

SPECIAL EXHIBITION NUMBER

# Wireless

AND TELEVISION REVIEW

PRICE

6<sup>D</sup>



OLYMPIA

AUGUST

# RADIOOLYMPIA 1935

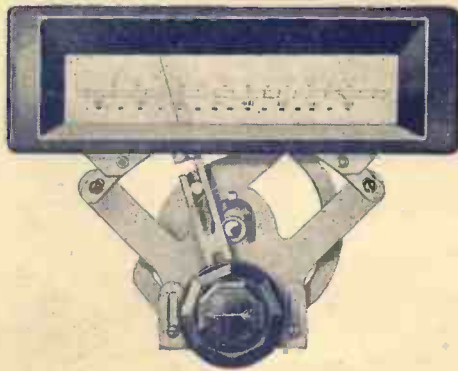
# S.T.600 BATTERY RADIOGRAM

## “Tuning O.K.?”



Baby 2-Gang Condenser, especially designed for the circuit.

Type S.T.2121 - - 10/6



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Type S.L.9a - - 6/6

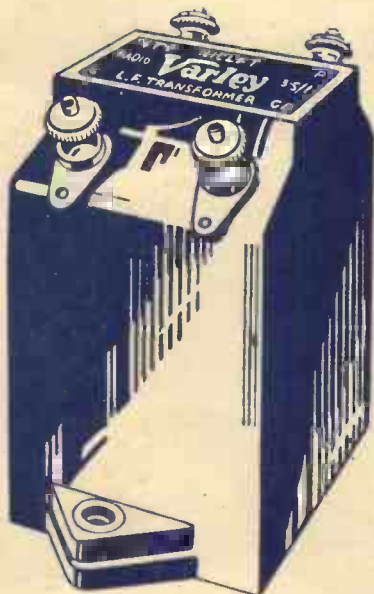


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As some of the arrangements and specialities described in this Journal may be the subjects of Letters Patent the amateur and trader would be well advised to obtain permission of the patentees to use the patents before doing so.

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0—250 "	0—500 "
0—500 "	
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Three-valve battery-operated receiver with moving coil speaker, pentode output. Complete with batteries **£7.19.6**



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Four-valve battery-operated superhet receiver with moving coil speaker. Push-pull pentode output **12 GNS**



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**MODEL 441 RECEIVER**  
Five-valve (inc. rect.) AC superhet receiver with adjustable QAVC. Exceptional value at **12 1/2 GNS**

**NOT ILLUSTRATED**

Model 540 DC Superhet Radiogram	21 GNS
Model 180 Speaker	8 GNS
Model 170 Speaker	£4 15 0
No. 11 pick-up unit	3/6

Keep this page. It shows you "His Master's Voice" 1936 Pedigree Radio instruments. Fuller information about them can be obtained from Stand No. 77 at Radiolympia.



**MODEL 442 RECEIVER**  
Five-valve (inc. rect.) AC superhet receiver with "fluid-light" tuning, AVC and static suppressor **13 1/2 GNS**



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**MODEL 800 High-Fidelity AUTORADIOGRAM**  
Fifteen-valve (inc. two rectifiers) AC superhet, for all-wave reception. The finest instrument ever produced **110 GNS**

**"HIS MASTER'S VOICE"**

Radio  
STAND NO  
**77**

# VOICE

1936 Pedigree RADIO

Records  
STAND NO  
**82**

The  
Editor's  
Chat

# Wireless

## & TELEVISION REVIEW

### The Largest Radio Exhibition in the World and The S.T.600 Radiogram

THE Radio Exhibition this year is almost overwhelming in its size and in the character of its exhibits. It is undoubtedly the largest in the world, and both as an exhibition pure and simple, and as an exposition of modern radio, it is a triumph for the British Radio Industry.

#### In the Van

It used to be accepted as a fact that wireless in this country lagged two years behind wireless in the United States. But this is no longer true. Where comparisons can be made, and this is not always so easy as might at first be thought, it is the opinion of impartial critics that British Radio is equal, if not superior, to that of any other country.

This is probably largely due to the fact that we enjoy the benefits of both keen competition and at least a measure of national co-ordination.

To the former we are indebted for the remarkable advancement in mass production methods and the evolution of really high-grade apparatus embodying the latest refinements and listed at prices within the reach of all. And then there is the Radio Manufacturers Association which is a body that holds together the individual entities of the industry in friendly co-operation and which crystallises its beneficent policy of common action in an exhibition so well organised that it grows year by year in size and popularity.

The Jubilee Radiolympia is a breathtaking display. Those who are interested in the technical aspects of set design and construction will find

material enough to keep their attention occupied through many visits.

During the twelve months that have elapsed since the last show, hundreds of thousands of pounds have been spent in research by the larger firms.

You will note that visual tuning, tone corrected volume control, compensated selectivity adjustment and a dozen other technical advancements are to be seen in instruments listed at reasonable prices.

But if you cannot go to Olympia yourself, you have the next best thing in this special show number of WIRELESS. We have made very special efforts to give you a really compre-

original model of John Scott-Taggart's S.T.600 Radiogram, full constructional details of which appear in this issue.

The S.T.600 Radiogram is the latest development of the great S.T.600 which was, of course, the most successful set of the past season. It inaugurated new standards of battery-set selectivity and general performance, and still further increased the reputation of its designer.

#### A Shop Window

In one or two quarters there has been a certain amount of criticism regarding the R.M.A.'s action of restricting the display of television apparatus at Radiolympia. But, after all, it is an R.M.A. show, and to be quite fair it must be admitted that this organisation has a right to exercise supervision of the exhibits. It has done so for years in regard to such matters as foreign-made apparatus, show-pieces likely to cause electrical disturbances, and so on, without much being said about it that was not entirely commendatory. The fact is, this great radio exhibition is primarily a shop window

for the industry, and television is not yet quite ready for a place in the shop window, except as an exciting future event.

An important alteration in the publishing date of WIRELESS AND TELEVISION REVIEW will be made next month. This journal will henceforth be on sale on the first of the month, or a day before if the first happens to be a Sunday.

Thus the September issue will be on sale on August 31st.

### All Visitors to the RADIO EXHIBITION

should make a special point of coming to see us at **Stand No. 13**, where there will be shown a wonderful scale model of Marconi's yacht, "Elettra," the original model of the S.T.600 Radiogram, and other notable home-constructor designs.

Our technical experts, who will be on our stand during the period of the Exhibition, will be delighted to give advice regarding readers' problems.

**DON'T FORGET STAND No. 13**

hensive and interesting survey of a show teeming with intriguing exhibits.

However, you must get along to Olympia if you possibly can. There will be technical experts at our own stand who will be delighted to see you and to discuss your radio problems. Also at our stand you will be able to examine a quite unique exhibit—a scale model of Marconi's famous yacht the "Elettra." There will be other interesting things, too.

For instance, we are showing the

# THE WORLD OF WAX

Some stories of stars of the gramophone who are at present to be heard on the halls, or by radio in this country.

**H**AVE you heard **The Street Singer** yet? No, I do not mean on his Decca records nor on the films, but in person. For he is touring the country, as you probably know, attracting great crowds wherever he goes.

Ever since his first success on records, in England, Arthur Tracy has been anxious to come over, but this is the first time he has escaped from his work in the States.

The title of *Street Singer* is one that Tracy has earned, not merely taken as a selling name. He actually was a singer in the street for a long time, starting at the very tender age of ten.

He was determined to learn music and, being poor, hit on the idea of singing in the alleys and side streets of Philadelphia so as to collect money to buy music. This went on successfully for some time till his parents, seeing that the boy was determined to be a singer, decided to scrape enough money together to send him to a tutor.

This step nearly lost *The Street Singer* to the world, for at his fourth lesson the voice his teacher regarded as so marvellous and had been "training" all out, packed up completely, and Arthur Tracy could do nothing but whisper for months. Specialists said he would never sing again, but with care and rest the voice gradually returned.

## Knows Ten Languages!

And it was then seen that the Caruso records he had so painstakingly bought with his collected coppers, and all his carefully marked sheets of music on which he had indicated Caruso's intonations and expressions, were to bear fruit.

For the course of architecture that he had started to follow when his voice went was cast aside, and Tracy left the Pennsylvania University where he had been for three years, though still teaching himself singing.

His parents saw again that nothing but singing would satisfy their son, and so he was sent to one of the largest music schools in Philadelphia. After a two-year course Tracy set out to seek his fortune.

He landed first in the road companies of several musical comedies. He sang all over the country and began to take up a hobby that was to become a most important part in his singing—the study of languages.

From that hobby he has built up a remarkable knowledge of ten languages besides English—French, Italian, Yiddish, German, Latin, Spanish, Greek, Hungarian, Hebrew and Japanese. He

## REGULAR RADIO LISTENERS



*The lady on the right is Hildegard, the popular cabaret and radio artist. She records for Columbia, and is here seen listening to her latest Cosson receiver.*

*Above we have Roy Fox and his band with a Pye set.*

thus has one of the largest repertoires known on the present stage. Then three years or so ago *The Street Singer* was discovered by radio, and since then he has gone on from strength to strength.

Here are a few notes on some of the recording favourites. If you want to find **Anona Winn, Layton, Norman Long, Leonard Henry, Eve Becke**, and some others in the flesh, keep an eye on the people appearing in the

famous "On With the Show" at Blackpool. These artists may not be there all the time, but if you are a visitor to that remarkable holiday resort pay the show a visit and you will be pretty sure to find one or other of them.

\* \* \*

**Kenneth and George Western** are at Eastbourne with their old school ties, in the Winter Gardens Show. **The Radio Three**, of whom I wrote a few months ago, have left Maurice Winnick and signed up with Lew Stone. It's the first time Stone has had ladies in his ensemble, as a regular thing, I believe, but this rhythm act will do nothing but good.

## A Firm Favourite

**Billy Cotton**, Regal Zonophone star, is a firm favourite among dance fans. He has broadcast quite recently, too, and the show he put over indicated without doubt the progress that he and his band have made.

But you want to see and hear Billy Cotton on the stage to get the full benefit of the band. It is essentially a stage combination, though his records are exceedingly good.

Born in Westminster, Billy left school to become a drummer in the Army. An early start, that. Crashed in the R.F.C. during the war, and was

seriously injured. After the big show of 1914-18 he started his own band and later played at the Exhibition at Wembley. Then to Brighton, Southport, Liverpool, and **Ciro's Club, London.**

It was from the latter that we first heard Billy Cotton on the air. Since then he has

appeared in practically every important cinema and music-hall in the country, for on leaving **Ciro's** he augmented his band and went all out into the stage band business.

We shall hear a great deal more of Billy Cotton, I think, for his band is still growing in popularity, and it only wants a few broadcasts to open the final doors to universal acclaim. It is a great band and fully merits its success.

K. D. R.

# The S.T.600 BATTERY RADIOGRAM

**JOHN SCOTT-TAGGART**

*By  
WIRELESS, F. Inst. P.,  
Ed. IRE.*

EVERY year at Exhibition time I have designed and described a radio-gramophone. Sometimes this has involved a new circuit, while at other times it has embodied a well-tried and popular arrangement.

This year I have incorporated the S.T.600 circuit, as it represents—for the constructor—the best current practice in my egotistical view, and apparently in the experience of a very large proportion of the wireless constructing public. This circuit was originally published in "Popular Wireless," and it will therefore be new to some readers of WIRELESS, especially those in foreign or distant lands. In this country, it is not likely that many constructors will have missed my original description and

so it is not my intention to devote much space to describing the original circuit.

The radio-gramophone is probably the ambition of every constructor of wireless receivers, especially if the gramophone portion and the cabinet can subsequently be used, as in the present



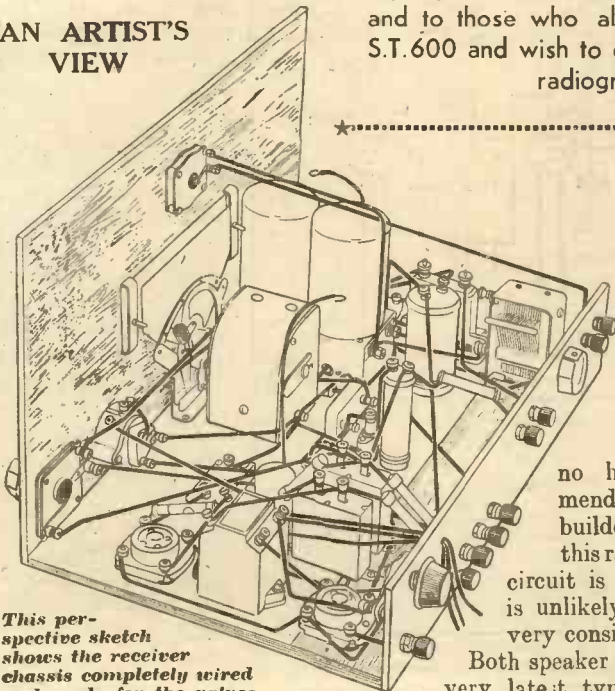
★.....★

"The radio-gramophone is probably the ambition of every constructor of wireless receivers," writes the world-famous author of this article which contains full details of a selective and powerful radiogram. It is an equally valuable design both to new builders and to those who already have the Battery S.T.600 and wish to convert it into a complete radiogram outfit.

★.....★

recommended, not only for this but many other sets, and an owner of the S.T.600 will certainly find the present design an extremely satisfactory one in which to embody his set. It is not my suggestion that the speaker and pick-up are the only ones which will give satisfaction, but they are eminently satisfactory and are representative of the very latest technique in their respective fields.

## AN ARTIST'S VIEW



This perspective sketch shows the receiver chassis completely wired and ready for the valves.

case, for future sets which the constructor might build, although I believe that once the S.T.600 Radiogram has been constructed there will be very few who will wish to change for a very long period. I have

no hesitation in recommending entirely new builders to commence on this radio-gramophone. The circuit is of such merit that it is unlikely to be displaced for a very considerable period.

Both speaker and pick-up are of the very latest types and can be fully

The S.T.600 circuit from the radio point of view consists of one stage of high-frequency amplification followed by a pentode detector, a triode "first L.F.," and a triode output valve. The H.F. valve is an H.F. pentode, and this construction ensures several benefits. Higher amplification is obtained with great stability; variable-mu control is provided and this enables variable selectivity to be obtained together with alterability of volume; there is a further and very special merit provided by aerial reaction, reaction being obtained from the screen-grid circuit.

### Employs Double Reaction

Double reaction, which was first introduced by the present writer many

years ago, was first suggested in a fully practical form in the S.T.400. It was subsequently used in the S.T.500, and reaches a climax of success in the S.T.600. The high-frequency circuits are two in number and reaction is applied to each, the reaction in the first case coming from the screen-grid circuit of the H.F. valve, and in the second case quite independently from the anode of the detector valve. The benefits to be derived from applying reaction to both circuits are (a) sensitivity, (b) selectivity. Neither control is essential to the success of the receiver when the local station is being received but for foreign reception, either reaction may be used—or both. Both reactions are employed where reception conditions are bad, e.g. a poor aerial, flat installations, daylight reception, or where interference is excessive.

**Very Great Sensitivity**

Some constructors, through lack of operating skill, have not obtained full benefits from double reaction and probably such set constructors would do equally well—if not better—without the aerial reaction at all. It might be wondered why I should say “do better,” since it is always possible to set the aerial reaction control at zero,

the knob being turned fully to the left. The reason is that if there is a knob there, even the most careless or inexperienced constructor will want to play with it, and, unless it is used with some care, conditions will be worse than if the knob were missing altogether. Although the advice seems simple common sense, it is impossible

**SPECIAL NOTE**

*Readers are specially requested to make a note of the fact that in future WIRELESS will be published at the beginning of each month and that the September number will be on sale August 31st.*

to persuade a constructor to avoid using the extremely valuable aerial reaction knob until he has gained some experience of working a wireless set.

Fortunately, the S.T.600 is an admirable receiver even without aerial reaction.

A feature which gives great sensitivity is the pentode detector valve, and the oddest aerial will give excellent signal strength with this set. Probably the most interesting feature of the S.T.600 was the introduction of an

Extractor circuit consisting of a high-efficiency iron-core coil and a tuning condenser. This Extractor circuit is connected in the aerial circuit and is tuned to the wavelength of any overpowering station which it proceeds immediately to cut out. The tuning varies with the particular part of the dial on which you are working.

For example, if you are working on a station near the Regional programme on the medium waves you would tune the Extractor to cut out the Regional, while if you were listening to a station near the medium-wave National, you would tune the Extractor condenser to cut out the National. The efficiency of the Extractor system depends not merely on the efficiency of the Extractor circuit itself, but on the remainder of the circuit with which it is associated. Failure to realise this fact has resulted in much disappointment in the past with rejectors, wavetraps, and similar devices.

**The Wonderful Extractor**

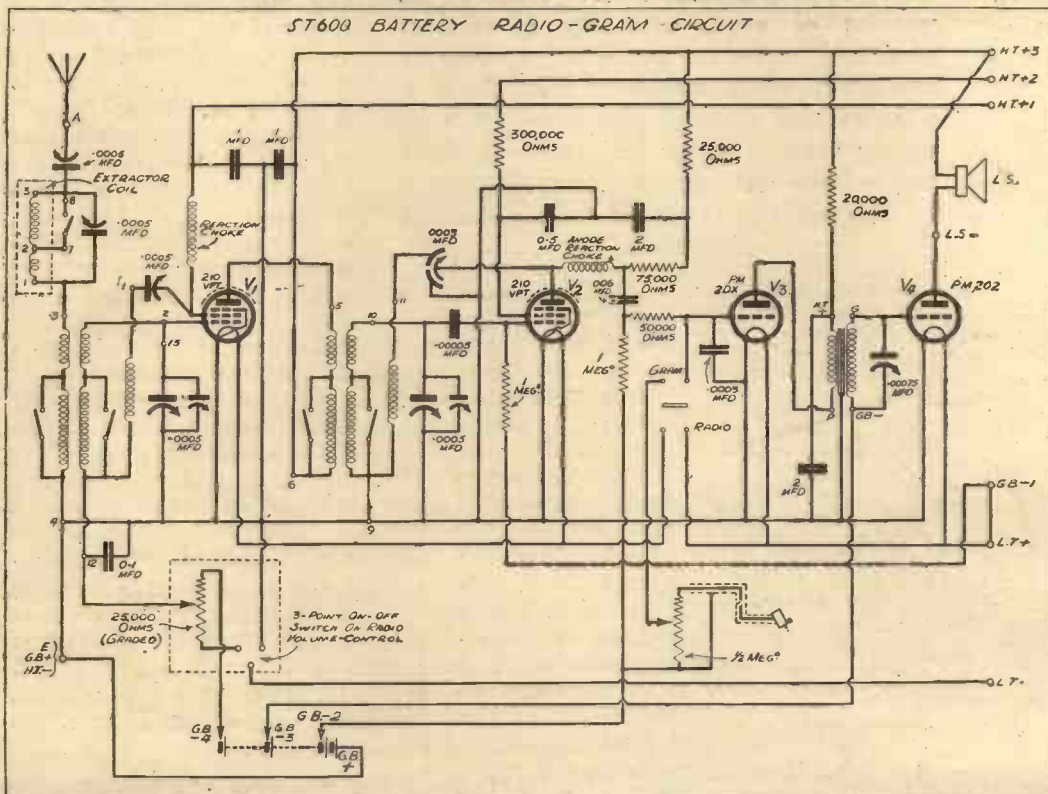
It is all important to see that certain theoretical conceptions are not flouted and the S.T.600 Extractor circuit represents, in my opinion, the highest peak in the rejection of a powerful local station. The operation is so extremely simple and takes such a short time—only a few seconds, in fact

—that the Extractor has proved an instantaneous success for constructors who have built the S.T.600. Once the Extractor has been used, the constructor wonders how he has ever been able to do without such a simple device for increasing the number of stations he can receive. The great merit of the Extractor system of obtaining selectivity is that it greatly enhances the general sensitivity of the set itself for other stations. Other systems of obtaining selectivity commonly involve some loss of signal-strength.

**“Enemies”**

Signal-strength and selectivity are enemies, and you cannot normally obtain one without injuring the other.

**THE CIRCUIT HAS MANY POINTS OF CONSIDERABLE MERIT**



From the radio point of view the circuit consists of one stage of high-frequency amplification followed by a pentode detector, a triode “first L.F.,” and a triode output valve. Variable- $\mu$  control and double reaction are incorporated.



The Extractor, however, does not affect signal-strength adversely but actually helps matters since there is no need for the constructor to reduce the sensitivity of the main set in order to obtain freedom from local interference.

From the gramophone point of view, the present design is of considerable interest. For the first time I have used a piezo-electric pick-up, and this gives very good quality indeed on records. There are several advantages claimed with justification for this pick-up. A good response is combined with bass compensation.

**Very Light**

The bass on electrically recorded records is deficient and proper recording of the bass on commercial records is probably impossible. If we cannot obtain in their correct proportions particular frequencies on a record, we can by suitable pick-ups or circuits accentuate or weaken these frequencies.

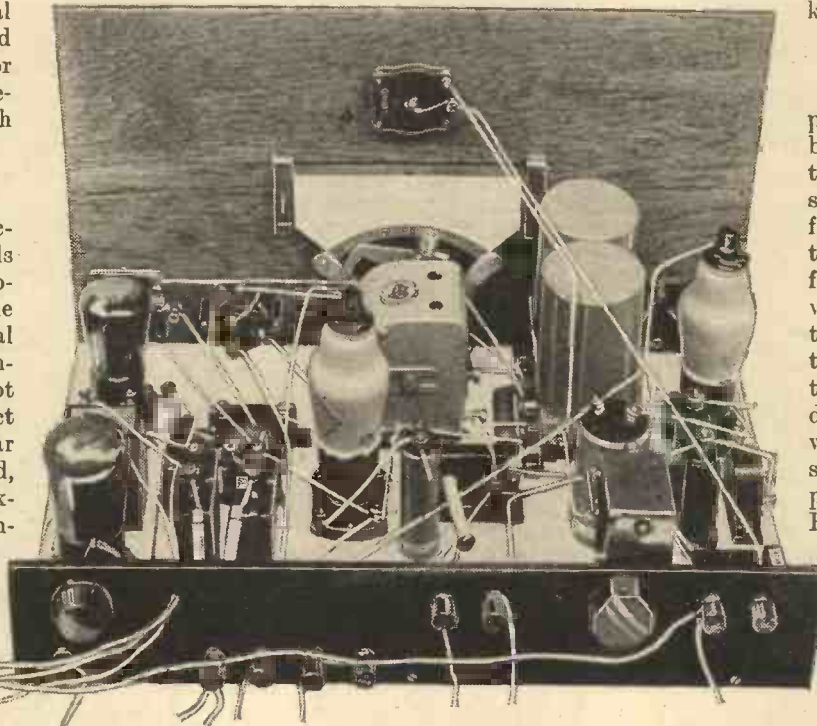
The classic example,

of course, is the reconstruction of Caruso's mechanically recorded records by modern methods. The quality of these old recordings has been improved beyond recognition.

Other merits of this pick-up include the extreme lightness of the pick-up and arm. The weight is only about one-third of that of the usual magnetic type of pick-up and several benefits

result from this lightness. There is little wear on the records, a very important factor to music-lovers who have to pay five or six shillings for good quality records. You know what a record will do to the point of the needle, but how many people ever think of what the needle does to the record? The needles used with this pick-up may be non-ferrous, such as Burma colour needles, which are especially kind to the record.

**THE COMPLETED SET**



**How It Works**

The principle of the piezo-electric pick-up is briefly as follows: The twisting of certain substances—their name, in fact, is legion—will establish electromotive forces which will vary with the amount of twist. Oranges certainly will—and even taxpayers might—produce such voltages when twisted. The substance used in the present pick-up is Rochelle salt, which is crystalline sodium-potassium-tartrate. The electric potential

**HERE ARE**

**THE PARTS**

Components.	Make Used by Designer.	Components.	Make Used by Designer.
1 Tone control, .00075-mfd. solid dielectric variable condenser	Polar (Compax)	9 Terminals, A., E., H.T.+1, H.T.+2, H.T.+3, L.T.+1, L.T.—, L.S.—, G.B.—1	Belling & Lee (type R)
1 Aerial coupler, .0005-mfd. solid dielectric variable condenser	B.T.S.	8 Wander plugs, G.B.—2, G.B.—3, G.B.—4, G.B.+1, H.T.—, H.T.+1, H.T.+2, H.T.+3	Clix
1 Aerial reaction condenser .0005-mfd. log. mid line	Graham Farish (Litlos)	1 Volume control with 3-pt. switch (on radio chassis for radio vol. control)	Bulgin G.M.25
1 Main coil assembly S.T.600	Colvern	1 Volume control for gramophone (mounted on motor-board)	Graham Farish 1/2-megohm
1 Extractor coil S.T.600	Colvern	1 Extractor tuning condenser .0005-mfd. air dielectric	Ormond (S.T.600 type with knob)
1 Two-gang condenser with drive incorporating front trimmer (special to this set)	J.B. (type S.T. 2121 and S.L.9A Dial)	1 L.F. transformer	Varley Niclet (standard 1:3.5)
1 1-mfd. fixed condenser	Graham Farish (Mansbridge type)	1 Terminal strip, 16x3x3/8 in.	Peto-Scott
1 1-mfd. fixed condenser	Dubilier (type 9200)	1 Baseboard, 16x10x1/8 in., with part Metaplex (Metaplex covers 16x7 1/2 in.)	Peto-Scott
2 2-mfd. fixed condensers	T.M.C. Hydra (300v. working, type 30)	1 Panel (walnut or oak-ply), 16x9 1/2x1/2 in.	Peto-Scott
1 .00005-mfd. fixed condenser	Lissen mica	4 Valveholders, 4-pin anti-microphonic	Benjamin Vibrolder
1 .0003-mfd. fixed condenser	Lissen mica	1 Pick-up	Rothermel-Brush Piezo-Electric, type S.8
1 .006-mfd. tubular condenser	T.M.C. Hydra (600v. working)	1 Radio-gram switch 4-pt. two-circuit	Bulgin N.C.5
1 0.1-mfd. tubular condenser	T.C.C. (type T.250-350v. D.C. working)	1 pair needle cups	British Rola (type F. 624 P.M.00 with terminals)
1 0.5-mfd. fixed condenser	Dubilier (type 9200)	1 Loudspeaker	Peto-Scott
1 Anode reaction condenser .0003-mfd. differential solid dielectric	Graham Farish (Litlos)	1 Cabinet (special to this set)	Garrard (type No. 20), with 7-inch handle
2 1-megohm mounted resistors	Ferranti (type G.H.1)	1 Turntable motor	
1 25,000 ohm 1-watt resistor	Dubilier metallised		
1 75,000 ohm 1-watt resistor	Dubilier metallised		
1 20,000 ohm 1-watt resistor	Dubilier metallised		
1 300,000 ohm 1-watt resistor	Erie		
1 50,000 ohm 1-watt resistor	Erie		
1 Anode reaction choke	Wearite H.F.P.J.		
1 Aerial reaction choke	B.T.S.		

