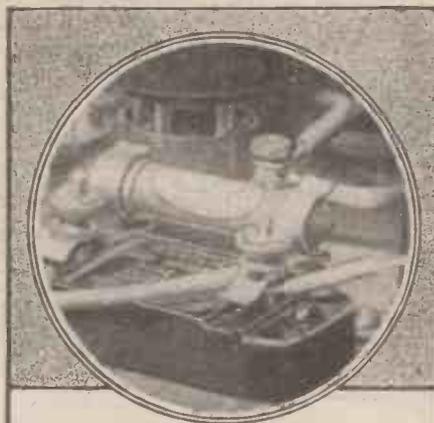
## TECHNICAL NOTES

(Continued from previous page.)

will be well aware of the distinct rise of temperature which takes place and of the effect of this upon the working. With a tantalum rectifier, as a matter of fact, the D.C. current which is passed by the rectifier under given conditions increases very definitely when the rectifier has got into a steady working condition.

With the very old types of rectifier, such as the ammonium phosphate, the rise of temperature was very large and, in fact, this was one of the great drawbacks of these early rectifiers. With the modern metal rectifier, which is exceedingly efficient, the temperature rise is extremely slight, and the allowance which I have mentioned above for the rectifier getting into its steady working condition is more by way of a refinement.

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A break in a grid circuit is always a serious matter, so contact clips, etc., should be watched carefully.

Keep grid wiring as short as possible.

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When using a moving-coil speaker in which the pot is energised by a field current, this current should be as smooth as possible. If it is supplied from D.C. mains it will generally be all right. In the case of a low-voltage pot, where the field current is supplied from a 6-volt accumulator battery, there is, of course, no question about the suitability of the current.

When alternating current is used, however, with a rectifier, the question of smoothing sometimes becomes quite important, because it may well be that the rectifying current will cause a hum. In view of the relatively large inductance of the field winding of the moving-coil speaker, many people think that this in itself would provide sufficient smoothing, and that no further smoothing is necessary.



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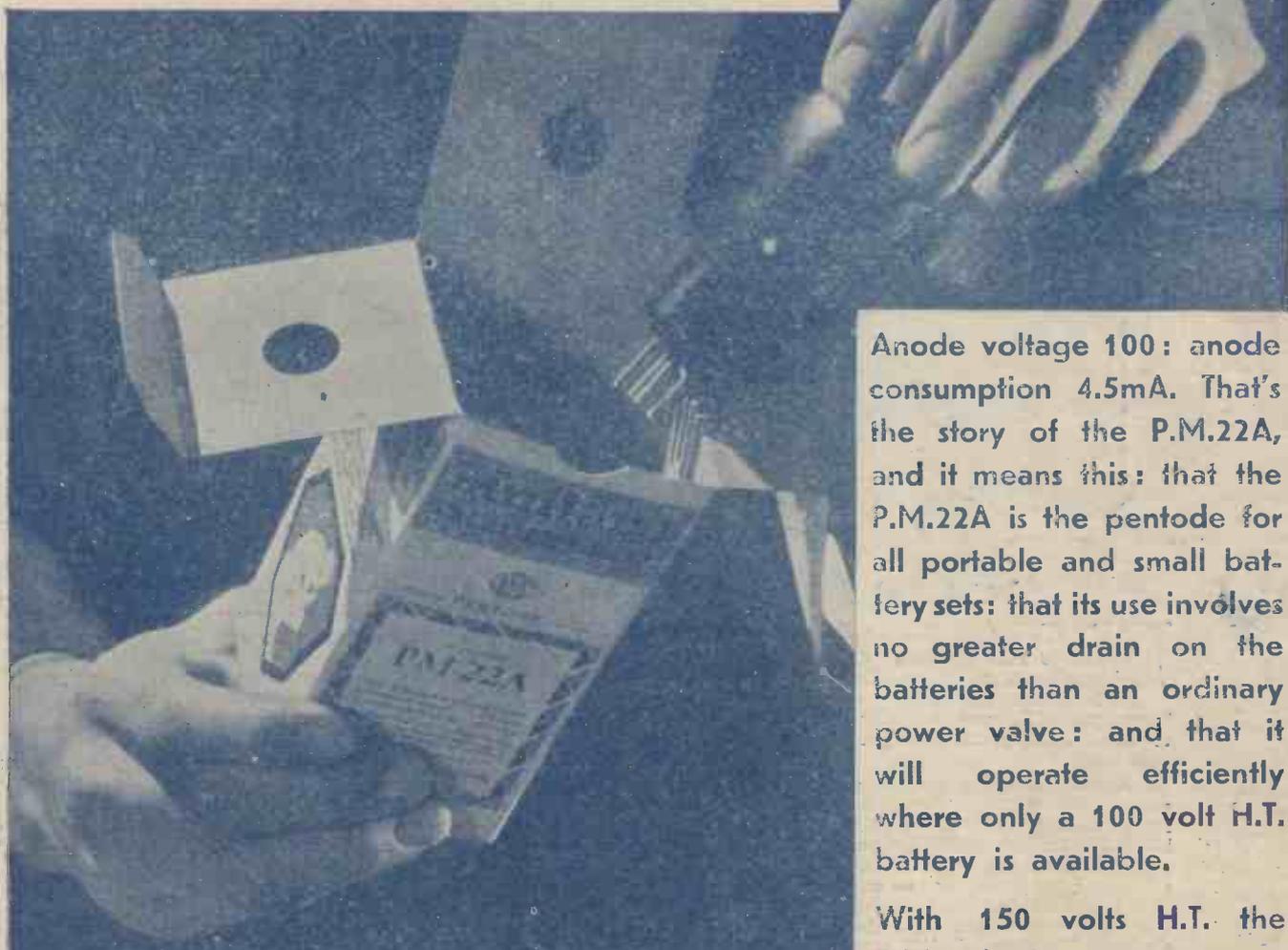
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