VALVES. 2 COSSOR 210 V.P.T. 4-pin, 1 MULLARD P.M. 2 D.X., 1 MULLARD P.M. 202



between opposite surfaces of this salt is proportionate to the pressure applied—a very valuable feature from a radio or gramophone point of view. The salt is soluble in water and some device for water-proofing is required. There are other commercial considerations which have taken Rochelle salt crystals out of the laboratory and into the home of gramophone users.

It is impossible to recite the whole history of "piezo" electricity,—the word "piezo" is derived from the

★.....★

*The great merit of the Extractor system of obtaining selectivity is that it greatly enhances the general sensitivity of the set itself for other stations. Other systems of obtaining selectivity commonly involve some loss of signal-strength.—J. S.-T.*

★.....★

Greek word for pressure,—but I was privileged to witness the remarkable early experiments in piezo-electric pick-ups in this country nearly fifteen years ago. Since then the device has been made available to the general public at such a low price that the original objections of cost are no longer valid. The manufacturers of the type of pick-up used with this set provide a most interesting booklet which gives far more technical details than could be given in the present article, and even general readers of this magazine would find the booklet of great technical interest.

**Smooth-running Motor**

The motor used in this radiogram is of an inexpensive but smooth-running type. There are more expensive models which may be purchased, but their chief merit to the average constructor would lie in the fact that they will run for a longer period without winding up. It has been felt that this merit does not justify, in the present case, the increasing of the price of the complete radio-gramophone.

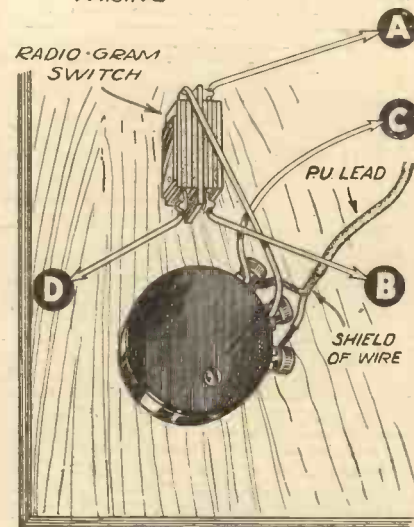
The cabinet is handsome but inexpensive, and, as I have already indicated, would be satisfactory for a large variety of sets. A radio-gramophone is, of course, not only a musical instrument but a piece of furniture, and those who actually see this cabinet at the Olympia Exhibition will agree that it is good value for money and an attractive furniture piece. It is necessary when ordering the cabinet to specify this particular set and the type of speaker used. The volume for gramophone records is the

maximum obtainable from the output valve, the pick-up being connected to the grid of the first L.F. valve. This ensures getting the absolute maximum of sound from the speaker, an important feature in the opinion of many.

The switching is particularly effective and it cuts out the first two valves when records are being played. This results in economy of H.T. and L.T. and there is no radio break-through on records. The switch, in one position, connects the volume control of the pick-up (a separate control on the motor-board) to the grid of the first L.F. valve, while the L.T. positive lead to the first and second valves is broken. In the other position of the switch the grid is disconnected from the volume control and the L.T. positive lead is re-joined.

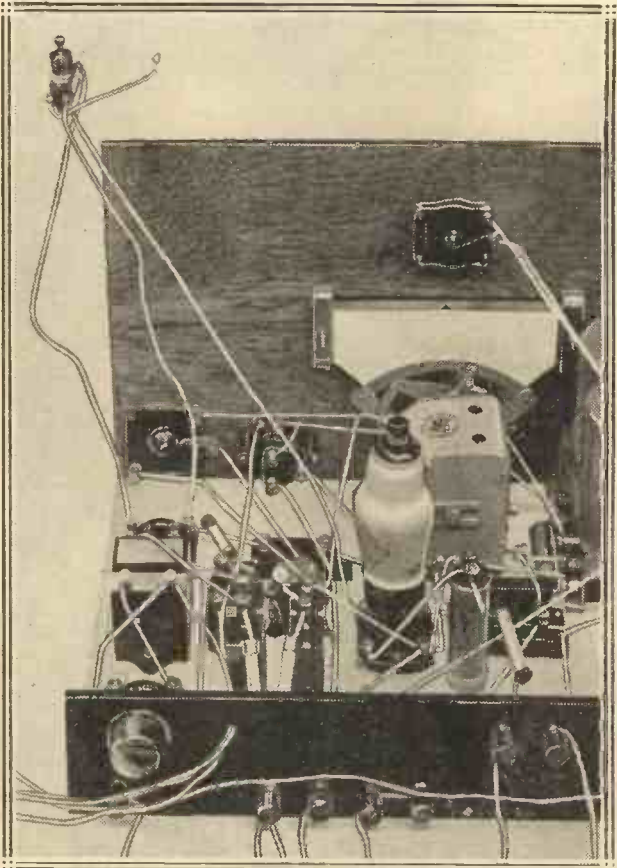
**"GRAM" COMPONENTS**

SUB-MOTOR-BOARD WIRING



The letters A, B, C and D on this diagram represent points on the radio chassis. A is the grid terminal on V3 valve holder, B the filament plus terminal on V3 valve holder, C the terminal connected to G.B.—2 lead on the 1-megohm grid resistance, and D the filament plus terminal on V2 valve holder.

**AT THE OUTPUT END**



In this photograph the valve seen in place is the pentode detector, which gives great sensitivity to the receiver. The knob on the terminal strip is for tone control.

A very hefty volume is obtainable from gramophone records, and this is increased by the improved sensitivity of the new type of loudspeaker. The transformer fitted to this loudspeaker, by the way, is designed for use with the style of output valve used, namely, a triode super-power valve.

Notes on the operation of this receiver and gramophone will be given in the next issue. Those who have already built the S.T.600 will, of course, require no instruction on this point.

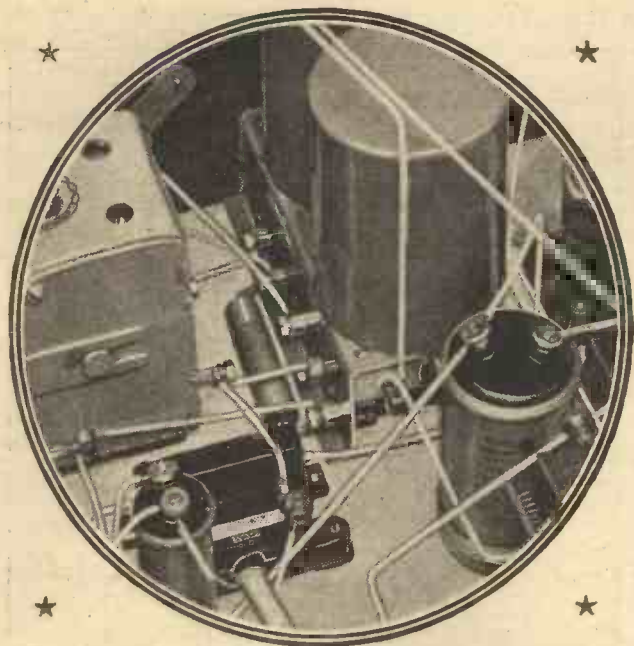
I now propose to give rather full constructional details regarding the building of the S.T.600 radio-gramophone.

**Constructional Notes**

The S.T.600 radiogram may, from a constructional point of view, be divided into the following sections :

- (1) The cabinet.
- (2) The loudspeaker baffle assembly.
- (3) The motor-board.
- (4) The radio chassis.
- (5) The two batteries and accumulator.

The cabinet is provided with (a) a motor-board which may be removed by releasing the four corner screws.



In the foreground of this photograph, just next to the smaller upright cylindrical condenser, can be seen the grid-leak and grid-condenser, both important components. The grid-leak is raised about 1/4 in. above the baseboard with cork spacers.

(b) the baffle-board assembly, which is designed for the particular speaker used (Rola), and (c) a skeleton shelf for supporting not skeletons but the radio chassis. This shelf is about half way up the cabinet.

The motor-board carries the gramophone spring-motor, the piezo-electric pick-up, the radiogram switch, the pick-up volume control, the two needle cups, one of which is for the unused and the other for used needles.

The speed regulator and stop for the gramophone motor appear on the motor-board, but are, of course, supplied with the motor.

### The Radio Chassis

The radio chassis really consists of an S.T.600 set constructed as originally designed but modified as regards some of the makes of components, and as regards the wiring necessary to provide an effective change-over from radio to gramophone. Details of this wiring are given in another section of this article and in the diagrams which accompany it.

Those who are not familiar with the S.T.600 will see from the illustrations that a wooden panel containing the main controls is fixed at right angles to a metallised baseboard which supports most of the components. A terminal strip of ebonite is screwed to the rear edge of the baseboard. The radio chassis is secured to the skeleton shelf by a screw passing through the baseboard into one of the cross-pieces of wood which form the skeleton shelf. The loudspeaker baffle assembly

consists of a baffle-board or panel with a circular hole of a size suited to the type of speaker used; the suppliers of the cabinet provide the correct size of hole; a baseboard is fixed at right-angles to the baffle panel, the panel and baseboard being firmly held together by means of two wooden side brackets or supports. This baffle assembly is withdrawn for fitting the speaker, which is mounted on the inside of the baffle panel, and then re-inserted into the cabinet so that the baseboard rests on the floor of the cabinet, where it is secured by a screw passing through the baseboard into the floor of the cabinet.

A 16.5-volt grid-bias battery is employed and is positioned alongside the radio chassis, as shown in the photograph. The high-tension battery and the 2-volt accumulator rest on the floor of the cabinet.

The interior of the cabinet is kept free from dust by means of a well-fitting back; the holes (in the back) provided to improve the acoustic

S.T.600. In the former case, of course, your work will be greatly simplified. Only a few alterations will be required to convert the radio chassis into the radio chassis for the radiogram. The only component that is altered is the pick-up terminal which is removed from the terminal strip at the back. The following wiring alterations will

\*.....\*

*A feature which gives great sensitivity is the pentode detector valve, and the oddest aerial will give excellent signal strength with this set.—J. S.-T.*

\*.....\*

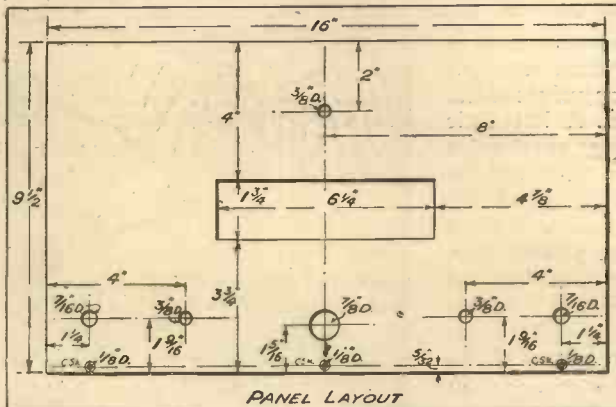
convert the original S.T.600 into the S.T.600 Radiogram radio chassis. The numbers of wires are those on the blueprint of the original S.T.600.

### Wiring Alterations

Remove wire 35 which connects the grid of  $V_3$  to the pick-up terminal, which, of course, is now itself removed. Remove wire 5 from  $V_1$  filament plus to L.T. + terminal on strip. Remove wire No. 32 from  $V_2$  filament + terminal to L.T. + terminal on strip. Connect with a new wire  $V_1$  filament + terminal to  $V_2$  filament plus terminal. This completes the actual wiring of the radio chassis.

The external connections are exactly the same as will be described later and apply equally to a converted S.T.600, or one built in accordance with the present description for incorporation in this radiogram.

### HOW THE PANEL IS DRILLED



The oblong hole in the centre of the panel is for the tuning condenser scale. The drilling is symmetrical, but should be carried out on the back of the panel.

properties of the cabinet, are covered with fabric.

### Procedure for Conversion

The steps taken to complete the S.T.600 Radiogram depend on whether or not you have already built the

### For S.T.600 Only

The above instructions are, of course, solely for those who already have S.T.600 receivers, and I need hardly emphasise that the conversion will be extremely simple, but that it is vital that the S.T.600 you already have should be in good working order. Some constructors have a touching faith that

a conversion operation, however slight, will turn a faulty set into a good one.

I now propose to give instructions for building the radio chassis, and these will apply to all those who are building the S.T. 600 for the first time.

In the first place I strongly advise you to adhere to the list of components recommended here or in the original S.T.600 article. You cannot do better than make an exact duplicate of the present set.

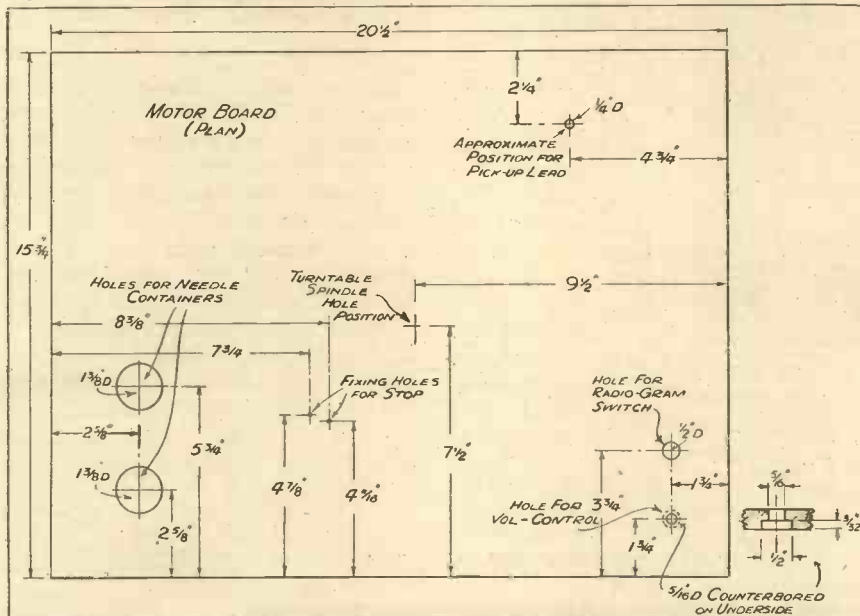
### Building the Radio Chassis

Collect and examine the required components. Handle the Extractor coil with respect; do not drop it on the floor. Do not remove the covers of the gang condenser. Do not permit

## EASY-TO-FOLLOW INSTRUCTIONS

template and drill the three holes for the gang condenser fixing screws and countersink these holes on the under side of the baseboard. The fixing hole positions for the drive should be prepared for screws but are not used at this stage in the construction of the set. The drive is fitted later because it is desirable to avoid

### FULL DETAILS OF THE MOTOR BOARD



A plan of the motor-board is shown above. The turntable spindle hole position is used to locate the motor mounting template given elsewhere.

any dust or tobacco ash to get into vulnerable parts of components. See that no soldering tags will touch other terminals or the metallising on the baseboard when in position.

### Using the Template

Take the gang condenser mounting template and lay it in its appropriate position on the Metaplex surface of the baseboard. This template is one which I have prepared myself and is reproduced on page 49. A good plan is to crease the template along the line marked "Front edge of baseboard" and to allow the folded strip to overhang the edge of the baseboard, so that the crease itself lies along the edge of the baseboard. The template may now be slipped along the baseboard until the middle line of the template is halfway along the baseboard, i.e. 8 in. from each side. Hold the template in this position with a weight, prick through with a bradawl the positions of the three mounting screws for the gang condenser, and the two fixing screws for the condenser drive. Remove the

damaging it while wiring is in progress. Mount the gang condenser on the baseboard.

Screw down the following in the order given: Main coil assembly so that its centre line comes four inches from the side of the baseboard;  $V_1$  valvholder, aerial reaction choke, 1-mfd. screen decoupling condenser, 1-mfd. Dubilier 9200, .00005-mfd. Lissen grid condenser, Ferranti 1-megohm grid leak, which is next to grid condenser, using bits of cork or metal washers at each end to raise this component about  $\frac{1}{8}$  in. above Metaplex,  $V_2$  valvholder,  $\frac{1}{2}$ -mfd. Dubilier 9200 condenser, the two 2-mfd. condensers,  $V_3$  valvholder, 1-megohm Ferranti grid resistance (which is near the  $V_3$  valvholder and requires no raising from baseboard), .0003-mfd. Lissen condenser lying flat on baseboard, Wearite screened reaction choke, Niclet (do not screw fixing screws tightly at this stage),  $V_4$  valvholder, Extractor coil (treat this coil gently and handle it by its base only). Mark out and drill terminal strip

(unless bought ready drilled). Fit the terminals to the terminal strip by means of the square-headed nuts, retaining the hexagon-headed nuts for later use. Fix terminal strip to edge of baseboard, using three countersunk-head brass screws (I used three half-inch No. 4 countersunk-head brass screws). If the holes are not countersunk do not use countersunk screws as they would split the strip. Mount .00075-mfd. tone-control condenser and .0005-mfd. Ormond Extractor condenser on strip.

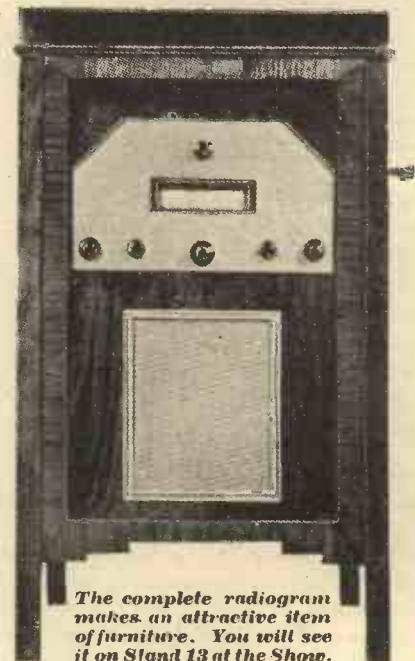
Complete all the baseboard and terminal strip wiring with stiffish insulated wire; a very convenient form of wire to use is the "pull-back" type (it is sometimes called Push-back and even Slip-back!). The positions of the wires as distinct from the points which they connect may be followed by consulting the various photographs.

### Drilling the Panel

Mark out and drill your panel unless it has already been bought ready drilled. The panel is, of course, of wood and is some  $\frac{1}{2}$  in. thick, plywood being essential, unless you are the fortunate possessor of some well-seasoned dry timber which is not likely to warp or to act as a leak.

One of the most convenient methods of cutting out the rectangle for the escutcheon is to bore four holes about  $\frac{5}{8}$  in. diameter just inside each corner, i.e. not going beyond the boundaries of the rectangle. The four holes can then be joined along the sides of the rectangle with a key-hole saw, a fret-saw, or even a hacksaw blade held in

### A FINE APPEARANCE



The complete radiogram makes an attractive item of furniture. You will see it on Stand 13 at the Show.

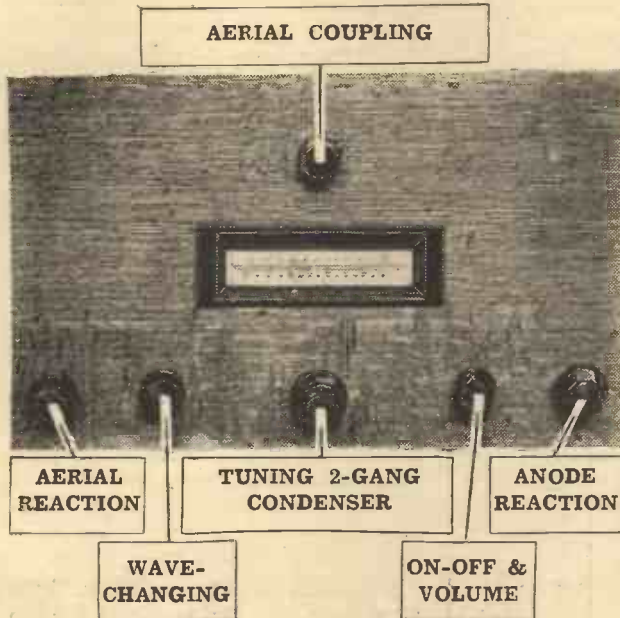
the hands. The corners of the rectangle can be cleaned out with a file. Fit the escutcheon to the panel.

Leaving consideration of the panel for the time being, turn your attention now to the fitting of the drive for the two-gang condenser. Turn the spindle of the two-gang condenser fully anti-clockwise. Take the condenser-drive

condenser (keep the moving vanes terminal clear of the metallised base-board to which it would otherwise short-circuit; the tag of this terminal should also be kept clear). Fit the combined volume control and 3-pt. switch, the anode reaction .0003-mfd. differential condenser (keep the lower fixed vanes terminal clear of the

metallised baseboard to avoid short-circuiting). Fit the aerial coupler .0005-mfd. condenser.

**THE DUTIES OF THE VARIOUS KNOBS**



You may now complete the wiring of the radio chassis. Fit the knobs to the controls on the radio chassis.

Now turn your attention to the motor-board. To clear the way for removing the motor-board, take out the two fixing screws from the lower end of the lid support. The lid may now be gently rested back in a horizontal position; leaving the motor-board in the cabinet, mark the

position, which you have already marked on the motor-board. Turn the template round on the pin until the line marked "parallel to front edge of motor-board" on the template lies parallel to the front edge of the motor-board.

★.....★

**COME AND EXAMINE  
THE S.T.600  
BATTERY RADIOGRAM**

on  
**STAND No. 13**

★.....★

The best way of checking if this line is actually parallel to the edge is to measure its distance from the front edge of the motor-board, taking the measurement at each end of the line. The distance should be  $7\frac{1}{16}$  in., but if you do not happen to have this exactly correct the two distances should nevertheless be equal. Hold the template in this position by means of a weight and mark through the positions for the three motor fixing holes and the speed-regulator spindle hole. On the template there is a line to assist in fixing the speed regulator. Mark this line through on to the motor-board by pricking through this line

with a bradawl, or other sharp-pointed instrument, at several points on the line, taking care that these marks do not extend beyond the area which will be later covered by the turntable, as otherwise they would be blemishes.

**THE TURNTABLE PART**



To the right of the turntable at the back can be seen the pick-up, and the radio-gram switch and volume control can be seen in front. To the left are the needle cups.

**Avoiding Mistakes**

Since there is some risk of mistaking the dots on the dotted line for one of the hole positions, it is desirable to make the marks much less heavy than the others, or

**Completing the Wiring**

The grub-screw in the condenser drive can now be tightened up, linking the drive with the gang condenser spindle. Connect the fixed vanes of the front trimmer by means of the wire provided to the fixed vanes of the front section of the gang condenser, i.e. to the terminal which is connected to No. 13 on the coil unit. Slip the panel into position and screw it on to the front edge of the baseboard by means of three countersunk-head brass wood-screws.

Fit the aerial reaction .0005-mfd.

position of the turntable spindle hole. Now take the template giving the hole positions for mounting the motor. Take a pin or other sharp-pointed instrument and prick it through the turntable spindle hole position on the template. Now place the pin's point on the turntable spindle hole

even with an instrument which makes a different kind of mark. Before removing the template make a note of the distance from the front edge of the motor-board to the line on the template marked "parallel to front edge of motor-board." This distance will be used later in marking the position

of the winding handle in the side of the cabinet.

The remaining hole position on the motor-board must now be marked, but without the aid of a template; measurements required for marking these holes are given in a drawing accompanying this article.

Remove the four corner screws which hold the motor-board in position and then lift the motor-board out of the cabinet. With the exception of the hole for the pick-up leads, all the holes in the motor-board should now be drilled. In the case of the larger holes you will find it a help to drill small pilot holes first, also to drill the holes part of the way from one side of the motor-board and to complete them by drilling from the other side.

**Special Sketch**

Note that the hole for the pick-up volume control is drilled in a rather special way. A small detail sketch of this hole is included with the motor-board plan. The two needle cups should now be fitted into the holes in the motor-board. You may find that they are too tight a fit in the 1 3/8-in. diameter holes, and that a little easing of the holes with a half-round file is desirable.

Now fit the motor to the motor-board by means of the three mounting screws. Keep the rubber washers between the motor and the motor-board, and the metal washers under the heads of the mounting screws. Make

★.....★

**THE TEMPLATES MENTIONED IN THE ARTICLE WILL BE FOUND ON PAGES 49 and 52.**

★.....★

sure that each of the three rubber washers is equally compressed so that the turntable will be horizontal when it is mounted later. Fit the radio-gram switch and volume control for the pick-up.

Now turn your attention to marking the hole position for the winding handle in the side of the cabinet. You have already made a note of the

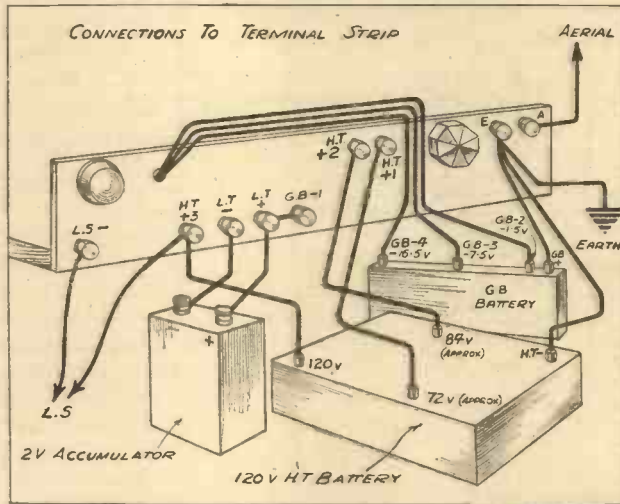
distance which this hole should be from the front edge of the motor-board when the motor-board is in position. Mark off this distance on the inside of the right-hand side of the cabinet, and then measure downwards and mark with a bradawl 9-16 in. below the level of the under-side of the motor-board when in position. Drill a pilot hole on this mark from the inside of the cabinet, and then drill a 5-16 in.

until the hole marked B comes nearest to the position which you have already marked approximately for the pick-up lead. Drill a 1/4-in. hole in the motor-board directly below the hole marked B. Leaving the template in position, take the gramophone pick-up and thread the lead through the 1/4-in. hole which you have just drilled. The base of the pick-up should now exactly cover the rounded end of the pick-up template. Hold the pick-up base firmly in this position and with a bradawl mark through into the motor-board the three fixing hole positions for the screws which will hold the pick-up base on to the motor-board.

**The Pick-up Rest**

Remove the pick-up and the pick-up template and prepare for screws the three screw-hole positions which you have just marked. Thread the pick-up leads once more through the 1/4-in. hole, and screw the pick-up down on to the motor-board by means of three screws. Fit the pick-up rest, making sure that it will not be in the way when a 12-in. record is being played.

**THE RADIO CHASSIS CONNECTIONS**



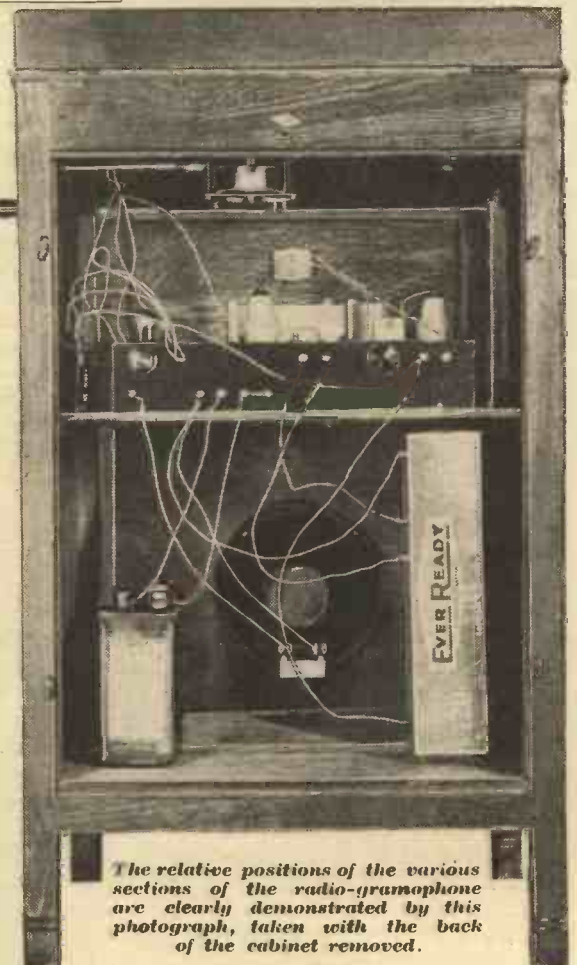
*This pictorial sketch will make quite clear how to connect up the batteries, aerial, earth and loudspeaker.*

hole from the outside of the cabinet.

Temporarily replace the motor-board in the cabinet. Fit the winding-handle escutcheon, which is supplied with the gramophone motor, on to the winding handle. Push the winding handle through the 5-16 in. hole in the side of the cabinet and screw the handle spindle (by turning the handle) into the appropriate bush on the gramophone motor. If the handle spindle screws too far into the bush, making the handle too short, the handle should be withdrawn and a small piece of wood or paper packing pushed into the bush.

Take the pick-up template supplied with the Rothermel-Brush gramophone pick-up, and slip it on to the turntable spindle, using the hole in the template marked A. Swing the template

**EVERYTHING IN PLACE**

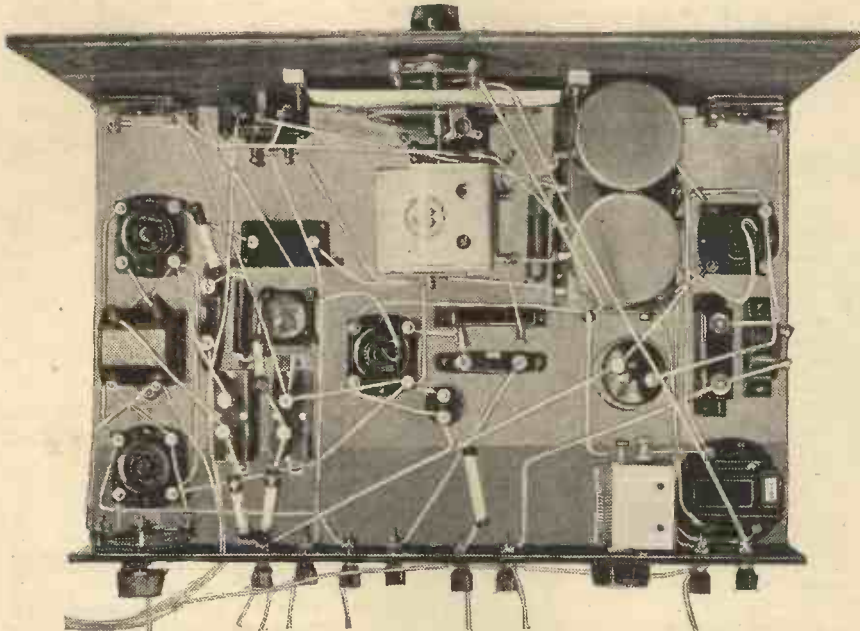


*The relative positions of the various sections of the radio-gramophone are clearly demonstrated by this photograph, taken with the back of the cabinet removed.*

Remove the winding handle. Tie the pick-up to the pick-up rest with a piece of wire or string. Remove the motor-board from the cabinet and carry out the sub-motor-board wiring. The leads from the pick-up consist of one insulated wire running inside braided metal sleeving. The leads should be cut one inch longer than is apparently necessary and the metal

turntable spindle speed is approximately 78 turns per minute. The speed regulating arm should now be released and swivelled until it lies along the dotted line which you have already marked on the motor-board. The speed regulating arm should now be tightened up again and the speed of revolution of the turntable spindle checked.

**A HELPFUL VIEW WHEN WIRING**



*A plan-view photograph of the set which will prove useful when wiring the radio chassis if it is compared with the wiring diagram on page 8.*

braiding unraveled by means of a pin down to 1½ in. from the freshly cut end.

The unraveled braiding should now be twisted together and connected to the pick-up volume control terminal which is later connected to G.B. — 2. The wires for connecting the motor-board components to the radio chassis should be prepared at this stage. These wires should be connected to the motor-board components, the other ends being left free for later connection to the radio chassis.

**The Final Assembly**

Slip the radio chassis into position in the cabinet and secure it by means of a screw passing through the unmetallised strip of the chassis base-board into the shelf. Replace the motor-board in the cabinet, and secure it in position by means of the four corner screws. Fit the winding handle and secure the winding handle escutcheon to the side of the cabinet.

Wind up the gramophone motor and fit a small card on to the turntable spindle so that you can easily count how many times it turns round in a given time. Fit temporarily the speed regulating arm and adjust it until the

Extend the speed regulating arm and slip into position the speed indicating strip, making sure that it will be visible when a 12 in. record is being played. The speed indicating strip should be adjusted so that 78 comes opposite the pointer on the speed regulating arm. The speed indicating strip can now be screwed down on to the motor-board.

Fit the turntable stop and then give it a trial with the turntable in position. If any adjustment is required it can easily be effected by slackening the stop fixing screws and swivelling the stop slightly. Fit the turntable and the spring washer which secures the turntable on the turntable spindle. Refix the lower end of the lid support.

Complete the motor-board-to-radio-chassis wiring by means of the wires which you have already prepared.

Secure the loudspeaker to the baffle assembly by means of four round-headed brass screws which pass through the rim of the loudspeaker. *You will be well advised to carry out this operation in a place which is perfectly free from iron filings or other stray magnetic materials.* The screw-driver, too, should be quite free from iron filings.

**THE POWER SUPPLY BATTERIES.**

- H.T. Drydex, G.E.C., Ever Ready, Lissen.
- G.B. Drydex, Ever Ready, Lissen.
- L.T. Exide, Block.

Slip the loudspeaker and baffle assembly into the cabinet. Secure the baffle assembly to the floor of the cabinet by means of a screw passing through the base of the baffle assembly. Wire up the loudspeaker to the radio chassis, the connections being made to L.S. — terminal and H.T. + 3 terminal as shown in the diagram.

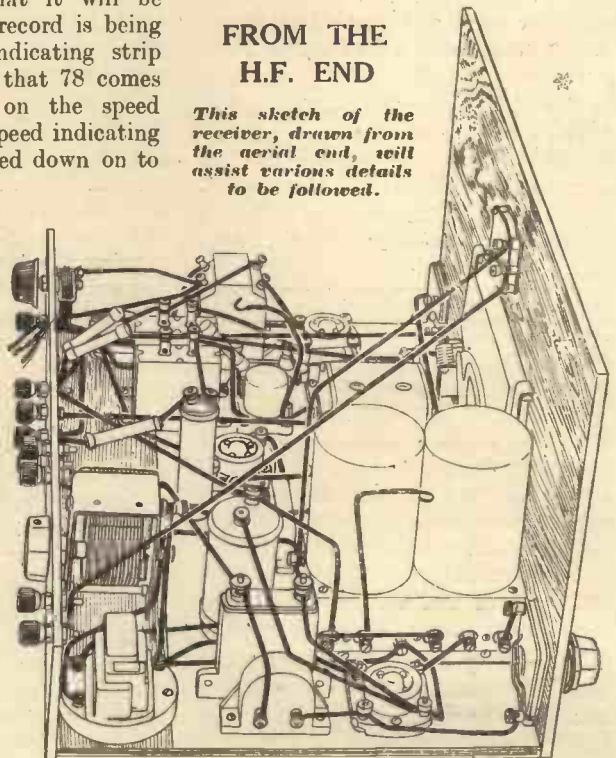
Place your high-tension battery and two-volt accumulator on the floor of the cabinet. The grid-bias battery rests on the same shelf as the radio chassis. Complete the wiring to the three batteries, and make connections to your aerial and earth.

The back of the cabinet can now be fitted and your radiogram is ready for operation.

J. S.-T.

**FROM THE H.F. END**

*This sketch of the receiver, drawn from the aerial end, will assist various details to be followed.*





# RADIO LYMPIA 1935

**AMALGAMATED PRESS, LTD.**  
Stand No. 13.

If you enter the exhibition by the Radio Theatre and could walk almost exactly diagonally across you would come upon one of the most interesting stands in the whole show. We say that not because it is the stand whereon you will find members of the staff of this journal and its sister journal, "Popular Wireless," but because of the unusually absorbing things that are on view.

Right in the centre is a giant model yacht. What has that to do with radio? Everything, for the model is of Marconi's world-famous "Elettra," and this huge scale representation of the noted floating laboratory will attract tremendous crowds.

## HIGH QUALITY

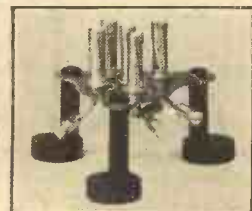


High-class condensers that are typical of the Dubilier range. The two upright types are mica condensers, and the other is one of the '1-mfd. tubulars.

In addition there will be Mr. Scott-Taggart's own model of the E.T. 600 Battery Radiogram, which is fully described on other pages in this issue. Come and study this set before building it. And ask questions, too, of the special technical staff that will be in attendance throughout the exhibition.

Another item of unusual interest is the double channel receiver that has been designed by "Popular Wireless," and will be on view. It enables long or medium waves and the short waves to be tuned in and listened to at one and the same time, and is one of the novelties of the exhibition.

This receiver opens up a new vista of home entertainment and is certain to capture a great deal of attention throughout the period of the Radio Exhibition. We are not going to say any more about it here, but just ask you not to miss it.



The Clia short-wave baseboard mounting valve holder is on insulating pillars.

Of course there will be sets, plenty of them, and covering all sorts of requirements. And there is a short-wave adaptor and other gear that will illustrate the trend of radio towards perfection in all directions.

Once more we hail the opening of Britain's Greatest Show—The Radio Exhibition at Olympia. Again it is in August, starting on the 14th, and closing on the 24th. The show will be open at 11 a.m. each day, Sunday excepted, of course, and will close at 10 p.m. The price of admission is 1s. 6d. In the following pages is a brief summary of some of the things you will see at Radiolympia.

Don't forget to come along and bring your friends. Come and see the sets. Come and ask as many questions as you like. You will all be welcomed.

**AERODYNE RADIO, LTD.**  
Stand No. 72.

This Tottenham firm is showing a number of receivers of various types all at remarkably cheap prices. For instance, there is the "Thrush" S.G. battery set at £6 17s. 6d., less batteries. The "Nightingale" S.G. Band-Pass Receiver at £1 more, and the "Silver Wing" 6-stage A.C. Superhet at 11 guineas.

## MODULATED OSCILLATOR

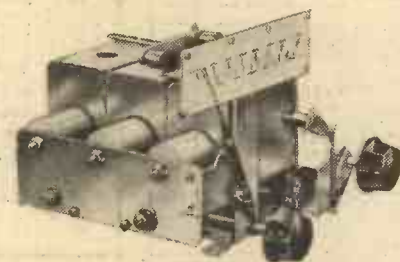


Haynes Radio have turned out this attractive oscillator for purposes of receiver testing and station identification.

These three sets were first introduced for the Jubilee, but are naturally being continued through next season.

New receivers worth special attention are the "Snipe," an S.G. pentode battery three, which retails at £5 17s. 6d. without batteries; and the "Bluebird," a four-valve mains receiver in two

models, one for A.C. at 8½ guineas, and the other for universal mains at half-a-guinea more. Finally, there is the "Silver Wing" universal at 11½ guineas.



One of the outstanding components of the Show—a Varley permeability tuner.

**AUTOMATIC COIL WINDER AND ELECTRICAL EQUIPMENT CO., LTD.**  
Stand No. 103.

Noted for their AvoMeters and testing instruments, the Automatic Coil Winder Co. invariably have a most interesting stand at the radio exhibition. It is a stand which no constructor should miss, and which contains apparatus which is well within the financial reach of most of us.

From the testing accessories at 2s. 6d., right up through the D.C. AvoMinor and its Universal brother, to the two AvoMeters and AvoOscillator, we have a most interesting and valuable range of measuring devices, and this year we welcome a new-comer in the form of a completely redesigned AvoOscillator, incorporating such refinements as waveband switching, variable attenuator, dummy aerial, and so forth.

And also there is the Avo Signal Generator, a modulated oscillator, built on more ambitious lines and incorporating separate valve modulations and completely variable constant impedance variable attenuator, and special iron-cored coils covering right down to ultra short waves.

We guarantee that stand No. 103 will make every true constructor's mouth water!

## PURE REPRODUCTION



The High-Fidelity Marconi phone loud-speaker with non-directional cone.

# How To Get To OLYMPIA

## YOUR SIMPLEST ROUTE

### FROM THE CITY AND WEST END.

#### VICTORIA

**UNDERGROUND:** District Line to Addison Road (change at Earls Court), Barons Court or West Kensington Station.

**BUS:** Route 52 to Knightsbridge, change to route 9, 33, 73, 73A, 73B, 73C.

#### WATERLOO

**UNDERGROUND:** Bakerloo or Edgware-Morden Line to Charing Cross, thence District Line to Addison Road (change at Earls Court), Barons Court or West Kensington.

**BUS:** Route 1 or 48 to Charing Cross, thence Route 9 or 33.

#### LONDON BRIDGE

**UNDERGROUND:** Edgware-Morden Line to Bank Station, change via escalator to Monument Station, thence district line to Addison Road (change at Earls Court), Barons Court or West Kensington Station.

**BUS:** Route 13 to Charing Cross Station, change to route 9 or 33.

#### HOLBORN VIADUCT

**UNDERGROUND:** Central London Line from Post Office Station (a short walk) to Shepherds Bush Station, thence-Bus 49 or 26 Metropolitan

Line from Farringdon and High Holborn Station (two minutes' walk) to Addison Road Station, change at Edgware Road Station.

**BUS:** Route 17 to Bond Street, change to route 73, 73A, 73B, 73C.

#### CHARING CROSS

**UNDERGROUND:** District Line to Addison Road (change at Earls Court), Barons Court or West Kensington Station.

**BUS:** Route 9 or 33 (direct).

#### PADDINGTON.

**UNDERGROUND:** Metropolitan Line to Addison Road Station.

**BUS:** 27 or 27A (direct).

#### EUSTON.

**UNDERGROUND:** Edgware-Morden Line to Charing Cross, change to District Line, thence District Line to Addison Road (change at Earls Court), Barons Court or West Kensington Station. Metropolitan Line from Euston Square Station (three minutes' walk) to Addison Road, change at Edgware Road Station.

**BUS:** 73, 73A, 73B, 73C (direct).

#### ST. PANCRAS

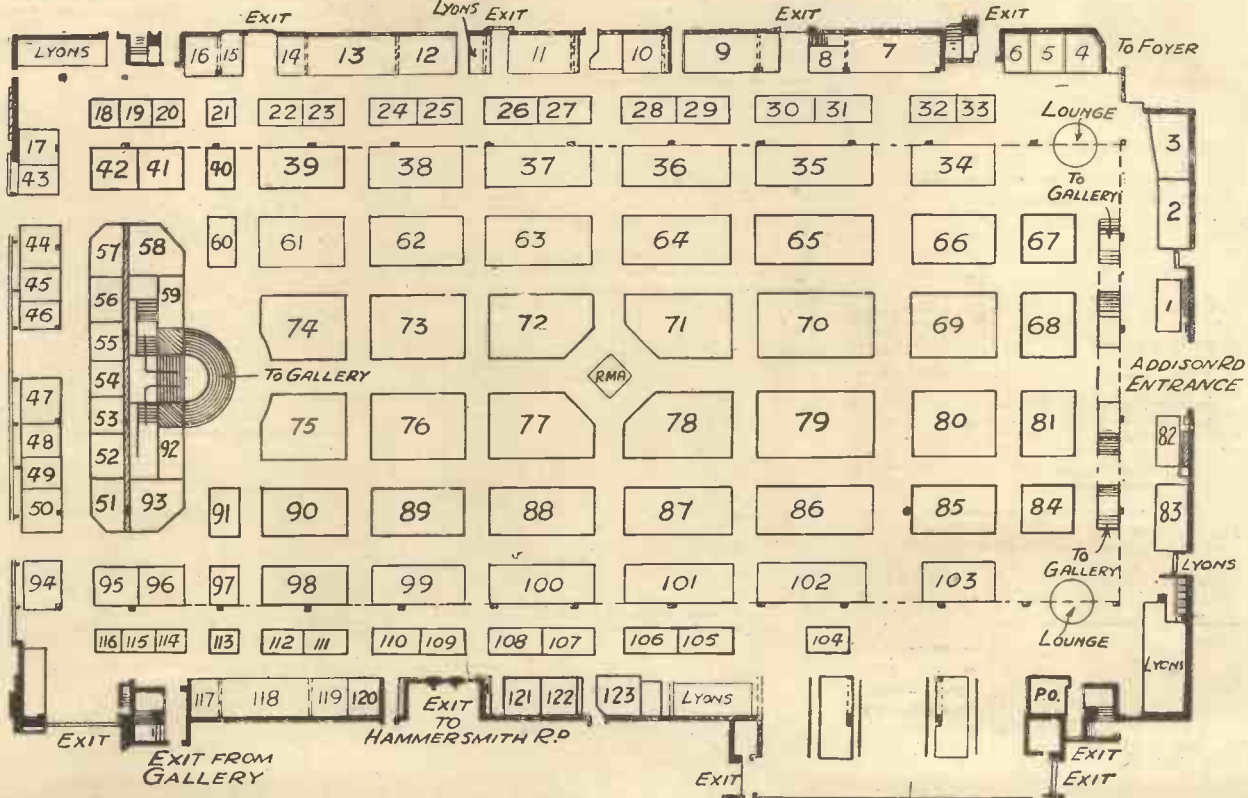
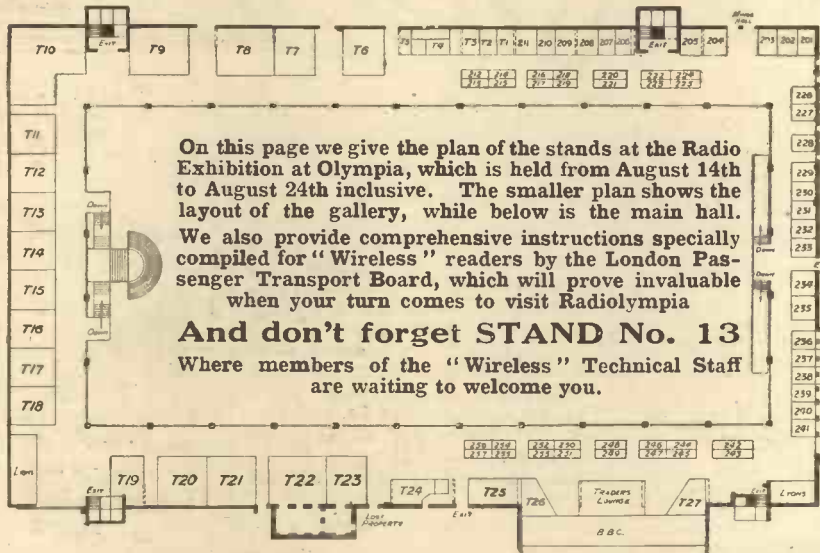
**UNDERGROUND:** Metropolitan Line from King's Cross and St. Pancras Station (two minutes' walk) to Addison Road Station, change at Edgware Road Station; Piccadilly Line to Barons Court Station.

**BUS:** Route 73, 73A, 73B, 73C (direct).

#### KINGS CROSS

**UNDERGROUND:** Metropolitan Line from Kings Cross and St. Pancras Station (subway connected) to Addison Road Station, change at

(Please turn to page 46)



THE MAIN HALL AT RADIOLYMPIA

To RADIO THEATRE

**COMPACT POWER**



A popular H.T. battery of most convenient size.

**BELLING & LEE LTD.**  
Stand No. 91.

Apart from the more usual lines which one expects to find on the Belling & Lee stand, such as terminals, volume controls, and so forth, there is this year an ingenious revolving display which shows the various Belling-Lee interference suppression devices visibly and audibly suppressing the electrical interference created by different types of appliances which run in turn.

The complete list of suppression devices includes the standard general purpose suppressor; one for small unearthed meters; a D.C.

**A MINUTE RECTIFIER**



Where an H.F. rectifier is required, we can recommend this Westector. It takes up very little space.

hum suppressor; special units for flashing signs, and for lifts; and kits of suppressors for the electrical equipment of motor-cars.

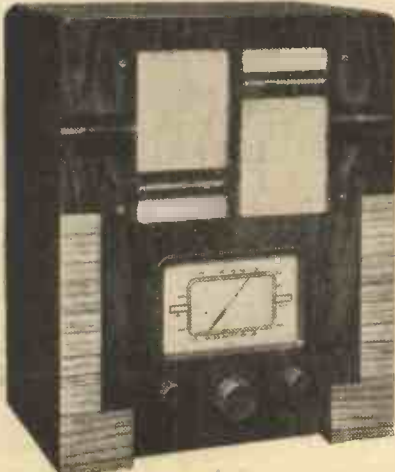
In connection with all these anti-interference devices, a special Manual has been brought out by the firm which, at one shilling, is truly remarkable value.

An attractive feature of the stand is the special inquiry bureau, and readers who have questions to ask concerning the products are heartily invited.

**BENJAMIN ELECTRIC CO., LTD.**  
Stand No. 42.

Do you remember the Double Six speaker of last year? Of course you do; it was one of

**A NEAT DIAL**



A particularly neat tuning dial characterises this Kolster Brandes, type K.B. 426 receiver.

THE things that people went to have a look at in Olympia. Well, this year the same speaker will be shown again, and also its little brother, the Thirty-Three. You know how excellent the former is, so you should be eager to go and hear how fine the smaller member of the family can be.

And it is not all that small, either, for it will handle up to 7 watts of undistorted speech input, and the response curve is not to be dismissed as any small accomplishment.

The two speakers will, of course, be the main items of dressing the stand, but also you will have a wide range of valve holders, Class B transformers, "Transfeedas," and so forth, to look at on the same stand.

**BRITANNIA BATTERIES, LTD.**  
Stand No. 40.

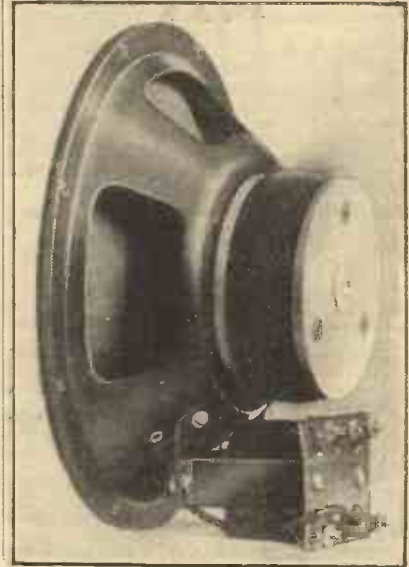
As our readers will probably remember, this is the firm which is responsible for the popular "Pertrix" non-sal-ammoniac batteries—and for the "Bull Dog" and "Meteor" sal-ammoniac types.

Pertrix batteries are divided into three ranges: yellow, blue and maroon series, and the prices range from 7s. 6d. for the standard 120-volt yellow carton battery, to 22s. 6d. for the giant power 120-volter in the maroon carton.

Besides the above batteries, however, there is the "Broadcast" range at special prices, these being 3s. for 60 volts, 5s. for 100 volts, and 6s. for 120 volts.

On this stand also, of course, will be found a wide range of "Pertrix" accumulators and grid-bias batteries.

**THE SOUL OF MUSIC**



The Celestion Junior 8 loudspeaker chassis.

The other extension speaker is complete with multi-tapped transformer and suitable for high impedance extension speaker terminals. The price is 35s.

Those speakers are also available in walnut cabinets at £2 15s. and £3 2s. 6d. each respectively.

A full range of field excited speakers in 6 inch and 8 inch diameters, and the new wholly dustproof car radio speakers are shown.

**BRITISH TELEVISION SUPPLIES.**

Stand No. 14.

A large number of new lines are to be seen on the B.T.S. stand, many of which have been brought out for the home constructor television market.

Among these, one of the most interesting is the new type Kerr cell, which is of particularly robust construction, and will be of special interest to those who are experimenting in mechanical television viewers.

A di-pole aerial kit, complete in every respect, will attract the attention of the short-wave enthusiasts, while numbers of smaller components such as H.F. chokes, short-wave coils and L.F. transformers, go to make up a thoroughly interesting exhibit.

Though not on view at the Exhibition, it will be of interest to readers to know that B.T.S. also are going into the market with television

**TAKING H.T. FROM THE MAINS**



One of the large range of Atlas mains units, the D.C. 20. It has three H.T. positive tappings.

**BRITISH BLUE SPOT CO., LTD.**  
Stand No. 23.

Although loudspeakers and pick-ups are still prominent members of the Blue Spot family, the stand will, this year, be largely devoted to the showing of complete receivers.

There is the Battery Three, which is claimed to have a particularly high performance; a four-valve universal set which has also been designed for low price distribution and popular appeal; it costs 9 guineas. Then there is the A.C.5, a four-valve superhet, plus rectifier, which gives over 2 1/2 watts output and has provision for pick-up and extension speaker; this costs 12 guineas.

Finally the radiogram model of this same receiver, called the A.C.5 G, is also being shown and costs 21 guineas cash. All the receivers, of course, can be obtained on the hire-purchase system.

We have mentioned the fact that speakers and pick-ups will be on view, and it is interesting to note that a new model pick-up at 27s. 6d. has been introduced, complete with volume control and with a rotating head and chromium plated finish.

Among the speakers there are three moving-coil types, priced at 19s. 6d., 32s. 6d., and 42s. 6d., with cabinet models at slightly higher figures.

**BRITISH ROLA**  
Stand No. 43.

All sorts of speakers, both mains and P.M. types, are to be seen here.

Special display is being given to the new G.12 high fidelity range of speakers. These are available in both D.C. and A.C. types, the former priced at £5 10s. and the latter at £7 15s.

In addition there are two special extension speakers. These are both of the 9 1/2 inch diameter wide-range type; one model is suitable for all extension speaker terminals with low impedance outputs. The price of this model is £1 7s. 6d.

**PLENTY OF MFDS.**



Two of the latest types of T.C.C. electrolytic condensers. They are of the 25-mfd. low voltage variety.

kits for home construction, and have already prepared blue prints for complete cathode ray exciter and time-base units.

**A. F. BULGIN & CO., LTD.**  
Stand No. 117.

The 1935/1936 programme of A. F. Bulgin is particularly ambitious, and many new lines have been added to their already vast selection.

Reduced prices are also being introduced, and there is no doubt that this go-ahead concern are out to do record-breaking trade during the coming season.

**VISIT US ON  
STAND 13**

The new Bulgin lines include a range of screened multi coils with terminals, covering aerial, H.F. transformer, tuned grid, band-pass, oscillator and intermediate transformer types.

Then there is a range of volume controls with ganged on-off switches; and a tremendous selection of chassis and baseboard mounting valve-holders in 5, 6, 7-pin types.

Interference suppression has also occupied the attention of A. F. Bulgin, and a very neat suppressor has been produced at the low price of 2s. 6d.

Mains resistances, for use with D.C. and universal valves are available at 15s. for the enclosed types, and 8s. 6d. for the semi-shrouded, and 3s. 6d. for the skeleton variety, while a long and comprehensive series of 4-watt wire-end resistances at 6d. each will provide a wonderful selection for the home constructor.

**BURNDIPT, LTD.**  
Stand No. 81.

Burndipt is one of the oldest names in the radio industry, and has been noted for high quality radio ever since 1920, so it is not surprising to find that Burndipt, Ltd., have a very comprehensive range of receivers and radio-gramophones at Radiolympia.

Incidentally, they have also a big range of H.T. batteries at competitive prices.

One of the most interesting of the sets is the 4-valve battery superhet portable C.N.218, in which the designers claim to have achieved full superhet efficiency despite such compact size. A high-efficiency moving-coil speaker is employed, and the whole receiver is housed in a cabinet of polished walnut, fitted with a special carrying strap, for the remarkably low price of 11 guineas.

In order to cater for the large number of listening public who are interested in short-wave reception, but don't wish to go to the expense of two separate receivers, Burndipt's introduce this year a three-valve all-wave set for battery use, and a mains four-valve all-wave receiver. Both these sets operate not only on the long and medium wavebands, but also on the short waves, and cost 8 and 10 guineas each respectively.

**BUSH RADIO.**  
Stand No. 85.

A wide range of superhets from the upright grand to the battery S.B.4 are to be seen here, and many interesting innovations have been

**A CRYSTAL PICK-UP**



The latest Edison pick-up employs the piezo-electric crystal principle and gives a high voltage output.

introduced into their designs, as will be judged from our review on another page.

One of the most interesting is the escalator dial, which is fitted to the S.A.C.21, and to the D.A.C.1. This scale is simple in operation, and the name "escalator" has been given to it for obvious reasons, for the pointer moves across a rectangular front diagonally, allowing the station names and wavelengths to be marked like steps along two parallel lines between which the pointer travels.

**CELESTION, LTD.**  
Stand No. 28.

No less than nine different loudspeakers in chassis and cabinet form are to be seen on the Celestion stand at Radiolympia this year. These range from the Junior 8 Permanent Magnet which, with its special multi ratio transformer with 50 matchings and the Celestion new permanent magnet, costs 35s., to the Senior Auditorium energised speaker, of which the A.C. model costs 18 guineas.

Between those figures there is a comprehensive range of speakers to suit every requirement and every pocket, while, in addition, the gramophone lover will be interested in the P.2. Pick-Up which, with incorporated volume control, is available for 29s. 6d.

**THE CHLORIDE ELECTRICAL STORAGE CO., LTD.**

Stand No. 59.

Exide. That is the name that is blazoned on this stand, and the name that will recall to every visitor memories of reliability in battery service, and will suggest further feelings of safety in the future.

The recently introduced Exide Ironclad radio battery—the battery with the submarine

**MODERN VALVES**



The new Osram N41 valve. It is a steep slope output pentode having most efficient characteristics.

battery plate"—as it has been called—having an Exide Ironclad slitted tube positive plate and incorporating the visible charge indicating dial which was the outstanding feature in last year's Radio Exhibition, are shown on the stand,

together with examples of other low tension and high tension batteries.

A number of entirely new radio batteries are shortly being introduced.

They are designed for use with transportable and table sets and will be capable of giving higher discharge rates, found necessary owing to the increasing use of more valves or valves having higher filament current consumption.

Specially designed polished wood crates to hold Exide 60-volt batteries are also shown.

The range of Drydex dry batteries has been extended still further and the exhibit includes a number of types developed for the latest battery operated receivers. There are now over 140 different listed types of Drydex batteries providing for every battery need and suiting the pocket of every user.

Other items which will appeal especially to those interested in the construction of portable receivers are the range of Jelly-type accumulators, and the new midget H.T. batteries which are available in 40 volt units.

**H. CLARKE & CO., LTD.**  
Stand No. 83.

All sorts of Atlas H.T. eliminators are to be found on this stand.

Four of the five eliminators that were so popular last year are being continued, while in addition there are two entirely new models appearing for the first time. These are the A.C.2 and the D.C.20.

**SET TESTING**



The Avo testing kit contains all that is required in the way of prods and connecting links.

The A.C.2 is a 12-m/a. output unit giving 120 volts, while the D.C.20 gives 20 m/a. at 120 volts. Each of these has three taps, for 60, 90 and 120 volts, and the cash prices are 30s. 6d. and 32s. 6d. respectively.

Of special interest to the large-set man is the 150-volt 25-m/a. maximum eliminator designed for Class B or Q.P.P. receivers. It costs £6 10s., but, as is the case with all the Atlas eliminators, it can be obtained on hire purchase terms.

Another of the large types of eliminator is the T. 10/30, which gives either 10, 20, or 30 m/a. at 120 or 150 volts according to the output chosen, which is adjustable. Like many of the other eliminators it includes a trickle charger, and in this case the price is only 69s. 6d. cash.

**E. K. COLE, LTD.**  
Stand No. 78.

So much is being shown on this stand that we are dividing our write-up into two portions; here we shall deal with the power units, for which E. K. Cole are so justly famous, while on another page you will find details of the set ranges for the coming season.

As regards the power units, the following will probably interest the home constructor most.

Model A.C.10/20 for A.C. mains, and model D.C.12/25 for D.C. mains. The former has adjustable tapplings at 120/150 volts, 50/80 volts, and tapplings for S.G. leads at 100, 65, and 40 volts. The model is capable of supplying up to 20 m/a. at 120 volts. The price is £2 2s. 6d. The D.C. model, which costs £1 12s. 6d., has exactly the same tapplings, and the maximum output is 25 m/a. at 120 volts.

In addition, there is the model K.10/20, which is a combined H.T. unit and L.T. charger for A.C. mains, having similar tapplings to the A.C.10/20, but also incorporating a 2-volt 1/2-amp. trickle charger. The price is £2 12s. 6d.

These mains units are, of course, obtainable on hire purchase terms, the deposit in each case being 5s. and 12 monthly payments of 4s., 3s., and 5s. respectively. Little enough to pay for a reliable high-tension supply.

One of the attractive Wharfedale P.M. speakers.

**COLVERN, LTD.**  
Stand No. 55.

Colvern, as usual, have a most attractive stand consisting of receivers for home construction, made up largely from their coils and other products and, of course, all the very latest Ferrocat and air-cored coils designed for superhets and bandpass receivers.

**FOR THE CAR**



*A special car radio chassis made by Lissen for Ford cars. It is neat and compact.*

Particularly interesting and valuable to the home constructor is the wide range of ganged coils and the specially ganged and matched coil and condenser units, which can be dropped into a set design with the greatest of ease and require very little adjustment to the trimmers before they are completely lined up.

**A. C. COSSOR, LTD.**  
Stand No. 70.

None of our readers requires any reminder regarding the vast amount of radio manufactures turned out by A.C. Cossor. Their "King of the Air" receivers are thoroughly well known, and the mains and battery models are discussed on another page, but, naturally, with a valve concern of this size, the receivers that are being marketed are not the only things to be seen on their stand at Radiolympia.

Among the general items of interest must, of course, be remembered the valves, which cover a most amazing range, from the 2-volt battery types up to the large output power valves, and the multi-grid variety for modern superhet design. Cathode-ray tubes are also among the manufactures of A. C. Cossor, who have done a great deal of television research and, though perhaps one does not find anything specified for television on the stand of this concern, anyone interested in the subject would do well to write to Highbury for further details of the large range of cathode-ray tubes and special valves for time bases which they make.

**MEET your friends on STAND 13**

**THE DUBILIER CONDENSER CO., LTD.**  
Stand No. 67.

It is difficult to know where to start when looking at the Dubilier stand—so many condensers of various shapes, types and sizes meet the eye that one cannot get a true grasp of the wide range of components made by this firm, unless one is prepared to spend quite a considerable time studying the exhibits.

New electrolytic condensers of the wet and dry types are to be seen, while high voltage condensers for high voltage amplifiers are new arrivals to the range this year. Particular notice should be taken of the oil-filled types, which are most scrupulously made, and are really a triumph of condenser engineering.

In addition, of course, to the almost bewildering range of condensers is the very wide selection of resistances available in various wattages from 1-5 watts, and all possessing the wonderful reliability for which Dubilier are justly famous.

**THE EDISON SWAN ELECTRIC CO., LTD.**  
Stand No. 79.

As usual, the stand of Edison and Mazda, as they are popularly known, is full of attractions.

Cathode-ray oscillographs are being exhibited and are working to show some of the multitude of uses, apart from television, that these tubes can cover.

In addition, an entirely new product, calling for special mention, will be seen in the form of the B.T.H. Piezo-electric pick-up and arm. Its operation depends upon the well-known Piezo effect whereby an electric potential is produced across certain crystal-iron substances when under pressure. The pick-up has a comparatively high voltage output or, in other words, is unusually sensitive, in addition to possessing an excellent frequency response.

As one would expect, a greater part of the Edison stand is devoted to the display of Mazda radio valves, including some of the very latest types which have been developed for steep-slope work in modern receivers, and there is also



*Epoch Reproducers, Ltd., make a full range of speakers. Here is one of the robust P.M. types.*

a range of special Edison valves of which the power output types and short-wave transmitters are of particular interest.

On this stand—also among the valves—will be seen some of the gas-discharge thyratrons, which have come so much to the fore recently for use in cathode-ray time bases.

**EPOCH REPRODUCERS, LTD.**

Stand No. 47.

The leading model on this stand is undoubtedly the "New 66," which replaces the famous "99." It has a 10-in. diaphragm and a response from 60/9,000 cycles, while it will handle 6 watts. For the D.C. and battery models the price is £4 12s. 6d., while the A.C. type is £6 12s. 6d.

An interesting speaker for car radio or midset sets, which will handle 2.5 watts, is the Super Dwarf, a 5-in. permanent-magnet model, which lists at one guinea, complete with transformer.

An interesting piece of apparatus for the experimenter or the amateur transmitter is the moving-coil microphone, which has a response stated to be from 72/5,000 cycles, and sells at 5 guineas with table stand, or at 6 guineas with floor stand.

A new range of distinctive cabinets for loud-

speakers is also included, and these should be carefully examined by all those desirous of purchasing a new loudspeaker, or of improving the appearance of their old one.

**ERIE RESISTOR, LTD.**  
Stand No. 15.

The products of this famous firm will probably have been seen by many of you on your way to Stand No. 15 in the various chassis sets on view on the stands of manufacturers of complete receivers.

The home constructor will be particularly interested in four main lines which are being exhibited.

**FREE ADVICE ON STAND 13**

Firstly, there are the volume controls of the carbon deposit type, which are available with various spindle fittings and with or without single and double pole switches, in values from 3,000 ohms to 1 megohm.

Then there are wire-wound resistors for high wattage work in different types, ranging from 5 to 100 watts dissipation, and available with tappings as required. These will be particularly in demand for voltage break-down purposes in universal and D.C. sets.

Those who consider fitting radio to their cars should examine the big range of suppressors, with resistances from 1,000 to 50,000 ohms, and including the new L.2 type, which is of elbow construction and particularly compact.

Finally, as last year, what might be termed the "ordinary" resistors are available in every possible value, and in 1/4, 1/2, 1, 2 and 3 watt ratings, but there is also in addition a new product in resistors, which has been produced as a result of a demand for a small, compact and completely insulated resistance which can be safely included in the wiring of a chassis for introducing in small spaces. The small size is remarkable when one remembers that the resistance is of 1/4 watt nominal or 1/2 watt maximum rating.

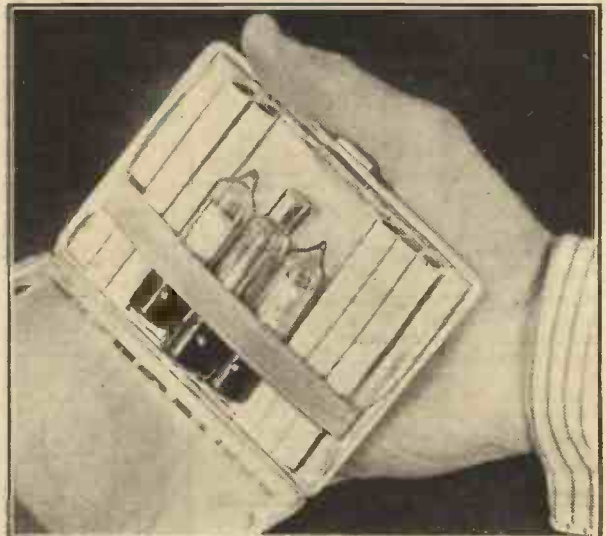
**EVER READY.**  
Stand No. 71.

Readers of WIRELESS need no introduction whatever to Ever Ready H.T. and grid bias batteries, and probably they are thoroughly familiar with the huge lines of torch and other batteries which Ever Ready make. But they will not be so familiar with one series of exhibits to be found on Stand No. 71, namely, the large range of sets which have been manufactured for both the battery and the mains market.

There are twelve different receivers on view; these range from an A.C. superhet radio-gramophone at 24 guineas, to a three-valve battery set at a competitive price.

A particularly interesting receiver is the Model 5008 Universal Superhet, which is a

**THEY ARE REALLY SMALL**



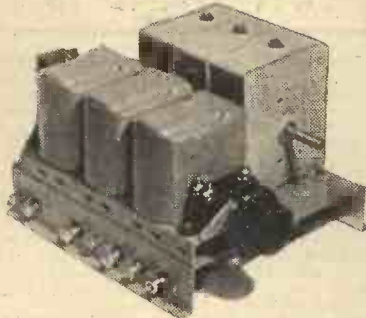
*Three three midget valves, packed away in an ordinary cigarette case.*

console incorporating 7 tuned circuits. It has a triode pentode frequency changer, variable-mu pentode I.F. amplifier, and a separate double diode pentode valve as signal rectifier, A.V.C. control and output. So that the whole receiver, apart from any rectifier, consists only of three valves.

**FERRANTI, LTD.**  
Stand No. 74.

On another page you will find details of the latest Ferranti sets, so that it is not our intention to discuss this branch of the well-known electrical firm in these columns, but we would draw your attention when visiting the exhibition to the wide range of L.F. and output transformers, in both push-pull and straight types, which are

**READY MATCHED**



*The Colvern "Ferropak" units make a delightfully easy way of building a receiver.*

marketed by Ferranti, Ltd., and also to the main transformers, of which a particularly large selection is being shown.

Condensers are also on view, there being not only the rolled-coil paper dielectric type, but also electrolytic and mica models.

Then there are permanent magnet and energised moving-coil speakers, valves, meters, and all sorts (and at all prices) of various range instruments, and other radio accessories, of absorbing interest to the home constructor and the service-man.

**FULLER ACCUMULATOR CO. (1926) LTD.**  
Stand No. 119.

There are far too many batteries of all types and sizes for us even to mention here, but we would like to say a few words about some of the new models which have just been introduced.

Among these is a new type of free acid non-spillable accumulator, which has a capacity of 27 amp. hours and measures only 4 1/2 by 2 1/2 by 6 1/2 ins. The retail price is 12s. 3d.

An alteration to the Fuller accumulators is the fitting of a new type of carrier to the standard plate range; this carrier ensures the safe conveyance of the accumulator to and from the charging station, and the construction is such that it is impossible for the battery to be unintentionally detached from its carrier.



*Famous for their Sten-torian speakers, W.B. are showing a fine new range this year.*

of H.T. batteries, namely the F.33, which has a voltage of 120 and costs 10s.

A main feature of the exhibits on this stand is the display of both accumulators and dry H.T. batteries in varying stages of manufacture.

**GARRARD ENGINEERING AND MFG. CO., LTD.**

Stand No. 57.

The radio-gramophone is now such a universally popular type of receiver that the name of

Garrard in connection with clockwork and electric gramophone motors and of automatic record changers has become a household word.



*Some of the excellent tag condensers made by T.M.C.-Hydra.*

But what may not be so generally known is the tremendous wideness of the range of motors, pick-up motor units, etc.; that are marketed by this famous Swindon engineering firm.

All sorts of separate motors and pick-up units are listed and shown on this stand, from the £10 automatic A.C. to the 17 shilling clockwork motor with single spring.

The Garrard pick-up can be obtained by itself, while a wealth of accessories for motors are also to be seen.

**GENERAL ELECTRIC CO., LTD.**  
Stand Nos. 35, 44, and 63.

The G.E.C. and Osram Stands are among the giants of the Radio Exhibition. A firm with the ramifications of the G.E.C. cannot possibly give requisite prominence to their manufactures on one stand, and it is remarkable that only three are needed in order to display the goods, when one considers the vast scope covered.

To home constructors the Osram Valve is probably the best known of the large range of

**RAPID CONNECTION**



*Graham Farish "Pop" terminals are ideal for the experimenter.*

products of the G.E.C. and it will be to the stand devoted to these modern wonders that many of our readers will first turn.

Everything that the average man can require for his set will be seen here, and a good many other valves that he will not need—valves that have been designed for super-power amplifiers or for transmitting circuits.

Pentodes, both H.F. and I.F. diodes, double diode triodes, heptodes, hexodes, triode hexodes, and goodness knows what else are on view. It would need a whole issue of WIRELESS to deal with the vast array that has been arranged.

But, as we said before, valves are by no means the whole, or even the main production of the G.E.C. From Coventry have come sets and batteries, photo electric cells and amplifiers, to swell the huge exhibit at Olympia.

Of the batteries a new feature is the Black Label range. This new battery incorporates the latest developments of the Research Laboratories at Wembley, and life and shelf test have proved that the Black Label batteries give longer service than any other batteries made by the G.E.C.

They are obtainable in 60, 100, 120 and 150 volt sizes where H.T. is concerned, and in 9 and 16 1/2 volt units for G.B. purposes.



*A coil of Electron screened aerial and lead-in wire.*

And then there are the sets. But we shall say nothing about these in this section; they are dealt with on another page, where more justice can be done to them.

**GRAHAM FARISH.**  
Stand No. 64.

At the time of going to press, Messrs. Graham Farish were still pushing forward with some of the latest component designs for ultra short-wave work and television, and by the time the show opens some of these will probably be ready to go on view.

We have examined some of the advance models of these components, and can honestly say, not only do they well uphold the fine name that Graham Farish have in the component market, but fully illustrate the aliveness of this firm, not only to be on top of modern development, but well ahead of most of the market.

The Graham Farish exhibits can really be divided into two parts; those coming under the name of Formo, and those under that of Graham Farish.

The first name includes such famous components as the Sensity iron-cored coils, and the Formo slow-motion twin ganged condenser, while that old favourite, the Formodensar, is still to be seen—witness of the fact that though it has been on the market so many years, it is still a firm favourite among constructors.

Short-wave listeners will be interested in the "Snail" dual-ratio drive and escutcheon, while a recent arrival to the ranks is a 1-watt resistor, complete with wire ends, and available in all the usual values at the remarkable price of 10d.

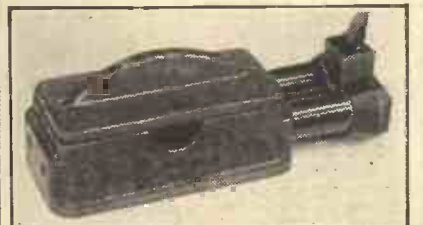
As regards the Graham Farish section of the stand, it is difficult to mention outstanding components, for there is not one there which has not proved its popularity or which, in the case of new ones, will not do so in the very near future.

We might, however, draw attention to the remarkably inexpensive compensated pick-up and tone arm, and also to the tubular condensers, which are available in values of 0001 to .25 mfd. and also to the rotary snap switch, costing only 10d. for the two-point model, or 1/- for the three-point, and having a remarkably simple but effective construction.



*One of the many modern Dossor valves—a D.D. Pen.*

**FULLY INSULATED**



*Novel design and good workmanship characterise this mains plug and fuse holder made by Belling and Lee.*

**GRAMPIAN REPRODUCERS, LTD.**  
Stand No. 111.

A wide range of loudspeakers, both permanent-magnet and energised, are to be found here, and will be of vital interest to every set owner. In addition, the moving-coil microphone and portable amplifier will attract the attention of the experimenter and amateur transmitter.

Harking back to the speakers, we would draw your attention to the new "Pantone" 2-guinea permanent-magnet speaker unit, which embodies many interesting and novel points, and undoubtedly represents outstanding value. Like the other permanent-magnet loudspeakers on this stand, this model employs the new nickel aluminium alloy magnet.

**HALCYON RADIO, LTD.**

Stand No. 36.

Among the new models of sets to be found here are the A.C.7 and A.C.7G., and the A.C.7G.A., which latter, as its initials suggest, is an auto-radiogram; a series of universal receivers, which include a table set at 14 guineas, and a radiogram at 24 guineas, and an auto-radiogram at 35 guineas. More details of these sets will be found on page 23.

In addition, two superhet transportables have been introduced this year—the T.T.4A. for A.C. mains, and the T.T.4B. for battery operation.

**A NEW LINE**



*The Midget Four-gang condenser that has been produced by Polar.*

**HARTLEY TURNER RADIO, LTD.**

Stand No. 23.

Brilliance in loudspeaker reproduction and faithful bass response are two of the qualities for which Hartley-Turner apparatus have a world-wide reputation, and they are qualities which no true radio constructor can possibly overlook, essential as they are to really high-class reproduction; and at this exhibition models of the famous Hartley Turner speakers, sets and amplifiers are being shown and demonstrated.

So we see the Standard model speakers for D.C. or A.C., the famous "True-Bass Baffle" and also the M.12 receiver and the R.G.M.12 Radio-gramophone. Kit sets and amplifiers are also part of a very fine exhibit.

**HAYNES RADIO.**

Stand No. 10.

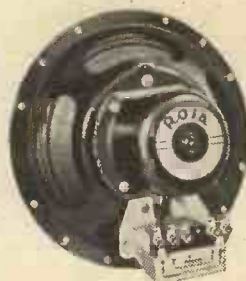
Quality radiograms and table model receivers will attract the connoisseur, as will the Haynes quality loudspeakers, both standard and senior models, which are available for £4 17s. 6d. and £7 5s. 0d. respectively.

The experimenter will welcome the Haynes Oscillator, which is an entirely new introduction, providing a ready means of finding a given transmission, identifying stations, producing a tone corrected modulated transmission from a pick-up, and generally facilitating set testing. It is, of course, ideal for the service man.

**F. C. HEYBERD & CO., LTD.**

Stand No. 25.

Those who have long looked upon Messrs. F. C. Heyberd solely as makers of first-class main units, and a whole host of efficient transformers, will be surprised when they visit the stand at Radiolympia this year. Not that we suggest that Heyberd have either given up the



*A popular speaker in the British Rola range of energised types.*

manufacture of those many good things for which they are famous, nor even have they reduced their output, but, for the first time, Heyberd's have gone into the complete receiver market.

The set in question is an all-mains receiver and is a high quality job, of the superhet type. It is known as the "Four Point Receiver" and is for A.C. operation.

Four valves are used, including octode frequency

changer, while the set is built in an unusually handsome walnut cabinet, with ebony and chromium finish.

The set is not to be a mass produced job, the primary aim and design in manufacture being to eliminate all servicing as far as is humanly possible and to ensure this, every set undergoes a two or three hours full working test.

The price of this outstanding receiver is 14 guineas, and there should be no doubt about its having a very good sale.

To many, the portable charger with valve rectification, will be of particular interest, while the enthusiastic home constructor will, as usual, be able to lose himself among the hosts of kits, power packs, resistances, transformers, and so forth, to be found on the stand.

**HELLESENS, LTD.**

Stand No. 21.

It is very many years since the Hellesen dry H.T. battery first appeared on the radio market. A little higher in price than the others at the time, it was certainly sought after by those who knew a good thing.

Since those days, Hellesen has become a general name where dry batteries are discussed, and types and sizes for all radio purposes are now available—at prices that are but a fraction of those asked at the time to which we refer.

**THERMOMETER TUNING**

NORTH SOTTENS	440
STOCKHOLM	
ROME	420
MUNICH	400
SCOTTISH LEIPZIG	380
WEST MILAN	
BERLIN	360
LONDON	340
HAMBURG	
TOULOUSE	320
POSTE PARISIEN	
HILVERSUM	300
MIDLAND	
SCOTTISH NAT	280
NATIONALS	
COPENHAGEN	260
TRIESTE	
ABERDEEN	240

*This is a close-up of the thermometer tuning on some of the Cossor receivers.*

Sixty-six-volt H.T. batteries for 3s. 6d., and one hundred volters for 5s. gives you some idea of the competitive prices asked to-day by this South London firm.

Pocket lamp and torch types of battery are also made by this firm, and at the Radio Show you will see not only their dry batteries, but also a range of accumulators—of the ordinary and the unspillable types.

An amazing collection that should be examined very closely if you want to get a good idea of what is and what is not available for the set owner these days. And you will find that the "is not" part of it is particularly hard to find.

**HENLEY'S TELEGRAPH WORKS CO., LTD.**

Stand No. 53.

The principal exhibit on the Henley stand this year, is the well-known "Solon" soldering iron. The popular domestic model at 7s. 6d. is being demonstrated, while the Industrial type "Empire" irons are also being shown. They are novel in design, for the bits are oval in shape, so that work can be done in restricted places, and they are intended to make the utmost use of the power supplied, for the heating element in each case is in the bit itself.

Resin-cored solder is also to be seen, while another interesting exhibit is the alcove containing slideback wires specially manufactured for the wiring of radio receivers.

Henley's are also showing fine rubber-covered wires, which are made in various colours, and also used for the internal wiring of sets. A good idea this colour wire, for it enables various circuits like the H.T. and L.T., H.F. and L.F. to be differentiated, thereby simplifying fault-finding should anything go wrong.

**HIGH VACUUM VALVE CO.**

Stand No. 27.

No introduction is needed by our readers to Hivac valves, and Stand No. 27 will be among the first ports of call of a great many of them.

One of the most interesting exhibits here is the famous "P.W." J.240, the special two-channel

**"UNIVERSALS"**



*Two of the New Wearite "Unigen" universal screened coils.*

valve which was designed for the "Silver King," and which is also used in the special Exhibition receiver which is on view on our own stand—No. 13.

Messrs. Hivac are also showing a model of a receiver which has been designed specially for the J.240. Other valves of particular interest are the Hivac midgets, which are claimed to be the only 2-volt high-efficiency multi-electrode midget valves on the market in this country or in America. These valves were especially designed to make possible the construction of a genuine pocket radio receiver and, in fact, such receivers using Hivac valves, are in daily use by members of the Brighton police force.

With television so near at hand, the series of midget valves which have been specially made for short-wave work should receive your attention. These are fitted with Frequentite bases, so that they can be used on the ultra-short-waves, and tests have been carried out with gratifying results by prominent short-wave engineers.

There is also the Hivac A.C./V... a valve specially designed for expanded volume control—one of the latest developments in high fidelity reproduction.

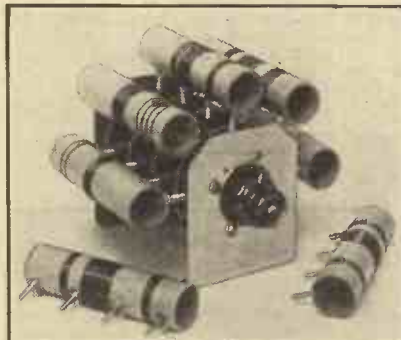
**JACKSON BROS.**

Stand No. 110.

Many alterations are being made and improvements included in the famous J.B. variable condensers this year. For instance, entirely new models of baby ganged condensers are being introduced with ball-bearing rotors, while, in addition, models of superhet baby ganged condensers are being introduced, tracked for 465 and 473 kc. These are available in two- and three-ganged units.

Among the new lines are special Airplane pattern dials, which have large circular scales and double-ended pointers. They are boldly calibrated in wavelengths, and incorporate a dual lampholder and escutcheon fitted with glass—the standard finish is a white scale with chrome or bronze escutcheon.

**ALL WAVES COVERED**



*This multi-coil unit covers short, medium and long waves. It is a Bulgin product.*

As this Show is more than ever a short-wave Exhibition, we expect to find short-wave condensers among the J.B. selection, and, in fact, there are a number of new lines devoted to the higher frequencies.

New midget condensers for band spreading, two-gang midgets, 8-1 slow-motion drives, and baby ganged double-spaced condensers, should receive the attention of all constructors interested in the short waves.

**KOLSTER-BRANDES LTD.**

Stand No. 78.

Those interested in the suppression and rejection of interference should pay particular attention to the Kolster - Brandes' Rejectostat system and Rejectostat units which are being shown on this stand.

**FOR H.F.**



**A B.T.S. H.F. choke that has proved exceedingly popular.**

This system, we understand, is being considerably extended to enable from 1 to 1,000 receivers to be operated from a single aerial. On another page will be found details of the wide range of superhets and other receivers which have been produced under the trade-mark of "K.B.", but here we may justifiably draw the attention of the home constructor to the K.B.432, which is a short-wave converter, covering from 15-18 metres, and employing heptode valves.

**Lectrolink Ltd.**

Stand No. 115.

The variety of plugs, spade terminals and ordinary terminals that are made under the well-known name of "Clix" is positively amazing, and, if only to see the vast choice which is being offered, visitors to Radiolympia are advised to have a look at the Lectrolink stand.

Most of the types of plugs and sockets, and the chassis mounting valve holders, that were shown last year, are again to be seen. There are some notable alterations, and, of course, many additions to the ranges.

Among the alterations are those to the chassis-mounting valve holders of the floating type. These are being discontinued in their 1934 form and are to be supplied rigid with cover plate. The prices will remain as before, and the alteration is confined to the 7-pin English type of valve holder, and the 4-, 5- and 6-pin American.

Additions to the 1935/6 catalogue, which are well worth noting, are the air-sprung chassis-mounting valve holders, which are anti-microphonic, and are supplied in the 7-pin variety with or without terminals, and also chassis-mounting two-socket strips which, with terminals, cost 6d. each.

A new short-wave baseboard mounting valve holder, which is worthy of close examination, is also being shown, in which the whole valve holder is supported from the baseboard by ebonite legs, and is fitted with resilient sockets, with the sockets and tags integral. The plate is of bakelite sheet, and is intersected by four special air slots, and is supported by a new fixing process which entirely eliminates metal.

**LISSEN LTD.**

Stand No. 86.

Some nine or ten instruments comprise the Lissen range, and will be on view on their stand in what might be termed the "complete receiver section."

But what will interest the home constructor even more are the Lissen batteries, which are, of

**ELECTRIC TURNTABLE UNIT**



**This is one of the many Garrard products—a complete pick-up and motor unit.**

course, to continue in all the H.T. and G.B. sizes to which we have become so accustomed. Of special note are the Super half-guinea, 120-volt battery; the Standard, 7s. 6d.; the Leader, 6s. 6d.; and the Super-Power, 16s.—all providing 120 volts.

**MARCONIPHONE CO., LTD.**

Stands No. 11 and 89.

On another page you will find a special description of the large range of Marconiphone sets which are being shown at Olympia this year. But here we would like to draw your attention to the tremendous range of valves which, naturally, takes up much of the space on this stand; catkins, heptodes, pentodes, Class B, and Q.P.P. valves—all are to be found on the Marconiphone stand.

**McMICHAEL RADIO LTD.**

Stand No. 68.

McMichael is an old name in the radio trade, so we need say very little in these columns about it, but we would draw your attention to this stand for the wide range of receivers which it contains, and which are separately described on another page of this issue.

**MULLARD RADIO VALVE CO., LTD.**

Stand No. 75.

Besides the various receivers which might be said to form the main section of the Mullard programme for the coming year, there will naturally be found on this stand a very large range of valves, covering practically every aspect of radio and certainly every requirement of the home constructor.

**NEW LONDON ELECTRON WORKS LTD.**

Stand No. 39.

Visitors to Radiolympia are always certain to find interesting gadgets on the stand of the firm responsible for the famous electron wire. This year, in addition to standard lines, such as the Globe aerial, Electron Insulator pins and earth wire, there is introduced a new line—Superial Screened Aerial and Lead-in—which has been especially designed to eliminate local interference, and which will be welcomed by a large number of constructors who live in districts where static is troublesome.

**OLIVER PELL CONTROL LTD. (VARLEY).**

Stand No. 31.

There is so much to be seen on the Varley stand that we are not attempting to mention one half of it. Most of the present popular lines are being continued this coming year, but there will be some outstanding additions that we cannot possibly overlook.

Chief among these are the three- and four-gang superhet permeability tuners. The former is a unit with two, pre-selector sections and one oscillator section. All necessary padding coils are enclosed and extremely accurate tracking is claimed. The four-gang unit is the same as the three with the addition of an additional pre-selector circuit enabling a preliminary H.F. stage to be used.

An Air-tune I.F. transformer for 455 kc., having Litz-wound iron-cored coils, is also to be seen for the first time. Frequency drift is said to be eliminated, and high amplification and low adjacent channel interference are also claimed.

A multi-volt mains transformer will attract the attention of the

constructor. It provides two heavy duty L.T. windings sufficient to supply the sound and the vision sections of two superhets for television purposes. An electrostatic screen between primary and secondary is incorporated.

**THE ORMOND ENGINEERING CO., LTD.**

Stand No. 33.

A tremendous range of components, loudspeakers and small gadgets are to be seen among the exhibits of this long-established radio firm.

But Ormond are not restricting themselves this year to components and loudspeakers, for while we find many of the old loudspeakers are being continued and new models are being introduced, there will also be seen on the stand three completely new Consolette radio receivers. These are models 605, 606 and 607, being respectively a battery three-valver, a universal four and an A.C.4. They are marketed at extremely reasonable prices, and are particularly efficient in operation.

The battery set is of special interest, as it is completely self-contained, with a frame aerial, followed by an iron-cored coupled H.F. stage, leaky grid detector and special economy output pentode. In this case a permanent magnet loudspeaker is employed, while in the mains receiver a powerful energised moving-coil loudspeakers are fitted.

**PETO AND RADFORD.**

Stand No. 94.

Dagenite batteries are to be found here in profusion. And readers will remember these batteries of old for their tell-tale float scheme of visual indication of the state of charge of the batteries.

All sorts of batteries of the wet variety, including jelly types, are to be seen, and both L.T. and H.T. requirements are most thoroughly covered.

No matter what your battery set, large or small, radiogram or portable, you can find a suitable Dagenite battery for it, and except in the jelly types you will probably be able to include the tell-tale float as one of the great advantages of the battery. With this you can see at a glance the state of charge, so that there is little likelihood of the battery being over-discharged, or left in a discharged state too long.

**PYE RADIO, LTD.**

Stand No. 84.

Messrs. Pye Radio have long been in the forefront of the set market, and have long been famous for the particularly interesting design of their transportable receivers.

This year their sets are as attractive as ever, and we would draw your attention to the special description which we give on another page.

**'REPRODUCERS AND AMPLIFIERS LTD.**

Stand No. 58.

At the time of writing full details of the R. & A. programme are not available, but on the stand at Olympia you will find a complete (Please turn to page 47.)

**A.C. MAINS**



**Ferranti are noted for their high-class power transformers. Here is one of them.**

**A PORTABLE GRAMOPHONE**



**A Gramopian portable electric gramophone that is well worth close examination.**



# SETS *for* EVERY POCKET

EXCELLENT VALUE  
AND ATTRACTIVE  
DESIGNS AT THE  
RADIO SHOW



WHAT YOU WILL  
FIND AMONG THE  
COMPLETE SETS  
FOR 1936

"THE time has come," the Walrus said, "to talk of many things." So runs one line of a famous poem. But it is not of cabbages and kings, or ships and sealing-wax, that we want to talk here. It is of something very much more vital, of infinitely greater importance to the listener—radio sets.

Once again we have reached Show Time. The giant radio exhibition at Olympia is with us once more. And, as expected, it is bigger and better than ever.

That is not an idle phrase, nor is it a parrot-like publicity cliché. It is a fact. More effort than ever has been put into the 1935 Radiolympia by Alec Moody and his band of organisers. And we know from the past what they can do when they try.

But, though readers of WIRELESS are naturally interested in the frills of the show—the gigantic set pieces, the huge radio theatre, the illuminations, fountains and what nots—they are more interested in the reason for the exhibition than the method of display.

And the reason? Sets, mainly. And a colossal array of receivers there is, too. More than ever, so that the task of making a choice has become even more difficult than of yore.

But if the choice of selection is difficult it is because the dish is full, not because it is lacking in variety. Literally hundreds of sets of different types, shapes,

sizes and prices are on view. Each has its own particular appeal and each should be judged on its merits before a final choice is made.

We are, of course, assuming that you want to buy a new set. You

are arrayed in a glorious panorama of cabinets and dials.

We mention dials specially because here the novelty is most striking. The makers have let themselves go here, and close examination of the different schemes is well worth while.

In order to assist readers of WIRELESS in their tour round the Exhibition we are giving a brief account of outstanding stands in our usual review of the general exhibits at Radiolympia. But in addition

we are devoting a number of pages to sets that should receive special attention.

These pages follow this one, and are so arranged that easy reference is possible, and the products of outstanding makes are grouped together.

At Radiolympia there are sets to suit every pocket; sets for every purpose—radiograms, consolettes, portables, everything that you could wish for. Go and have a good look. Then consider your present receiver and decide whether you would not be well advised to take advantage of the low prices and exceptional value now being offered.

There is a set at Olympia to suit you, your requirements, your pocket. And never before has there been such high intrinsic value offered to listeners.

Visit the show if you possibly can.

A SPECIAL SECTION OF "WIRELESS"  
DEVOTED TO THE DESCRIPTION OF  
OUTSTANDING RECEIVERS AT  
RADIOLYMPIA

should do if you have not just done so, for modern achievement is such that sets of only a comparatively few months ago are put right in the shade by the latest and newest designs.

Throughout 1935 new sets have been released by many of the firms, and now these and new sets introduced for the first time at the show,

## KEEPING RIGHT UP TO DATE



Those in the forefront of business or in the professions cannot afford to drop behind in anything—not even radio. Here is Beverley Nichols with his Marconi-Phone Model "264." You should examine this model at the Show.



The Ferranti "Nova" is obtainable in either black or brown moulded material, with ivory inlay.

**FERRANTI**—the huge electrical firm in the North—are experts in all branches of electrical engineering. And as with all their products, quality is the outstanding feature of their range of radio receivers—quality in both reproduction and workmanship.

There are eleven models in all in their range of receivers, all of which are on show at Radiolympia. These receivers may be roughly divided into two sections—those with a straight type of circuit, and those which fall into the superhet class. In the former there are two models, and in the latter nine.

The straight circuit has three valves, used as H.F. amplifier, detector and pentode output. There is also a rectifier valve.

One model, costing 8½ guineas, is known as the UNA A.C. Consolette, and has the Ferranti "All-In" tuning dial. This device shows you just what is happening when you operate any of the controls on the set. It indicates station names and wavelengths, whether on medium or long waves, when set is correctly tuned, whether set is "on" or "off," and the position of the tone and volume controls.

#### Superhet Designs

The other straight-circuit model is similar in specification, but is a universal mains design. It costs the same.

The circuits of all the remaining nine receivers are, as already mentioned, of the superhet class. They employ four valves, including the rectifier.

Features which are common to them all include A.V.C. and the "All-In" dial already referred to. There are also additional refinements, such as terminals for additional speaker, cut-out switch for internal speaker, mains aerial, provision for gramophone pick-up, and variable tone control. In the case of the two models

11 guineas, while a further half guinea is charged for the NOVA Universal A.C./D.C.

## A McMICHAEL SET TO SEE

**T**HAT a McMichael receiver is one of outstanding merit has long been an accepted fact of radio-receiver manufacture. In the past this firm has specialised in what may be termed receivers of a de Luxe nature.

It is, therefore, of special interest that they

majority of the listening public. It is an A.C. superhet with an advanced specification and particularly attractive appearance.

Although only four valves, including the heavy-duty rectifier are employed, the circuit is a seven-stage band-pass one. The valves are a triode-pentode frequency-changer, an H.F. pentode for intermediate-frequency amplification, and a double-diode-pentode for detection, A.V.C. and output.

A special form of aerial coupling is provided to keep the sensitivity constant over the whole of the receiver's range. Writing of sensitivity, it is noteworthy that the makers claim that an aerial of only 15 ft., used in or out of doors, gives an entirely satisfactory performance in most parts of the country.

Calibration is in both wavelengths and station setting is indicated by a travelling knife-edge intercepting a series of diagonal lines which appear behind the station names when the scale is illuminated.

The cabinet itself is as outstanding as the chassis, and is an original but most attractive departure from usual practice. Attention has been given in its design to mechanical and acoustic considerations, it is hand-built from inlaid walnut, and is fitted with a quick-release back which requires neither clips nor screws to hold it in place.

There are four controls, tuning, volume control and on-off switching, tone control, and wave-change switching. Other features include special mains static suppressors to minimise electrical interference troubles, provision for extra loudspeakers which may be switched on and off without the built-in speaker, and the low consumption of 60 watts.

The receiver is available on hire-purchase terms of only 5s. per week, namely 21s. 11d. deposit followed by twelve monthly payments of 21s. 11d.



The new 12 Guinea receiver, Model "235," is a most attractive superhet for use on A.C. mains.

have added a receiver at as low a price as 12 guineas to their range. As a matter of fact this is the first complete receiver ever to be produced by this firm at so low a figure.

This receiver, known as the McMichael Model "235," is designed to place McMichael reliability and performance within reach of the vast

## RECEIVERS OF NOTE

### THE FERRANTI RANGE AT OLYMPIA

for universal mains working, no mains aerial or provision for pick-up are incorporated, a usual procedure with this particular type of set.

The NOVA and LANCASTRIA models are very similar. They all use a 2½-watt output pentode, but the LANCASTRIA models have additional refinements, including a noise suppressor. These latter models also have wooden cabinets of veneered walnut, whereas the NOVA models are supplied in bakelite cabinets.

These cabinets are available in either black or walnut brown finish with ivory inlay. The NOVA Consolette costs

The cost of the LANCASTRIA Consolette and Universal models is 12½ and 13½ guineas respectively.

The remaining five models all incorporate the same type of receiver chassis, the main difference between these and the other superhet models described being in the use of a 2½-watt triode output valve instead of a pentode. A special high-note-uplift is incorporated.

The first of these models is known as the ARCADIA Consolette, and is similar in appearance to the LANCASTRIA models. Its price is 15 guineas. It is worth mentioning at this point that all these models are available on generous hire-purchase terms.

Next comes the ARCADIA Console, similar to the Consolette model but provided with a cabinet which stands on the floor. The price is 18 guineas.

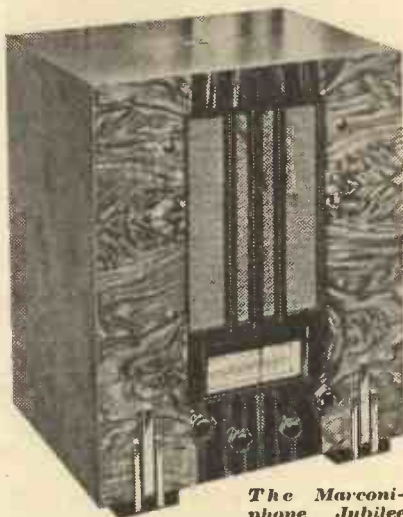
Finally, there are the ARCADIA Radiogram, GLORIA Radiogram, and GLORIA Autogram. The names make these models self-explanatory, and it but remains to give their prices which, in the order of mentioning, are 26, 45 and 52 guineas.

THE name Marconiphone has been associated with radio set design since the very earliest days of broadcasting, and the firm may truly claim to be real pioneers in every sense.

The range of receivers which visitors to Radiolympia will find on the Marconiphone stands is, in every way, comprehensive and fully up to the high standard which one expects from this great firm.

All the sets shown are obtainable on deferred terms, and prospective purchasers can rest assured that they will find a receiver among those shown which will, without doubt, fulfil their requirements.

### FOR JUBILEE YEAR



The Marconiphone Jubilee Model "264," brought out specially early for this year.

The most ambitious set in the range is the magnificent Console Radiogram, which incorporates a 9-valve 12-stage super-heterodyne circuit with automatic record changing. This receiver, which is replete with every modern refinement, is capable of bringing in every worth-while station in the European ether, and of doing the fullest justice as regards quality of reproduction, to the programmes sent out. Listed as the Model 292, it is designed for A.C. mains only.

### A Fine Example

Another fine example of radiogram technique is the Jubilee Model

287; moderate in price, it is excellent value for money in every way. This set is fitted with a 5-valve 7-stage superhet chassis, incorporating "quiet" A.V.C. and tone compen-

earth is necessary with this set, the aerial being in the form of a frame built into the receiver cabinet. A neat turntable is also fitted, so that the receiver can be rotated into the position giving the best results.

There is, of course, a great number of D.C. mains and battery users. Those who require a D.C. mains radiogram should examine the Model 286, a 4-valve superheterodyne which will provide ample range and selectivity for all normal purposes, combined with excellent reproduction, simple operation and low running costs.

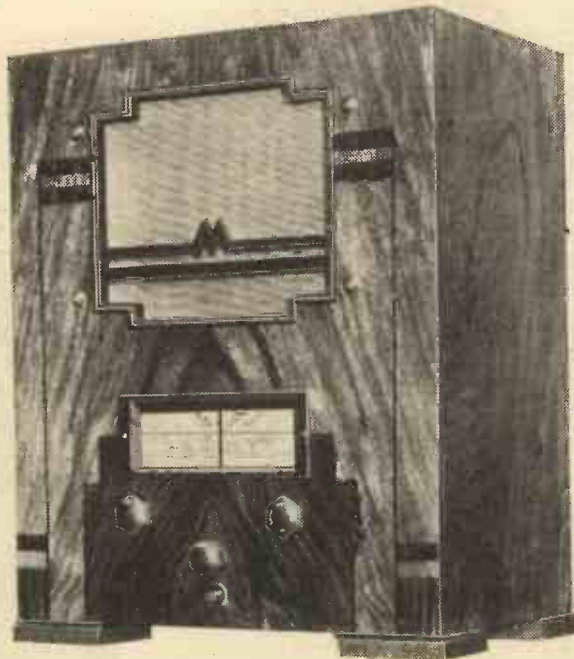
### Universal Models

There is, in addition, a table model (Model 262) suitable for D.C. mains. This again is a superhet incorporating a band-pass tuning circuit and moving-coil loudspeaker.

So far we have said nothing about sets of the Universal mains type, and before we proceed any further we would draw attention to the Model 223, a reflex superheterodyne using 4 valves, including rectifier.

(Please turn to page 52.)

### A REFLEX SUPERHET



Here is the "223" receiver, one of the latest to be put on the market by this famous firm.

sated volume control. Here again the design is intended for A.C. supplies.

Also in the Jubilee range are the Models 297 Console and the Jubilee Table-Grand. Both receivers are for use on A.C. supplies and incorporate powerful 5-valve superheterodyne circuits and moving-coil loudspeakers.

All the Jubilee models are capable of giving an output of 2 watts undistorted, the output valve being an indirectly heated pentode. The power consumption of the Models 264 and 297—that is the table grand and console receiver, is 60 watts, while that of the Model 287 Radiogram is 60 watts on the radio side, and 75 watts for the gramophone.

Special models of these receivers suitable for non-standard mains supplies are available at an extra charge.

### On the Top

In the case of the console model, the tuning scale is let into the top of the cabinet, so that one looks directly down upon it when adjusting the tuning control: this is very convenient.

Those who require an A.C. mains set of the portable type will be especially interested in the self-contained Model 279, a 6-valve 7-stage superhet with delayed A.V.C. and an energised moving-coil loudspeaker; no external aerial or



## "THE MASTER CRAFTSMEN OF RADIO"

Such is the slogan used by Marconiphone, and it fairly describes their products, as you will see when you visit Stands 11 and 69.

# THE G.E.C. RANGE

Some receivers you should closely examine when you visit the G.E.C. stands.

Nos. 35,

44 & 63.

AMONG the attractive range of G.E.C. receivers made by the General Electric Co., Ltd., are three outstanding models to which we would especially like to call readers' attention. They are one battery set and two newly introduced 1935-1936 mains receivers.

First of all, we will consider the battery model, which is an S.G. Three. Complete with all batteries and valves, this instrument costs only £7 19s. 6d. The hire purchase terms are: Deposit of 13s. 6d. and twelve monthly payments of 13s. 6d. also.

One of the most notable features about it, and a feature which is of considerable value, as it helps to lengthen the life of the H.T. battery, is the incorporation of automatic grid bias. This is so arranged that the value of the bias varies as the H.T. runs down, and so maintains it at the best value for obtaining maximum efficiency and economy the whole time.



The control unit of the G.E.C. car radio set.

Details of the circuit are as follows. There is a variable-mu screen grid H.F. stage, pentode detector and pentode output valve, the latter operating a full size moving-coil loudspeaker.

Exceptional range and selectivity are claimed by virtue of the special high-efficiency radio-frequency coils employed.

## Calibrated in Wavelengths

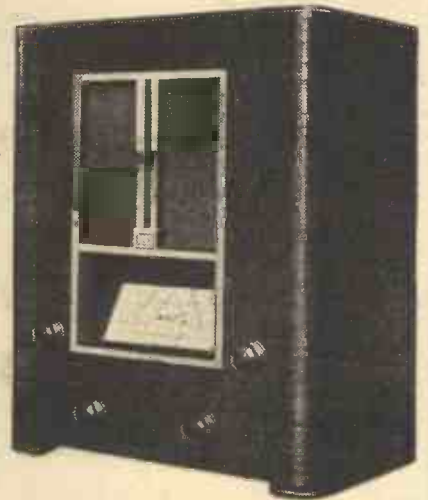
Other items worthy of mention are calibration in metres, 8-inch permanent magnet speaker, provision for external speaker, high tension consumption of 9-10 milliamps. when battery is new, pick-up sockets, and a protective fuse.

Apart from the fact that one is for A.C. mains only and the other for A.C. or D.C. operation, the specifications of the two new mains models are the same. The price of the first is 11 guineas and of the second 11½ guineas. A special model of the A.C. version is also available

for either high or low voltage mains. The circuit is a four-valve superhet arrangement, one of these valves being used for rectifying the high tension. The other three valves are a heptode frequency changer, variable-mu pentode and double-diode-pentode.

Although primarily designed for use with an outdoor aerial, these sets are provided with an internal aerial located on the back.

## A HANDSOME SET



Extremely neat are the G.E.C. A.C. 4 and D.C./A.C. 4 as can be realised by this illustration. The sets are identical in appearance.

## KOLSTER-BRANDES STAND No. 78

ONE of the advantages of deciding upon a Kolster-Brandes' receiver in the past has been the wonderfully large and varied range of models that have been available from which to choose. This is a valuable feature which is being continued for the 1935-1936 season.

A number of the old models are being continued this season, and in addition there are seven entirely new ones being added. Of these, three are A.C. models, two of universal mains type, and two for battery drive.

### The New Tuning Dial

Little need be said about the models which are being retained, as they have already proved their worth during the past months. However, for the benefit of those who have copies of the old catalogue, we will mention the particular types which are being retained. They are 935 A.C. Superhet, 422 "Cavalcade" A.C./D.C. Superhet, 383 and 383A A.C./D.C. Superhets (Consolette and Console models respectively), 396 Class B battery receiver, and 398 Superhet Class B battery receiver.

Variable selectivity and a new dial known as the "Fototune" are features of the new range of receivers. Both of these are on

the new models 426, 427 and 428, which we will consider in a moment. Meanwhile, a few words about the new dial.

This dial goes much further than the ordinary full vision dial in simplifying station selection and rendering identification easy and certain. As each station is tuned in its name is projected optically on to one of two small translucent screens, according to whether it is a long or a medium-wave station. Only one name appears at a time, and the illumination of a small aperture near either of the two screens

## A BATTERY THREE



Here is the Model 431, a 3-valve battery receiver made by Kolster-Brandes.

indicates which waveband the set is adjusted to.

Another interesting tuning feature is that the set can be changed from one band to the other instantly without moving the hand from the tuning control.

The first of the new models, 425, is a superhet transportable with built-in frame aerial for use on either A.C. or D.C. mains. It has six valves; and costs 15 guineas.

The next two models, the 426 and 427 are similar in specification, the first is for universal mains operation, while the second is an A.C. receiver. The price is twelve guineas in both cases.

### Variable Selectivity Incorporated.

These sets again employ a superhet circuit, using six valves including the rectifier, and the features of variable selectivity and "Fototune" dial, already mentioned are, of course, included. There are six tuned band-pass H.F. and intermediate circuits.

The model 428 is also a superhet for A.C. mains, but employs H.F. amplification prior to the mixer valve. Its price is 14 guineas.

And that brings us to the two battery models. There is the 429, which has a five-stage circuit using three valves. The cost is 8½ guineas. The other battery receiver is the 431, a detector and two low-frequency type. It costs but £5 17s. 6d.

Finally, in the new range there is an inexpensive A.C. receiver (Model 433) with moving-coil speaker selling at £6 17s. 6d.

It does not seem so very long since the mention of the word Cossor immediately brought to mind only radio valves. For years this well-known firm specialised in the manufacture of high-efficiency valves (and, of course, is still doing so), and then suddenly there appeared upon the market a kit set bearing this famous name.

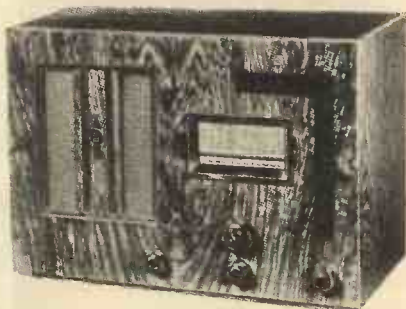
The success was instantaneous, and since that time the firm's activities in the manufacture of complete sets has gone on increasing, the demand for its receivers being so great that factory expansions were necessary to cope with it.

This is sure proof of the efficiency of the Cossor set, and is the logical outcome of many years of experience in valve design. We would say, here and now, that Cossor sets are extraordinary good value for money, as a visit to the stand will quickly show.

Included in the Cossor range are two superheterodynes and seven "straight" receivers. The battery user has as many as five different designs to choose from, while there are A.C. mains and universal sets for the all-electric enthusiast.

In the superhet class there are the A.C. mains Model 364 and the battery Model 366A. Both receivers embody the very latest advances in reception technique, including the new Cossor development

## FOR ALL MAINS



Model 360 is a universal A.C./D.C. receiver. It has a triode output valve.

"Thermometer Tuning." Before going any further we will say a few words about this ingenious device to ensure dead accurate station selection.

On the front of the receiver there are two scales, one clearly marked in wavelengths and the names of stations on the medium waveband, and the other similarly marked for the long waveband.

### The "Mercury" Column

At the side of each scale is a black column in appearance not unlike the mercury in a thermometer tube. When the tuning knob of the set is rotated this column rises or falls, showing immediately the name of the station tuned in. To use the makers own words, it is "so simple that a child can use it."

The Model 364 is a four-valve (plus rectifier) A.C. superhet, incorporating the

latest multi-electrode valves, viz. a Pentagrid Frequency Changer, H.F. Screened I.F. Amplifier, Double Diode 2nd Detector, and high slope Pentode Output. The rectifier is of the full-wave type. In addition to a manual volume control there is a special compensated circuit arrangement to eliminate fading on all worth-while stations.

An eight-inch energised moving-coil speaker is fitted, as are also plug and

sockets for an extension speaker, and gramophone pick-up. The price is £8 18s. 6d. as for the Model 368, but the hire purchase terms are 20s. deposit and 11 monthly payments of 16s. 6d.

The remaining sets in the Cossor range are designed for battery users.

The Model 436B is a high-efficiency four-valve set with Class B output, giving a performance equal in volume to many mains receivers combined with a low average H.T. current consumption. An eight-inch permanent magnet moving-coil speaker ensures high quality reproduction, and the price is £8 8s. (exclusive of batteries). The set is available on deferred terms for an initial payment of 16s., followed by 11 monthly payments of 16s.

Then there is the Model 363, a three-valve set with a moving-coil speaker, priced at £6 15s. (Hire purchase terms, 13s. deposit and 11 monthly payments of 13s.) This receiver has a special economy pentode output stage.

### A Battery Console

Next we come to the Model 360, a three-valver with a triode power valve in the output stage, and a sensitive moving iron type speaker.

The price of this model is £5 15s. (Hire purchase terms, 12s. 6d. deposit and 12 monthly payments of 10s.)

Finally, we have the Battery Console (Model 3535), a distinctive three-valve set with pentode output and the latest type moving iron speaker. It is built into a walnut-finish cabinet 34 inches high, and

## ATTRACTIVE DESIGN



The Cossor Model 364, which employs thermometer tuning. A close-up of the tuning scale is given on page 21.

priced at £7 15s. (Hire purchase terms, 15s. deposit and 11 monthly payments of 15s.)

Incidentally, the station name plates fitted to Cossor receivers can be readily changed in the event of alterations in wavelengths, and moreover, in the case of battery receivers there is ample accommodation in the cabinets for the L.T. and H.T. batteries.

# "KINGS OF THE AIR"

Outstanding sets by A. C. Cossor, Ltd., that are to be seen on Stand No. 70 at Radiolympia.

sockets for an extension speaker, and gramophone pick-up.

The battery Model 366A is similar in its characteristics to the A.C. model, "Thermometer" tuning being fitted as before. The loudspeaker is of the permanent magnet type, and special attention has been paid to the question of securing economy in H.T. current consumption.

The price of the Model 364 is 11 guineas. (Hire purchase terms, 20s. deposit and 12 monthly payments of 20s.)

### "Ferrodyne" Radiogram

And of the battery model (excluding batteries), 9 guineas. (Hire purchase terms, 17s. 6d. deposit and 11 monthly payments of 17s. 6d.)

Another noteworthy set is the "Super-Ferrodyne" Radiogram for A.C. mains—Model 536. A three-valve (plus rectifier) circuit is employed, the arrangement being a variable-mu H.F. stage, followed by a pentode detector and pentode output.

Other features are single-knob tuning (the full-vision scale being calibrated in wavelengths) and a moving-coil loudspeaker.

A silent running induction motor with a turntable to take up to 12-inch records, with a speed regulator and automatic stop, and volume control are fitted to the gramophone side. The cabinet is attractively finished in walnut, and the price of the complete equipment is 16 guineas. (Hire purchase terms, 40s. deposit and 17 monthly payments of 20s.)

### Universal Set

The third A.C. mains receiver is the Model 368. Three valves are employed on the radio side, as in the case of the Model 536, but a triode power valve is used in the output stage instead of a pentode. The set, which is a console type, is equipped with special super-selective tuning coils, and an eight-inch energised moving-coil speaker.

The price is £8 18s. 8d. (Hire purchase terms, 15s. 6d. deposit and 12 monthly payments of 15s. 6d.)

The Universal mains receiver (Model 369) is similar to the A.C. mains Model 368, with the exception that a permanent magnet moving-coil speaker replaces the energised type.

It will work on D.C. mains of from 200-250 volts, as well as A.C. supplies within

## "DOUBLE PROGRAMME VALUE" A.V.C.

*Details of an ingenious arrangement that is incorporated in the Halcyon receivers on Stand No. 36.*

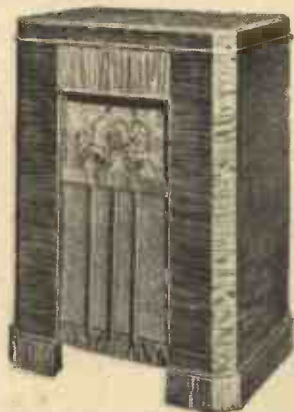
THERE are several receivers of particular merit on view at Radiolympia on the Halcyon stand, and we would particularly call readers attention to the following details concerning them.

The A.C.7 models are three in all. All three models use the same radio chassis, the first being a table model at 14 guineas. Then there are two radiograms at 24 and 35 guineas. The latter is of the automatic record-charger type and is the latest model.

A slight difference between the table model and the other two is that the latter have a 3-watt output valve instead of the 2½-watt one in the table model. A special gramophone circuit is also used in the two models which reproduce records.

### Seven Stages

The circuit of the chassis in the above models is, of course, of the superhet type, and is for A.C. mains only. There are seven stages and seven tuned circuits.



*One of the A.C.7 G receivers—a handsome radiogram—which incorporates the new "double programme value" A.V.C.*

An interesting feature is the "double programme value" A.V.C. In this, both the delay and the volume controlling are automatic. The A.V.C. is thus effective on all stations which the sets receive, and programme value is claimed to be very considerably in excess of that given by ordinary A.V.C. systems. It is also stated that the automatic volume control is so strong that it gives a variation ratio of amplification of 1,750 to 1.

Other features include a visual tuning device and special tone balance volume control.

There is another range of superhet receivers made by this firm and known as the Halcyon 4701 range of Universal receivers. As with those just dealt with, there are three models, an ordinary one, a radiogram and an automatic radiogram. The technical specification of the chassis is on rather similar lines to that of the A.C. models.

### An All-Pentode Three

And that brings us to the 3401 model, which is also a universal mains receiver. However, it employs a straight circuit as opposed to the superhet type.

But at the same time, the circuit is of special interest in that it employs three pentode valves. In addition there is, of course, the usual rectifier valve.

The price is 9 guineas, and the hire-purchase terms 18s. deposit and 12 payments of 15s. 9d. The price is very reasonable when the various features of the set are considered.

There is a full-size energised moving-coil speaker, and the output available is sufficient to work several extension loudspeakers as well. A mains anti-interference unit is incorporated which keeps down the noise on even the worst of mains.

No external aerial is necessary for the reception of powerful stations. Fuses for both mains and valve protection are included.

Finally, it should be mentioned that a variable selectivity control is provided, enabling the set to be matched to a large number of different aerials.

## BUSH RADIO ON STAND No. 85

BUSH RADIO, LTD., as many will already be aware, is a subsidiary firm of Gaumont-British, the film people. It is only to be expected, therefore, that they know just about all there is to know about the question of quality in reproduction. And it is therefore only natural that this knowledge should be reflected in their radio receivers.

Among the particularly interesting

models in their range are two battery superhets—interesting partly because the number of firms showing battery superhets is small in comparison with the large number of makes of mains superhets available to-day.

There is the S.B.21 which employs a three-valve circuit. Automatic volume control is incorporated, and a permanent magnet moving-coil speaker. Automatic grid bias is also used, and is arranged to drop as the voltage of the high-tension battery drops.

The cost of the set without batteries is 9 guineas. It is supplied without batteries, since it is specially designed to work from quite standard H.T. and L.T. units.

### Low H.T. Consumption

The circuit is a four-stage one with seven tuned circuits, made up as follows: Band-pass input filter (2), oscillator (1), and four tuned intermediate frequency circuits. An octode frequency changer is followed by an H.F. pentode which feeds into a Westector second detector, while the output stage uses an ordinary pentode. The H.T. current consumption at 144 volts is 8½ milliamps. The set will also work well on a 120-volt battery.

The second battery superhet is known as the S.B.4, and is a more ambitious outfit, costing £11 19s. 6d., complete with batteries. It employs four valves, a double diode-triode, taking the place of the Westector in the model just described.

### ESCALATOR TUNING



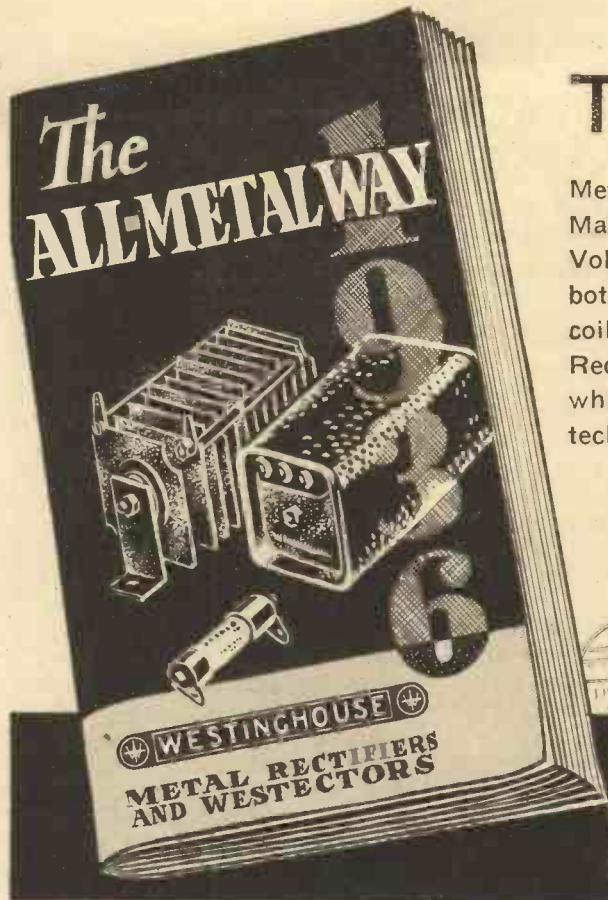
*Attractive and ingenious is the escalator tuning employed on this Bush Radio S.A.C. 21 model.*

Other details, such as automatic bias, are similar to those of the S.B.21. The H.T. consumption of the set is 9 milliamps.

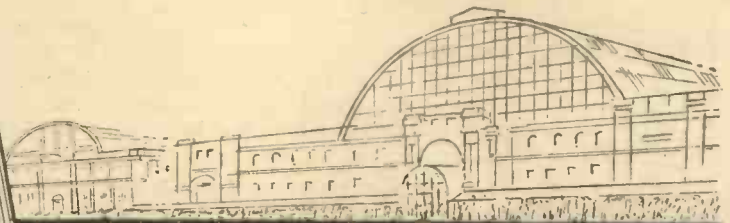
Turning to the mains models, we find the Upright Grand Superhet at 15 guineas. This is a console type of receiver, and in the words of the catalogue, has been introduced primarily for those who require better reproduction than is possible with the more usual table type of set.

For 11½ guineas the S.A.C.21 superhet is available. This is a table model, and has what is termed "Escalator" tuning. It uses four valves plus a rectifier valve.

Two more models remain which should be mentioned, a superhet for use on either A.C. or D.C. mains, and a mains portable receiver.



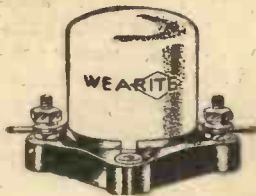
**T**HERE'S one booklet you mustn't fail to get when you visit Olympia—"The All-Metal Way, 1936." It's more than a catalogue of Westinghouse Metal Rectifiers and Westectors—it's a treatise on A.C. Mains Radio, distortionless detection and Automatic Volume Control. It contains chapters on trickle-charging both H.T. and L.T. accumulators, operation of moving-coil loudspeakers from the A.C. Mains, Universal Receivers, etc., etc. Get a copy from Stand 101, and while you're there, don't forget to ask for any technical information you may require.



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**7/6**



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W.8.35

**P**ROGRESS is the Ekco watch-word, and, in consequence, many improvements and refinements are to be found in the firm's range of receivers for the new season. During the past year the Research Department at the Ekco works has paid special attention to the question of reproduction, with the result that the tonal quality of the new models is better than ever.

### Sound Diffusion

Another advance is what the makers term "three-way sound diffusion," a system in which all trace of box resonance and other artificial coloration is entirely absent at all frequencies. It is pointed out that since it is claimed that the new speakers respond to all frequencies between 45 and 7,500 cycles, such aids as box resonance in an effort to improve the bass notes are quite unnecessary.

Another important change concerns the appearance of the new Ekco sets.

The familiar figured walnut shade associated with the models of the last two years has been supplanted by a darker and richer shade, the object being more closely to follow the present trend of furniture fashions.

### Ambitious Model

Here are details of the sets featured in the 1935/1936 programme.

The most ambitious model in the range is the R.G.86, a radiogram for A.C. mains. This receiver is housed in a very fine two-tone walnut cabinet. An 8-stage superheterodyne circuit, with band-pass tuning, is employed. Among the technical refinements may be mentioned the Ekco system of H.F. triggered automatic noise suppression and station pre-selection, continuously variable tone control, full delayed



## FROM THE FACTORY BY THE SEA

*On Stand 76 is a selection of the latest sets from E. K. Cole Ltd.'s famous works at Southend-on-Sea.*

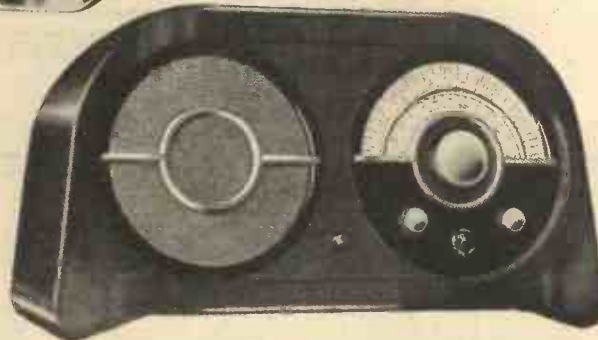
Q.A.V.C., tone-compensating volume control and image rejection. Wavelength ranges of 200/550 metres and 900/2,000 metres are adequately covered, the various stations being clearly marked on a large size illuminated tuning scale.

The gramophone has a 12-inch turntable, electric motor, Garrard swivel-headed pick-up, and automatic stop.

All the latest researches of the Ekco engineering staff have been included in this outstanding design, fidelity reproduction being the



*On the left is the Ekco Model ACT96. It is a 9-stage superhet trans-portable for A.C. mains. Below is the 8-stage superhet AC86, which is another A.C. receiver. It can also be obtained for battery operation, when it is known as Model B86.*



### TWO OF THE LATEST DESIGNS

key-note. An undistorted output of 3 watts is available.

The price of the R.G.86 is 22 guineas, or it may be had on deferred terms for an initial payment of 2 guineas and 13 monthly instalments of £1 16s. 0d.

Next on the list comes the model

A.C.86, an A.C. mains design which includes all the features of the G.R.86, with the exception of the gramophone section.

The A.C.86 model is available in dark walnut moulded cabinet for 12½ guineas, or in black and chromium for 10s. 6d. extra. On hire purchase the set is obtainable on an initial payment of £1 2s. 6d., followed by 12 monthly payments of £1 2s. 6d.

### With Q.P.P. Output

There is also the model B.86, a battery design employing a chassis not dissimilar to that of the A.C. version. In this case, a valve combination comprising a triode pentode, H.F. pentode, double-diode-triode and Q.P.P. output through a double pentode is used.

The price without batteries is 11½ guineas, and the deferred terms are an initial payment of 1 guinea followed by 12 monthly payments of 1 guinea.

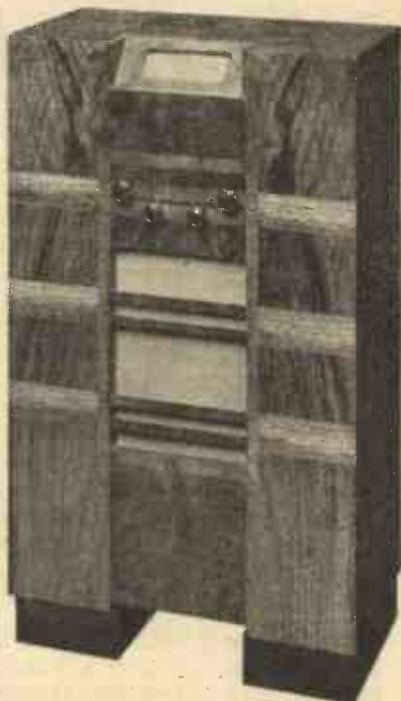
The model A.C.76 is yet another attractive proposition, in which a seven-stage superhet circuit with band-pass tuning is used. This receiver, incidentally, is available in two forms, namely, for A.C. mains only, or for universal mains.

The well-known Ekco pre-selector and automatic noise suppressor is included, together with full automatic volume control, tone-compensating volume control, image rejection, and a large size moving-coil loudspeaker. The undistorted output is 2½ watts, and the wide vision tuning scale is engraved with station names as well

as wavelengths. Sockets for an external speaker, and for the connection of a gramophone pick-up are provided, provision being made for switching in the latter from the front of the cabinet. The wavelength ranges are 195/560 and

*(Please turn to page 45.)*





The H.M.V. "Console Superhet Five" incorporates a superhet circuit, QAVC, and energised field M.C. speaker.

VISITORS to the H.M.V. stand should take particular care to examine the many fine receivers on show. The beautiful cabinet work and the evidence of sound craftsmanship everywhere cannot fail to make their appeal.

The name H.M.V. is, of course, a guarantee in itself of superlative quality.

One of the most recent H.M.V. innovations is fluid-light tuning, an ingenious visual method of showing when the set is dead-accurately tuned to a station.

#### Low-Priced "Five"

Among the sets incorporating this system may be mentioned the "Superhet Fluid-Light Five," an all-electric receiver for use on A.C. mains. This is a high-efficiency set with full automatic volume control and a high-note corrected output of  $2\frac{1}{2}$  watts. It is priced at  $13\frac{1}{2}$  guineas and, like the other sets in the H.M.V. range, is available on deferred terms.

For those who prefer the Console type of receiver there is the "A.V.C. Autoradiogram" priced at 33 guineas. It is a beautiful piece of work, and incorporates automatic record changing, playing as many as eight records at any one loading. The silent-running electrically-operated

## "HIS MASTER'S VOICE"

No introduction is needed to H.M.V. They are noted for high class work, and everyone who goes to the Radio Exhibition should visit Stands 77 and 82.



gramophone motor starts automatically when you lift the arm of the pick-up and you can play a complete opera right through without stirring from your armchair, rejecting or repeating records just as you like. Fluid-light tuning is fitted to the radio side, and the names of the various stations are clearly marked on the illuminated scale. This model is for A.C. mains supplies.

#### Universal Super

Listeners who are interested in Universal mains receivers should inspect the "Universal Superhet Four," model 340; this receiver has been designed specially for operation off either D.C. or A.C. mains of 195 volts or more. It reaches the same high standards of sensitivity and reproduction that are present in the equivalent superhet receiver designed for A.C. operation only.

The power consumption of this particular instrument is only 90 watts, and the price is  $11\frac{1}{2}$  guineas.

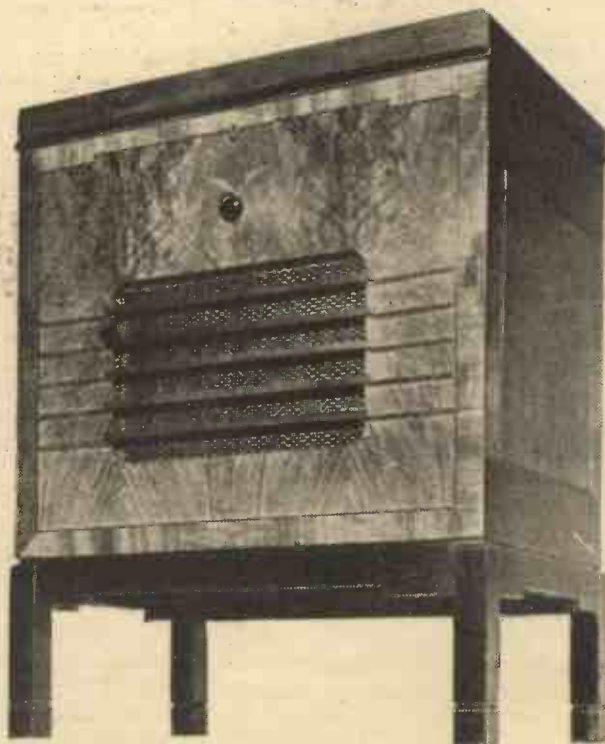
In the battery range are the "Battery Long Three," and the "Superhet Battery Four."

The "Battery Long Three" is an inexpensive set incorporating a moving-coil loud-speaker and capable of providing programmes from a large number of European stations. It is priced at £7 19s. 6d.

The second battery design is, as its name implies, a four-valve superheterodyne, and it includes such refinements as delayed A.V.C., double pentode output, and many other features. For example, there is a new type of scale called the "Reflecto" light scale, which is the invention of the H.M.V. research engineers. In order to save current, the scale is not illuminated, but is made of special material which makes the station names and wavelength calibrations stand out clearly from the background, and gives the illusion that the scale is illuminated from behind. As the main switch is turned to medium-waves, or long waves, a small transparent scale bearing the word "on" comes into

(Please turn to page 46.)

#### AN UP-TO-DATE RADIOGRAM



Costing only 33 guineas, this H.M.V. Radiogram has an automatic record changer, fluid-light tuning, superhet circuit and A.V.C. It is also a handsome piece of furniture.

# Questions I am Asked

**Q. 146.** What does the word superhet mean? It is so commonly used, but none of my friends seem to know exactly what it signifies.

**A.** Short for super-sonic-heterodyne. Heterodyne is an invented word derived from the Greek and meaning "different powers." When two different alternating currents are combined, "beats" are produced. These beats, or increases of strength, will occur at a frequency equal to the difference between the two original frequencies (also at a frequency equal to their sum, but this is not used). In a "superhet," the incoming signals are "heterodyned" by a locally produced alternating current. The resulting beats when rectified become the "intermediate frequency" signals which are exactly similar to the original signals but are of lower frequency (corresponding to a longer wavelength).

## The Intermediate Frequency

We can adjust this intermediate frequency to anything we like by altering the local frequency. If the local frequency is made only a 1,000 different from the incoming frequency, the beats would be audible or "sonic," and would directly influence a loud-speaker. The result would be a garbled one.

Actually we make the intermediate frequency equivalent to, say, 110 kilocycles (somewhere around 3,000 metres), although sometimes we raise it to, say, 500 kilocycles. In both cases the frequency is much higher than we could hear, even if we could get any instrument to respond. The usual human ear cannot hear sounds above 40 kilocycles (40,000 frequency).

The intermediate frequency is said to be super-sonic or above audible frequency. It is, of course, passed through several tuned circuits which provide selectivity, and then fed to a second rectifier (known as the "second detector") which converts the signals into "L.F." currents which, when they influence the loudspeaker, are audible.

**Q. 147.** I possess a superheterodyne receiver which is controlled by one tuning knob, but I can only receive one station. A technical



*This month our distinguished contributor gives some very interesting information concerning the superhet and on the value of having variable H.T. tappings on a battery set.*

friend tells me that if I can get any station at all on a superhet, it must be working. I have ganged the set perfectly on this station, which is at the bottom end of the medium waves. But over the rest of the dial the set does not seem to work.

**A.** Possibly the oscillator valve "packs up" as you tune to a longer wavelength. It may only just be oscillating on the station you receive. The fault may be that there is insufficient H.T. on the anode of the oscillator or excess negative bias, or the valve itself may be particularly dud.

A quite likely reason for your troubles, however, is that you have tuned your oscillator circuit (by means of the trimmer) to give an oscillator frequency *lower* than that of the incoming signal. It should actually be higher. Superheterodyne reception would be possible with your oscillator section trimmer tuning to the lower frequency, but other stations would not take kindly to this. You would very likely receive only one station, since there might be only one point in

the travel of the condenser at which the oscillator would differ from the incoming signal by the chosen intermediate frequency. To try out this defect, tune in to your one "ewe-lamb" station, and then unscrew the adjusting screw on the trimmer of the oscillator section of the gang condenser; this will reduce the capacity and raise the frequency. If the station reappears at a reduced setting of the trimmer, the trouble is no doubt due to the reason I have suggested, and other stations should be received by tuning the condenser to other settings.

**Q. 148.** The Hexoverter has several H.T. tappings. This is a common fault in your sets and tends to reduce their popularity. Tappings are totally unnecessary on a battery set and are nothing but a nuisance. Many batteries do not give the voltages you suggest, and when they run down where are you?

**A.** On velvet. And in company with those who have "tapped." I know it is a nuisance but many nuisances are necessities—take income tax. One taps because one has to tap. There are three main reasons—essential reasons, in fact—why tappings are provided on battery sets.

## Valve Characteristics

The first reason is that the designer does not possess second sight and cannot foresee the characteristics of the valves his constructor is going to use. While it is true that valve manufacturers issue curves and figures for their types of valve, it is equally and more dreadfully true that the figures for different samples may be 50 per cent out. In fact, most manufacturers will, if pressed, admit that this is their routine limit.

Now if H.T. tappings are provided, variations as between valves may be compensated usually by raising or lowering the H.T. voltage. For example, if the detector valve provides reaction which is inadequate, all you have to do, after, is to increase the H.T. on that valve. If the reaction is too fierce, a reduction of H.T. will put matters right. In the case of screened-grid and H.F. pentode valves, it is

(Please turn to page 45.)



# DUBILIER

... contributes a new feature to the technique of radio and amplifier design by producing a range of new Oil-Immersed Paper Dielectric Condensers, which will come as a boon to designers of apparatus for Television, Radio and Low-frequency Amplifiers, using the higher voltages.

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1.0 "	" "		13/-
2.0 "	2,000 "		17/6
4.0 "	" "		21/-

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#### MODEL F720—P.M.M. 27'6

For receivers with High Impedance Extension Terminals

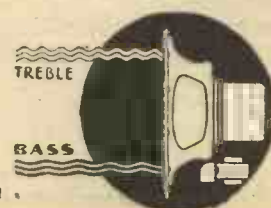
#### MODEL F720—P.M.T. 35'-

Both the above Speakers are 9 $\frac{1}{2}$ -inch DIAMETER WIDE RANGE TYPE giving supreme performance and embody a design which is unique in the history of Moving-Coil Speaker construction. In sensitivity, performance and range these new ROLA Extension Speakers are far in advance of any others available elsewhere.

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# B.B.C. News

A Coming Appointment—Clearing Away Red Tape—  
B.B.C. Territorials—Music Policy Criticised.

By Our Special Commissioner

## The Children's Hour

**I**N all the reorganisation that has been going on at the B.B.C. there has been no reference that I have noticed to the future of the Children's Hour; nor can I get much out of the B.B.C. in reply to my inquiries on the subject. One thing, however, is clear, and that is that the Children's Hour in future is to be part of the Drama Department. Whether or not this will mean that it will become more professional in the entertainment sense remains to be seen; but I suspect that the real reason for the amalgamation was to prevent the Children's Hour from claiming a place in the ranks of the nine regular programme departments.

The Children's Hour is definitely the Cinderella round at the "Big House." Its activities have been curtailed increasingly and its recognition minimised. The feeling I get is that the B.B.C. is rather ashamed of the Children's Hour. If I am right, then the situation is ridiculous. Derek McCullough, who runs the London Children's Hour, and the others who handle the Regions Children's Hours have been doing noble and consistent work for broadcasting.

If there were competition in British Broadcasting, this streak of inferiority complex at Broadcasting House would not last long. As it is, the Children's Hours from the Continent in English are steadily gaining ground, and I am sure everyone will agree that this is no tribute to our broadcasting.

## Sir Charles Carpendale's Successor

Sir Charles Carpendale, I have it on good authority, will not be prevailed upon to remain as Controller of Administration at the B.B.C. after about six months.

He will continue in an advisory capacity partly in connection with television. Therefore his succession is a matter of growing interest. First of all, Sir Stephen Tallents will move up one, not that he will be Controller of Administration, but rather that, as Controller of Public Relations, he will be second-in-command to Sir John Reith, the Director-General.

Mr. B. E. Nicolls, Director of Internal Administration, is the present favourite for the succession to Sir Charles Carpendale. Mr. Nicolls has considerable staff experience in the army on the North West Frontier of India. It is believed he is the firm nomination of Sir Charles Carpendale.

## SNAPPED AT THE MIKE



Two firm favourites with listeners, the jovial Leonard Henry and the "mournful" Horace Kenny.

## "Humanising" the B.B.C.

It is confirmed that Sir Stephen Tallents' chief function will be to humanise the B.B.C., and that the steps he will take in this direction will be on the programme side rather than

on the public relations side. Sir Stephen is credibly reported to have made up his mind to clear away masses of red tape.

One of his reforms will be the frequent microphone appearances of the Governors of the B.B.C. These "trustees" of the public interest will become real live personalities, chatting to their listeners regularly.

## Recruiting for the Services

The big drive to get the B.B.C. staff to join the Territorial Army or Air Force is, I understand, making good progress. There was recently a census taken of those already in some form of military reserve. This stimulated interest, especially when it became known that annual training with any branch of the armed forces of the Crown meant extra equivalent leave from duty.

## Musicians and the B.B.C.

Practically the whole of the membership of the Music Advisory Committee of the B.B.C. have become highly critical of B.B.C. music policy of late. The whole subject is being thrashed out at meetings of the Ullswater Committee, which can be counted on to deal with it faithfully in its Report. The present bone of contention is the attitude of the B.B.C. to such positive measures of musical education as the "Foundations of Music," which high-brow musicians think inadequate as a contribution to listeners' musical education.

I suppose a difficulty of this kind was bound to come sooner or later. There can be no doubt where the sympathy and the interest of listeners lie. It is high time that the B.B.C. shook itself free from minority control in music as it has already done in talks. These fine-sounding committees of experts have already served their purpose.

# Round the world of

# TELEVISION

## Television Finance

WHEN the new high-definition television service gets properly going a very important question is going to be the provision of the necessary finance. According to present arrangements this is to be provided out of the ordinary ten-shilling licence fee. It is probable, in fact, it seems to me to be inevitable, that the proportion of this which the B.B.C. gets will have to be considerably increased.

I never could quite see (and it is pretty certain that the B.B.C. takes the same view) why the Post Office should get any part of this ten-shilling fee at all, certainly nothing more than a very small percentage for collecting the money. It has always been rather a grievance with the vast army of licence-paying listeners that only a proportion of their money goes directly towards maintaining the service for which the fee is ostensibly levied.

## What About Advertising?

In other countries, notably in the United States and France, they have turned to advertising as a means of increasing the revenue for broadcast services. In America advertising is very largely introduced into ordinary sound broadcast services, and the same will apply in the television service in that country.

In France the stations are under Government control, but a number of wavelengths are allowed to certain independent stations which operate purely on advertising. This in some ways is not a bad idea, because after all listeners can keep to the regular broadcasts if they wish, and there is no obligation on them to tune in the "sponsored" programmes.

But the B.B.C., being a single monopoly, has always set its face against any advertising matter at all and, needless to say, independent concerns broadcasting either sound or television would have no earthly chance of getting a footing in this country.

## A REVIEW OF DEVELOPMENTS IN THE VARIOUS COUNTRIES

By Dr. J. H. Roberts, F.Inst.P.

### An Important Point

The whole question of advertising over the broadcast has been gone into very thoroughly in the past, and there might seem to be no reason to raise it all over again now. But some people maintain that television is far more adaptable to advertising purposes than sound broadcast, and that the problem arises in a new and more pointed form now than it did in the early days of sound broadcasting.

One important technical point in this connection is that, since the range of the television broadcast stations on

### FROM ITALY



*A peculiar-looking cathode-ray tube invented by M. Castellani, the Italian inventor. It is a "camera" tube for transmitting purposes.*

ultra-short wavelengths will be limited to perhaps 25 or 30 miles, it is possible to have quite a large number of stations which are prevented from interfering with one another by actual distance of separation and not by difference in wavelength, which is necessary in the case of sound broadcast on medium wavelengths. Another argument in favour of independent stations is that, being looked after by private enter-

prise they would "get going" in different parts of the country much more quickly than is likely to be the case with the official broadcast television stations.

### Television by Landline

The American Telephone & Telegraph Company are working hard on the development of a new type of television cable which, according to experts, is going to make all the difference to the transmission of the ultra-high-frequency television impulses by landline.

When the top of the Empire State Building in New York was selected as a television aerial site, it was believed the performers would have to go skywards in the elevators in order to be "seen on the air." But this new so-called "co-axial cable" has killed this idea, and the television camera, like the microphone, will go to the performers. Television shows will be staged in Radio City studios.

The new cable, over which images can travel as easily as a voice over a telephone wire, will be installed between Rockefeller Centre studios and the ultra-short-wave image transmitter in the skyscraper, probably within a year. The television productions will first be electrified at the radio acropolis and then will be sent under the city streets to the jumping-off site at the Empire State Building.

### An Enormous Amplifier

The invention of a new vacuum-tube amplifier, capable of tremendous amplification, along with the co-axial cable, has greatly helped the advance of television, and according to one expert, closely allied with the development work, puts television in the United States far ahead of any system in Europe. This amplifier tube is said to facilitate the reproduction of pictures on a screen several feet square. Furthermore, the images are reported to be clear and without flicker, and the lines that "paint" the pictures are so finely cross-meshed that the pictures

are described as being as clear as half-tones.

### German Developments

Something of the same kind is happening in Germany, where the German Postal Administration have developed a special type of cable suitable for television purposes. A cable of this sort is soon to be laid in Berlin, and the idea is to carry out experiments with a view to relaying television services over long distances by land-line, that is, by this new cable.

The alternative to some type of landline is, of course, to use short-wave radio transmissions, but as this is liable to all kinds of interference it is believed that the cable system will be much more reliable and satisfactory. Certainly some system of linking up various relay television stations will be necessary in order to provide a proper service over any large area.

### Television and Films

A good deal of discussion is still going on in film circles as to what is going to be the ultimate relationship between the film world and that of television. Sir Oswald Stoll had something to say on this question quite recently. He gave it as his opinion that television had undoubtedly come, or was coming, to *stay* and that it would form a permanent part of home entertainment in the future. At the same time, he felt that close co-operation between the stage, the screen, and television was very desirable in the interests of the latter.

In the early stages television would involve largely, if not entirely, the transmission of films, and for this reason alone it was desirable that the different interests involved should keep in closest touch. Some film people have frankly expressed a fear that television may do their industry some harm, but personally I think this is a very short-sighted view.

### Television Camera

The new Baird television camera, which is portable in the same sense as an ordinary professional cinematograph camera, is available for use for the transmission of both indoor and outdoor scenes. The direction transmission of a scene by television—that is, without the intermediary of a cinematograph film—involves some pretty delicate technique. It is very much

## BIG PICTURES POSSIBLE

easier to transmit from a film than from the direct subject, especially when the subject happens to be a more or less distant scene. With the new Baird camera an image is obtained as in an ordinary camera, and this image is used to provide electronic charges on a specially prepared plate. A picture frequency of 25 pictures per second can easily be reached.

### Huge Screen Reception

I learn from America that Mr. Sanabria, the well-known television engineer, has been able to show television pictures on a screen about 10 ft. square, the definition being 150 line. One of the special problems which had to be solved, was that of the source of light, as obviously an extremely powerful source would have to be used. A special type of arc light was finally employed and, according to the reports which reach me, a very good picture was obtained on this enormous screen.

### Mechanical or Cathode-Ray?

Readers often ask me whether the mechanical system of television recep-

It is impossible, of course, to say at this early date to what extent the cathode-ray receiver will monopolise the field. I think there is no doubt that the majority, at any rate, of high-definition receivers will be of the cathode-ray type. At the same time, there would appear to be no reason why the mechanical receiver should not still retain a good percentage of adherents.

### A Bright Picture

Amongst mechanical receivers' one of the best known is the Mihaly or, in its more up-to-date form, the Mihaly-Traub. In the earlier receiver of this type there were certain difficulties with regard to the setting of a large number of mirrors, but with the new Traub improvements the instrument has been made much smaller and is readily adjusted for the reception of high-definition television.

I recently attended a demonstration of the latest type of Mihaly-Traub television receiver and saw very good pictures, a particular feature of these being the brightness of the image.

### Television Call-Signs

When you receive foreign stations on the broadcast you identify them by their name or sound signature. The same question will arise with regard to television programmes, and it has been suggested to use a slide or plate with the name of the station printed on it, and to transmit this before each item of the programme. It is, of course, quite a simple matter to announce the name of the station on the accompanying sound broadcast.

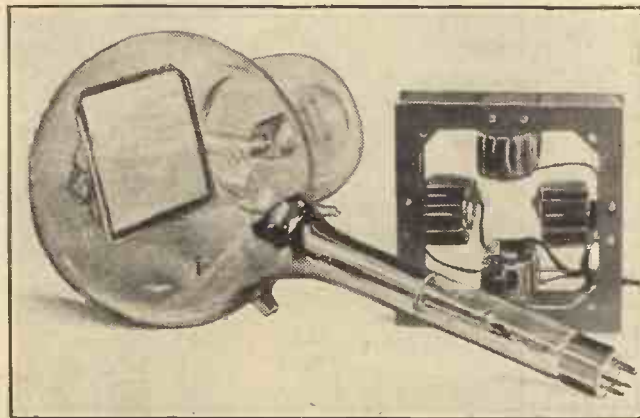
For some reasons, however, it is very useful to have some identifying mark such as a letter or word in small type in the corner of the picture, either there permanently or introduced from time to time so that it can be recognised by anyone who is engaged in tuning for the pictures without perhaps bothering for the moment to tune in the sound.

### Masking the Screen

The Marconi Company have recently taken out a patent for something of this kind. According to their arrangement the call sign, consisting of a letter or a word or other distinctive mark, is introduced into the cathode-ray tube transmitter and acts as a

(Please turn to page 50.)

## THE FAMOUS ICONOSCOPE



Another form of television camera. The screen on which the image is focused can be clearly seen. The deflecting coils have been removed and are shown on the right of the picture.

tion is likely to pass out when the new high-definition television broadcast system begins. Up to the present, with the 30-line B.B.C. transmissions, the mechanical type of receiver holds sway, and I suppose the majority of home television receivers at the moment are of the mechanical type. But when it comes to high-definition reception, it is a somewhat different thing, and many people seem to have the idea that mechanical reception is not adaptable to new conditions.

# SHORT-WAVE NOTES

By W.L.S.

I WONDER how many of the people who are reading this page are *really* interested in short waves? It would be nice to think that every reader of WIRELESS passed at least a casual eye over it, and thought, just for a moment, "I suppose I shall have to take up these short waves, sooner or later."

Let's put it another way. How many of my readers are interested in home-construction? We all know that the home-constructor, nowadays, finds himself in a very different position from the home-constructor of seven or eight years ago. There are some branches of radio in which he can

## SIMPLE BUT EFFICIENT

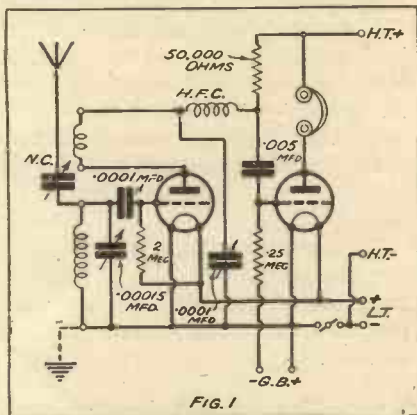


FIG. 1  
The circuit of a simple two-valve short-wave receiver. A set employing a circuit such as this can be constructed very easily and will give excellent results.

hardly hope to compete with the manufacturers of complete receivers.

When it comes to short waves, however, he is still in a veritable paradise, for short-wave receivers are still simple affairs to build, and they don't exist in ready-made form in terrific numbers.

## Try for Yourself

Last month I tried to put forward the claim of short waves as a branch of radio that should be taken up by everyone who likes to do a little bit of experimenting on his own. This month I should like to put them before the man who just likes to make his own gear for the joy of making it.

For not only can the home-constructor make a tremendously effective

short-wave receiver these days, but he can also make his own components to quite a large extent. He can "re-vamp" old parts from his scrap-box and make perfectly good short-wave parts out of them; and it is safe to say that for the expenditure of a

.....  
*This month W. L. S. gives some very practical hints which all home constructors who are making a start on the short waves will find of the utmost value.*  
.....

few shillings he can build quite a nice little short-wave receiver.

Possibly he thinks that this receiver will be a fiddly little affair on which he *may*, occasionally, receive a weak transmission or so if he's lucky. Perhaps he thinks that all the claims I make for the short waves are exaggerated and born of imagination. In either case, it's just about time that he tried things out for himself.

## Easy-to-Build Set

Last month I showed, for the keener readers, a two-valve short-waver of fairly advanced design. This month I am going to talk about a two-valver of the very simplest type that it's possible to build. Fig. 1 shows the circuit diagram, and Fig. 2 a suggested layout of the parts. The rest I leave to you, with the suggestion that you try hard to build it up from old components that you have on hand.

When you have gained your first experience of short-wave work, you will feel more like a visit to the local radio shop to buy new components and start off in earnest.

Please note that the circuit of this receiver is, broadly speaking, the circuit of the average broadcast receiver of ten years ago! This doesn't mean to say that short waves are ten years behind the times, but rather that the complications that beset the designer of a broadcast receiver don't yet arise on the short waves.

We have so much space down there that we don't have a whole bandful of powerful stations working at 9 kc. separation; furthermore, although there are scores of active broadcast stations on short waves, they don't all work at once, and one hasn't to worry

about cutting out a local 50-kw. transmitter, unless one happens to live very near Daventry.

The detector circuit uses the ordinary series-fed reaction arrangement, which does away with the need for a very efficient H.F. choke. Any broadcast H.F. choke will do the job. This valve is resistance-coupled to the L.F. stage, so that altogether there are remarkably few components in the receiver.

## No Threshold Howl

Notwithstanding its simplicity, a short-waver of this type is remarkably effective, and is free from most of the troubles that one usually associates with work on the very high frequencies. The resistance coupling makes "threshold howl" a virtual impossibility; careful layout will do away with hand-capacity, if one doesn't try to couple the aerial too tightly; and the volume one should obtain, at any rate on the more powerful stations, is ample for headphone work.

Regarding the individual components there is quite a lot to be said. The accepted fashion for coils, nowadays, is to arrange two windings—grid and reaction—on a four-pin

## A SUGGESTED LAYOUT

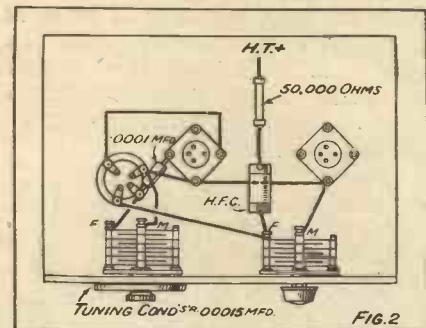


FIG. 2  
This is W. L. S.'s suggested layout for the Fig. 1 arrangement. Note the position of the coil holder in relation to the detector valveholder. This ensures a short grid lead.

former which plugs into an ordinary valveholder.

Naturally you may connect the four ends to the four pins in any way that strikes you as convenient, provided, of course, that all the coils are arranged in the same way! There are, at least,

four different commercially built sets of coils which *all* have different pin-arrangements—so you'll be in good company whichever way you do it.

The connections shown in my layout diagram imply that the grid coil is connected across the grid pin and one filament pin, with the reaction coil across the remaining two. The grid pin carries the "live" end of the grid-coil, and the anode-pin the "live" end of the reaction coil.

### The Coil Windings

On the coil itself these live ends are arranged at the extremes—top end of grid winding goes to grid pin; bottom end of reaction winding to anode pin; low-potential ends (filament pins) adjacent in the middle. Both coils, of course, are wound in the same direction.

Regarding turn-numbers, I suggest the following three coils: 12 grid and 7 reaction; 7 grid and 5 reaction; 3 grid and 3 reaction. There's a lot to be said for an attempt to standardise turn-numbers in this way, so that we may have a kind of approved series of home-made coils, the wavelength ranges of which are more or less known.

If you haven't a .00015 condenser suitable for tuning, you may easily make one up from an old .0005, preferably one of fairly good quality. Half the plates should be removed, and the two spacing-washers used between those that are left. This will give you a condenser with a capacity that is roughly one-quarter of that of the original.

### Winding a Choke

If the one you operate on is of a very old type, cut away as much of the supporting ebonite (or "x-ite") as you possibly can. Just leave enough dielectric material to hold the fixed plates rigidly in position—that's all you need.

A good slow-motion dial is a great help. If the condenser is of the slow-motion type the dissection operation won't be too easy, and will probably result in the disintegration of the slow-motion apparatus, if I know anything about the job.

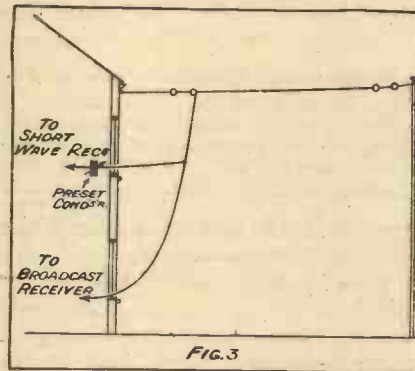
I have already suggested that practically any H.F. choke will be sufficient. If you haven't an old broadcast type on hand, make your own by winding 60 or 70 turns of wire on a length of ebonite rod.

Some people are apt to look upon short-wave aerials as a bit of a problem. There is no need

## USING TWO SETS AT ONCE

to be worried at all; you can easily string up 50 feet or so in a position that won't interfere with the broadcast receiving aerial. Possibly your broadcast receiver has a mains aerial or a small indoor affair, anyway; or possibly you won't want to use both sets at once.

### TWIN INPUT LEADS



How two sets, one tuned to the short waves and the other to the ordinary broadcast waves, may be used simultaneously on the same aerial.

In most cases it is actually possible to operate the two sets off the same aerial without interaction. I often do this myself. In my case the lead-in from the big aerial goes down to the broadcast receiver on the ground floor. From a convenient point I just tap off a separate lead-in coming to my first-floor window, and there's my short-wave aerial. Neither set seems to know that another one is sharing its aerial!

An earth connection may generally be dispensed with altogether. The capacity of the set and batteries to

### FIVE-METRE TESTS



Five-metre work is one of the most fascinating branches of short-wave transmission and reception. Here are two enthusiasts carrying out tests with a portable five-metre transmitter which is installed in their car. There is unlimited scope for experiments on these very short wavelengths.

earth forms a perfectly good earth at these very high frequencies, and the provision of a direct connection will sometimes spoil matters by introducing hand-capacity troubles.

Try one, by all means, but don't be afraid of leaving it out of the picture if things don't go well with it.

### Slowness is Essential

In the near future I am going to give you an idea of the sort of things you ought to hear on the various wavebands and different times of day. I won't go into that any further here, but I should like to pass on a few hints on how to listen.

You may have the best short-wave set obtainable, but you certainly won't get the best from it without intelligent operating. Don't be hurried with the controls. Tune very slowly, cultivate a featherweight touch on the reaction control, and listen to everything that you hear. Carrier-waves will come and go in a tenth of a degree—but what is just a squeal to one man is probably a station at some fabulous distance to another.

If you only stop and listen to the loud ones, your log will only contain those call-signs that *everybody* hears. Be patient—stop and listen to the weak ones, and try your hardest to make something stronger out of them by really careful adjustment of the controls.

Then, once you know their settings you can look for them day after day, until one glorious day arrives when *they* come under the heading of strong stations.

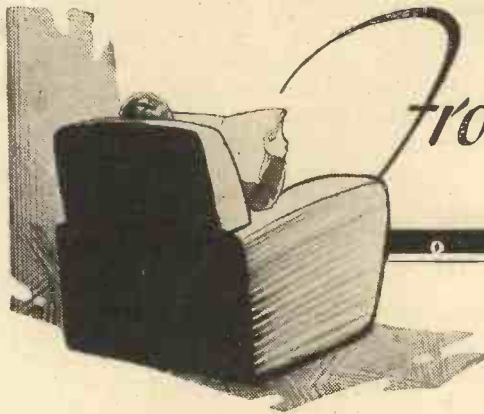
### Start Right Away

Conditions vary enormously from one day to another—one of the charms of short-wave reception—and you will never lose the fascination of meeting new friends and finding old ones gone.

In the next issue I am coming back to the layout of the "more advanced" receiver that I talked about in the last issue. Meanwhile, try out this simple one.

But please do try it. Don't wait till the next issue, so that you can start right in with what is a "better" receiver. For the new arrival to short-waves the simple one is preferable, just to get his hand in. You will do ever so much more with the next set if you have already tried the circuit given here.





# From My Armchair

Farewell to a Radio Pioneer—Dr. Eddy—Television and the Home Constructor, are among the aspects of radio discussed in this racy contribution.

ANOTHER landmark in the history of broadcasting is being pulled down, bit by bit. I pass Chelmsford about once a week and from the train window I see that one of the giant tubular masts is already down and that the other is truncated, and will also no longer stamp Chelmsford as a home of radio.

## An Element of Tragedy

Of course, Marconi's chief works are there, and the masts supported the aerial from which Melba sang and from which 5XX (before it moved to Daventry, before it moved to Droitwich) dispensed entertainment to Britain on the long waves.

There is an element of tragedy about this dismantling of a famous station. We all felt the same about Poldhu's masts, which incidentally were of exactly the same type—consisting of tubular sections bolted together, an invention of John Gray, who was chief engineer of Marconi's.

What will happen to the bits? Scrap iron or re-erection somewhere else? Meanwhile, a glance from the railway window reveals two other masts of the open-work pylon type with steel cross-bars or "spreaders" at the top.

The discovery of eddy currents by Dr. Aloysius Eddy, of Göttingen, first revealed in a West Country newspaper, was—as is so often the case—a matter of luck or luck combined with a rare

genius which sees the significant in the undistinguished.

Eddy was visiting a famous authority on transformers in this country, and was shown a new type in action. The manufacturer, who was inordinately proud of his latest development, tapped the transformer and remarked: "Pretty hot, isn't it?" The German professor, not understanding this English idiom, followed the manufacturer's example, touched the transformer and found that it was hot.

On returning to Göttingen, he explored the possible reasons for the heat and found it was due to undesirable electric currents in the solid iron core of the transformer. These currents were afterwards called Eddy currents, and Eddy reduced the effect

invaded by a little common sense and cool-headed criticism. Their queen bees are buzzing in an impotent frenzy at the cool douche poured on the hive.

Never mind they will soon be buzzing delightedly; my article will probably be forgotten in a couple of months' time, and the laughing jackasses of Timbuctoo and wail of the Jabberwock in Terra del Fuego will be dangled before your credulous, popping eyes and excitedly twitching furred ears.

## "The Salt of the Earth"

God bless all hams. Actually, they are the salt of the earth—but if the cow-faced British general public had the same elementary critical faculties and were as easily satisfied with feeble, fading, fiddling, fugitive fudge, we should all still be listening with headphones tied to a coal detector hitched to an iron-bedstead.

Readers are continually asking me how television will affect them and their hobby. Well, I am hoping that television will come within the abilities of the constructor, but some manufac-

turers, ungrateful of the great impetus given to broadcasting by the fraternity of the screwdriver and bradawl, are hoping the reverse.

We shall, of course, and in due course, see—which is one of the compensations for growing older. My own feelings are that only the higher-grade constructors—and those with more money to spend—will be able to

## RADIO-EQUIPPED SOUTH AFRICAN AIRCRAFT



Junkers aircraft for South African Airways in flight. They are fitted with Marconi combined medium- and short-wave transmitting and receiving equipment.

by altering the design of the core, "laminating" it. He took the idea back to the English manufacturer, who, after making new models, declared the Eddy transformer had the others beaten "stone cold."

My article on the short waves has certainly livened up the "hams." They have seen their precious preserves

cash-in on television. The home-constructed television outfit will, no doubt, be a main job and constructors—for a very accountable reason—have fought shy of main jobs. The reason has been cost. The battery set can still whack the manufactured article in price and performance, but the cheap mains super-heterodyne manufactured in the mass has never had any competition from the technical press.

### Designing for Home Constructors

Only a wholesale slashing of component prices would put the constructor on a level with the manufacturer, and such a slashing will never occur. Component manufacturers like to give manufacturers huge discounts.

The policy, as I see it, is for designers for the home-constructor to design on different lines from those adopted by manufacturers. It is no use imitating a commercial job at the same or a higher price. I present this idea free to all Press designers. We should give the constructor different and better results. Constructors, on their part, will get very much more out of their hobby by improving their operating skill and not crying out for one-knob control.

Inventive ability, rather than mere designing skill, has become necessary for the Press designer. There are hundreds of very able designers, but you have only to look at the circuits of any dozen manufacturers' sets to see that they are all cut to more or less the same pattern.

One of the most praiseworthy attempts to strike out in a new direction was W. T. Cocking's single-span super-heterodyne. There must be other directions for invention

and research especially beneficial to the constructor. As the price of commercial sets falls—it must surely have reached the nadir already—the need for merit becomes paramount in a constructor's set. In the old days most people built their own to save money. Now they do it partly as a hobby and partly because better results can still be obtained if the right design is chosen.

## THE R.M.A. AND TELEVISION

But to return to television. Any constructor who fails to learn something about this subject will find that he is behind the times. He has a great opportunity for returning to his old position as a "local authority."

Television will not come with a rush. It will ooze on us, but it will produce lots of excitement. Those with television equipment will invite their friends in to "see"—and will derive great social status thereby.

The radio industry would, if it had the chance, gladly forego television. It is thought that it will unsettle people and stop them buying the present type of sets. It is said—with some exaggeration, no doubt—that the Television Report stopped the sale of sets for a week!

### A Highly Specialised Job

The panic is subsiding and I, for one, would not hesitate to buy an ordinary broadcast receiver at this stage if I were planning to purchase a set. A television receiver is such a

factors' Association, which includes the leading British makers:

"Many years must elapse before any high definition television service is available for the country as a whole. The receiving instrument will probably take the form of a receiver employing anything up to twenty-five valves, with the addition of a cathode ray tube. It is safe to say that in so far as a television receiver, as at present visualised, requires up to six times as many valves as the popular priced radio receiver, its price cannot be less than approximately six times that of present-day instruments; that is to say, about 60 to 70 guineas. The fact that there are many more valves than in an ordinary radio receiver means that valve replacements will be costly; and the replacement of a worn-out cathode ray tube will be a very expensive job. Television can only be regarded as an expensive hobby for the time being, whereas sound broadcasting is a democratic entertainment. Television cannot in any way be regarded as an alternative to sound broadcasting. Rather, in the course of time, will it become a supplement thereto."

Well, there you have the manufacturers' viewpoint. Rather jaundiced and tintured by a fear that television will upset their apple-cart, but full of common sense and that greatest of all wholesome liquids—cold water.

In private they think television is a darned nuisance and that it is being thrust on an unwilling public. Probably they are quite right. Commercially, a five years' television moratorium would be ideal. The public has not yet tired of sound broadcasting and does not need the titillating attraction of a new scientific development . . . Yet.

### Progress Must Go On

One ought not to dangle a brightly coloured toy before the eyes of a perfectly good baby enjoying a perfectly good dinner. In this case the baby's dinner is the manufacturer's bread and butter.

Television is a disturbing element, but this 'ere progress has to go on. Baird has set the pace, and without this far-seeing Scot nobody would be bothering about television at all. Believe it or not, he put dynamite behind all the big corporations who are now actively engaged in television work—and incidentally competing with himself.

There is no overwhelming demand for television as yet, but neither was there for talkies till we got them. I foresee a day when all the B.B.C.

(Please turn to page 51.)

### A POPULAR PIANIST

Mr. Austen Croom-Johnson, famous for his special light music programmes, is an enthusiastic radio fan and no mean home-constructor, as well as an accomplished musician.



highly specialised job that I foresee ordinary receivers being a marketable proposition for many years yet.

But the manufacturers are determined to educate the public on television prospects. This autumn may see another foolish panic on the part of a public that wants to see what is going to happen before buying a set.

Here are some extracts from a pamphlet issued by the Radio Manu-

THE items illustrated by my two diagrams this month are rather in the nature of fault-correcting ideas to apply when things are not working quite as they should. But they are both essentially practical ways out of trouble, so I think you will agree they are fully justified under the title of this article.

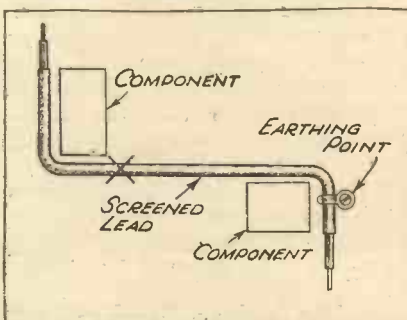
The first one refers to mains sets or radiograms especially, but may also apply to battery receivers sometimes. The introduction of screened leads at certain points to cure hum or instability does not always prove as effective a cure as theory would lead one to expect.

### A Question of Earthing

Quite often the reason for this can be traced to the earthing point for the screening of the lead. In the diagram you will see that the screened lead runs past one component and then along past another one before reaching the point where the sheathing is earthed.

Now suppose that the first component, either by virtue of its capacity to the screening of the lead, or by induction due to its field, induces currents into the screening. These will have to run past the second component before they are nullified by the connection to earth.

### THOSE SHIELDED LEADS



Illustrating how currents induced into a shielded lead may produce hum or other troubles in a nearby component before reaching the earthing point. The remedy is to earth the shielding at the point X in addition to the other point shown.

Thus, should the second component come earlier in the set's circuit than the first one, feed-back can easily be caused, or alternately, hum can be introduced. Of course, if the screened lead ran along a metal chassis and was in contact with it, the effect would be removed by the earlier earthing of the screening.

# Practical HINTS FOR ALL



## Some Topical Tips

By

A. S. CLARK

But the shielding of the wire might only touch the chassis at times, with the result that most peculiar intermittent humming or instability might occur. Obviously the best thing to do is simply to earth the metal shielding at either end, and then there will be no question of unwanted currents running along its length.

Considering how simple the cure illustrated in the second diagram is—just a single spot of oil at the right place—it is really amazing what a lot of bother can be caused by the trouble it overcomes. The whole thing was brought to my notice by a colleague who was called in by a friend because a most mysterious trouble had cropped up in his radiogram, on the record side.

When it was first turned on everything seemed O.K. for the first record or so. Then a most terrifying judder started up and the record reproduction was spoilt by a spasmodic slowing up of the record.

### The Cause of the Trouble

Investigation showed the trouble to be connected with the pressure pad of the governor. This was trying to seize up against its bearing plate, in much the same way as a piece of rubber will grip when rubbed down a pane of glass.

Just a suspicion of oil on the pad cured the whole trouble. But if you employ this dodge, whatever you do, don't put more than just a suggestion of oil on. Otherwise the braking power of the pad may not be sufficient to keep the motor down to the right speed, since normally it does not require oiling at all.

As a matter of interest, it is worth trying to puzzle out the cause of the motor working properly when first

turned on. Personally I am of the opinion that this was owing to the fact that, due to thickish oil, there was not so much power available at first, and consequently the governor pad did

not have to press so firmly on the flange.

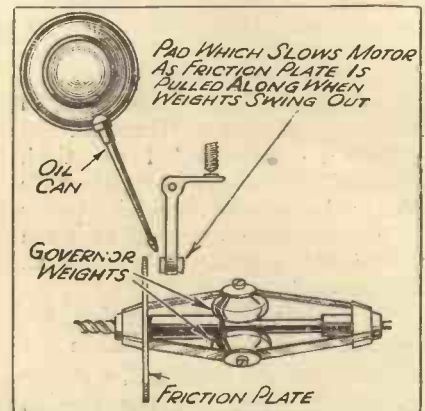
Others with whom I discussed the subject think it more likely that a thin film, either oil or dust, prevented the pad from binding until a little time had expired to enable this film to be rubbed off. Whichever explanation you like to take, there is no doubt about the effectiveness of the cure.

### A Point to Note

Just a final point, though: don't assume that a motor which simply runs slowly without any judder or vibration is necessarily suffering from the complaint I have just dealt with. It is far likelier that it simply requires oiling in the ordinary way.

It is amazing how many people seem to assume that a gramophone motor will go on running year in and year out without a little grease and oil occasionally. So if you have any motor trouble, just see that it is not due to a lack of lubrication before suspecting anything more serious.

### A SIMPLE REMEDY



If you are troubled with a spasmodic slowing up of your gramophone turntable, try a spot of oil at the point shown in this sketch.

And while on the subject of gramophone motors, it is worth mentioning that some single-spring motors of small power are only properly effective when running at the correct speed. If run a bit slow, apparently due to a slight loss in velocity of the turntable, they will slow up on heavy passages. This is worth remembering.



INVENTIONS are positively bursting from the Professor at the present time. Amongst the most outstanding, I may mention the rubber bath suit for use in drought-stricken districts. This covers the wearer from top to toe, and, since the water is not even soiled from his immersion, the same bath can be used by any number of people.

### An Outdoor Set

Then there is the new tuning condenser with which once more he will completely revolutionise wireless reception. In this condenser the moving vanes are fixed, whilst the fixed vanes move. The hub is connected by a reduction drive working through a synchro-mesh gear-box with three forward speeds and reverse.

There are many others, but most of them are still so hush-hush that even I know little of them; and, between ourselves, I am not quite sure that the Professor does, either.

Since he was so strongly under the influence of the creative urge, it seemed that the time was ripe for me to suggest that our joint brains should produce one of those remarkable innovations which mean so much in the lives of readers of WIRELESS.

"It's a long time," I remarked, as I sank into the most comfortable chair in his den at The Microfarads—"a long time since we've given readers anything in the way of an outdoor set."

### "Blue Prints" Available

"Just think," I continued, warming up to my work, "of the way in which the greater part of the population discards most of its clothes at the week-ends and starts out for the great open spaces, hiking——"

"And biking."

"Yes, and even triking."

"My dear fellow," exclaimed the Professor, "I see at once what your point is! There is practically no receiving set so light and so compact that they can take it with them on their rambles to enable them to listen to the—er—er——"

A moving story of adventure wherein the traffic laws are defied in the interests of invention by our famous pair.

"Talks to Schools," I suggested.

"Yes, and the Children's Hour, and all the other good things that the B.B.C. gives us during the afternoons. Something must, undoubtedly, be done about it. A set for cyclists is clearly required, but I foresee certain difficulties."

"Have you noticed," I queried, "the amazing number of tandem bicycles that are now to be seen on our roads? Let us evolve a special

### HIKING AND BIKING



"... the population discards most of its clothes at the week-ends and starts out for the great open spaces . . ."

set for tandems, and we shall probably get the O.B.E. or N.B.E., or something."

"How? Why?"

"Well, our set will be so perfect that all cyclists will take to riding tandems. They will no longer straggle side by side over three-quarters of the road, and the Minister of Transport chappie will be so frightfully bucked that he is sure to push us into the next Honours List."

From these small beginnings the Goop-Wayfarer Tandem Ether Snatcher, of which (and from which) so much will be heard in the future, was born.

The set itself would be described in detail, the particulars occupying the whole of the next issue of WIRELESS were it not for the professional jealousy of other and less eminent writers. As it is, any reader can obtain a full-sized blue print (in black and white) and a complete set

of instructions absolutely free of charge by sending the Professor a cheque for £3 10s. 4½d. to cover the cost of postage and packing.

N.B.—Cheques subsequently marked "R.D." will be returned to the sender wrapped round a brick and postage not prepaid.

### The Idea is Born

When we came to think it over, the tandem bicycle seemed to offer many possibilities. We were thinking them over during a walk down the High Street of Mudbury Wallow, when the Professor stepped absent-mindedly off the pavement and was promptly knocked down by one of these machines. Most people would have been somewhat annoyed at being made thus to bite the dust.

Not so the Professor. Continuing to sit upon the wreck of his hat, he apologised profusely to the crew of the machine, and called upon me to come and examine it. Its front seat was arranged for papa and that behind for mamma. Nothing unusual about that, but read on. As we were examining it another drew up behind—with friends of the first lot on board.

"Look at that!" cried the Professor, getting up hurriedly from his hat and rushing over to the new arrivals.

He pointed to the rear wheel. Attached to the frame was one of the neatest miniature sidecars for baby.

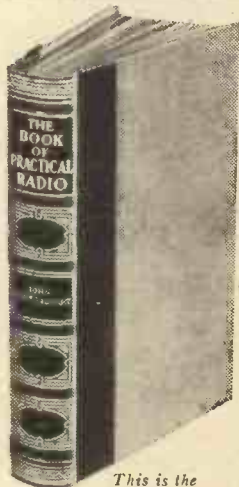
"You see," cooed the Professor, "just how we can fit up our 'Ether Snatcher.' It shall have a pretty little sidecar all on its own."

### We Make a Tandem

Naturally, I grasped the big idea in a moment. We returned almost at the double to The Microfarads, eager to get down to the work.

We couldn't raise a tandem bicycle, but great minds like ours are never daunted by that kind of thing. We very soon made one by pinching Tootle's push-bike and Primpleson's from outside the Wireless Club hut, removing the rear wheel of the former and the front wheel of the latter, and fixing them together with a portion of

(Please turn to page 46.)



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Your volume is waiting. This month gift token No. 2 appears, and readers who started with gift



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**IMPORTANT NOTICE**

**THE NEXT ISSUE**

(September Number)

OF

**WIRELESS AND TELEVISION REVIEW**

Will be on Sale

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Thereafter future issues will be published at the beginning of each month, instead of on the 15th, as heretofore.

All your favourite writers and features will continue just the same. It is only the publication date that is being altered.

**DON'T FORGET**

**NEXT NUMBER**

**AUGUST 31st**

**Building the  
ST600  
RADIOGRAM?**

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The batteries that

**'Still keep going when  
the rest have stopped'**

FOR L.T.—EXIDE CZG4, 2 VOLT, 40 AMPERE HOURS—11/6

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Obtainable from Exide Service Stations and all reputable dealers. Exide Service Stations give service on every make of battery. EXIDE BATTERIES, Exide Works, Clifton Junction, near Manchester. Branches at London, Manchester, Birmingham, Bristol, Glasgow, Dublin and Belfast.

## ROME'S TWIN STATION

THE Italian Broadcasting Company have decided to increase the total power of their broadcasting stations from the present 190 kw. to 450 kw. by the end of this year. The Bolzano transmitter at present rated at 1 kw. will be replaced by a 10 kw. station. The present Turin local station working on 200 watts will be increased to 1 kw., Turin I from 7 kw. to 10 kw.

An entirely new station rated at 50 kw. in aerial will be opened at Bologna, on October 28th. The power of the Rome I station will be increased from 50 to 120kw. and a second medium-wave transmitter, also with 120 kw., will take the place of the present low-power Rome III local station.

These plans will make Italy the most powerful broadcasting country in Southern Europe. Since last year the international aspect of broadcasting in the Mediterranean has come to the forefront in Italian programmes. A special broadcasting service is provided for Greece from Bari, also one in the Arabian language. Special

transmissions in Bulgarian are regularly broadcast from Florence. News bulletins in Serbo-Croat are sent out from Triest and Bari, in Hungarian from Triest alone and in Roumanian from Bari.

Apart from these broadcasts in languages of the people of South-Eastern and Southern Europe the Italian stations appeal to foreign listeners in the other parts of our continent by providing language lessons, news bulletins, and tourist talks. These are broadcast in German from Rome, Milan, Turin, Triest, Florence, Bolzano; in French from Rome, Milan, Turin, Florence, Bolzano, and in English from Rome, Milan, Turin and Bolzano.

### A "Local" Alternative

There is no doubt about it that these broadcasts in foreign languages take up a large amount of programme time which would otherwise be devoted to the requirements of the Italian listener. This is probably one of the main reasons for the Italian Broadcasting Company's policy of providing suitable alternative programmes in all the more important and thickly populated centres.

Special broadcasts for foreign listeners are always a cause of possible protests by diplomatic representatives of the countries concerned. In Rome the authorities have therefore limited the news they broadcast in other languages to such items as directly concern Italy and Italian policy, and they invite and obtain the co-operation of national authorities in cases as, for instance, the special Greek broadcasts.

The natural musical talent of the population demands a high standard of execution in all musical programmes from Italian stations. This is also very fortunate for listeners outside the country. The excellence of the musical programmes, the special service in languages, and last, but not least, the alluring tones of the women announcers tend to make Italian stations the favourites of Europe.

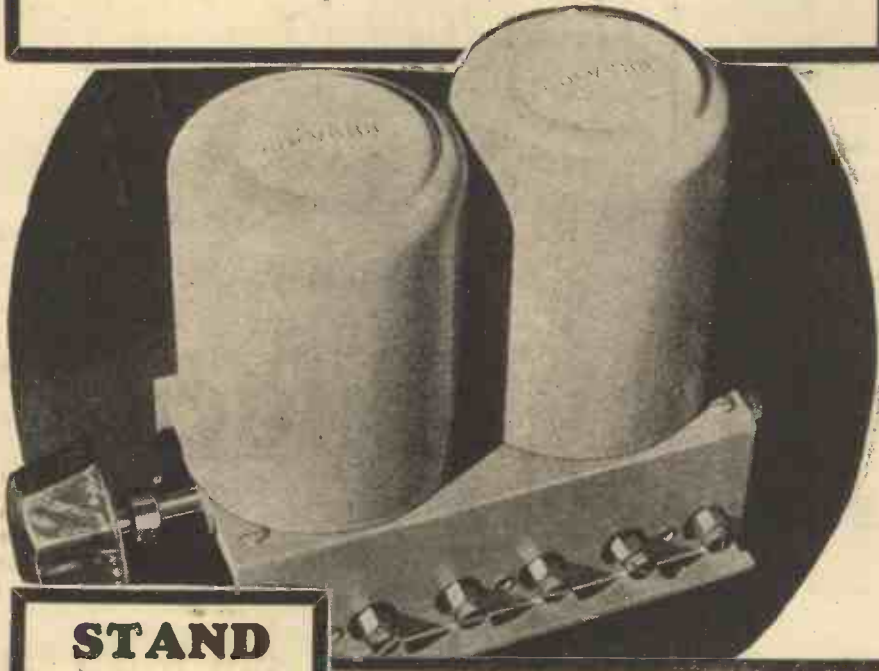
### Still Few Listeners

By this I do not wish to say that the power increases in Italy are in reality intended to further strengthen the international position of these stations. Undoubtedly the geographic formation of Italy requires more stations and possibly more power, and let us hope that once the programme of extension is completed the number of Italian listeners—which is still only 450,000, or little more than 1 per cent of the total population—will increase by leaps and bounds.

A. A. G.

# Selected for selectivity

COLVERN COILS SPECIFIED FOR  
"S.T.600 BATTERY RADIOGRAM"



**STAND**

**55  
OLYMPIA**

Mr. John Scott-Taggart repeatedly specifies Colvern components for his receivers. The consistently high standard of workmanship in all Colvern productions assures that every Scott-Taggart receiver in which they are used will give the same perfect reproduction as the original model.

1 pair S.T.600 Coils 12/6  
Price, Complete  
Extractor Coil 8/6  
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# COLVERN

Colvern Limited, Mawneys Road, Romford, Essex.  
London Depot: 150, King's Cross Road, London, W.C.1.

### VARIABLE RESISTANCE

Colvern wire wound variable resistances are reliable and noiseless. Available in three types from 2 to 50,000 ohms.

**FROM THE FACTORY  
BY THE SEA**

—continued from page 30.

900/2,000 metres. The price of the A.C.76 model in walnut finish is 11 guineas, the black and chromium cabinet being 10s. 6d. extra; hire purchase terms in this case being an initial payment of 1 guinea, followed by 12 monthly instalments of 1 guinea.

Two other mains designs complete the firm's comprehensive range. One of these is the model ACT.96, a 9-stage superhet transportable for A.C. mains; in this receiver twin frame aerials built inside the cabinet are employed, although an external aerial and earth may be used if desired.

**A Wise Servicing Move**

The large size station scale is uptilted for easy reading. Such features as full delayed automatic volume control, continuously variable tone control, tone-compensating volume control, and other special Ekco features are all included.

The model ACT.96 is priced at 14½ guineas in walnut finish, and is available on deferred terms for an initial payment of £1 6s. 0d., followed by 12 monthly payments of £1 6s. 0d.

The last receiver in the range is the model AD.36, an inexpensive 3-stage H.F. detector and pentode outfit for universal mains. This model is housed in a circular moulded cabinet, and costs 8 guineas. On hire purchase, the terms are 14s. 6d. down, followed by 12 monthly payments of 14s. 6d.

Readers will be interested to learn that service accessibility is a feature of all the new Ekco sets; in every case the chassis may be removed by detaching the control knobs and four screws, while the volume control, wave-change switch, and all other vital components are removable singly without disturbing the other wiring or causing any difficulty in replacement.

**QUESTIONS I AM ASKED**

—continued from page 32.

useful to be able to apply the best H.T. to the screen. If the H.T. is fixed, none of these tests can be carried out, and there will be a loss of efficiency. In the Hexoverter, a complicated set of electrodes are to be found in the "mixer" valve—the X.21. It is essential that the oscillator portion should oscillate at all points

on the tuning dial, and the H.T. applied to the "grid" acting as oscillator anode is most important.

The second reason why H.T. tappings on battery sets are employed is that mains units are often used, and to avoid interaction and motorboating there are advantages in having separate anode voltage tappings. Mains units are provided with tappings.

The third reason is that "high-tension" batteries run down. This means that the maximum voltage drops. If you had only one H.T. positive tapping the set would work well when the H.T. was fresh, but the smaller H.T. voltages in the set itself

might fall below their serviceable value. A reduction in maximum H.T. will reduce the available sound output, but lack of sensitivity may be nearly restored by increasing the subsidiary H.T. tappings, such as the ostensible voltage on the screen-grid of the H.F. valve. This increasing of the H.T. compensates in some measure, counteracting the drop in the maximum H.T. volts. The tapping thus becomes very useful.

It is regrettable that H.T. battery makers do not standardise the tappings, but you can get near enough (try both sides) to a designer's recommended voltages.

**NOW —  
ANOTHER MOMENTOUS  
ADVANCE!**



1936 Stentorian:—

- Senior Chassis..... 42'—
- Junior " ..... 32'6
- Baby " ..... 23'6
- Midget " ..... 17'6
- Stentorian Duplex ... 84'—

New production methods make possible a vastly improved performance at no price increase. New designs of magnet and component parts bring an order of efficiency hitherto beyond the bounds of possibility. Hear the 1936 Stentorian to-day! Listen to the enormous volume from weak inputs. Notice the marvellous definition, incisive top notes, and magnificent natural bass. You will find it hard to believe that prices remain at the same level as last year!

In this startling new range of instruments W.B. engineers again give triumphant proof of the value of consistent and intensive research.



**1936  
STENTORIAN**

Whiteley Electrical Radio Co., Ltd., Radio Works, Mansfield, Notts. (Electrical Dept.)

Sole Agents in Scotland: Radiovision, Ltd., 233, St. Vincent Street, Glasgow, C.2.

Sole Agents in I.F.S.: Kelly & Shiel, Ltd., 47, Fleet Street, Dublin.

**"HIS MASTER'S VOICE"**

—continued from page 31.

view at the top and on the front of the main station scale.

Another feature of the set is its low average H.T. consumption. And although extremely economical in its running costs the undistorted output is as much as 1½ watts—more than enough for all domestic purposes. A permanent magnet moving-coil loud-speaker is fitted. This model is 12 guineas.

It is not always convenient to have an aerial and earth, and there are many listeners to whom a completely self-contained set is essential. For these, there is the "Superhet Portable Fluid-Light Six," a self-contained A.C. mains transportable with built-in frame aerials. It has an undistorted output of approximately 2 watts, automatic volume control, single-knob tuning and a moving-coil loudspeaker.

For the radio and record connoisseur who requires the very best possible radio performance, coupled with all the refinements of a high-quality radio-gramophone, there are two de-luxe models—"The Duo Diffusion Autoradiogram Nine," priced at 52 guineas, and the "High Fidelity 15-Valve Autoradiogram," costing 110 guineas.

**HOW TO GET TO OLYMPIA**

—continued from page 16.

- Edgware Road Station; Piccadilly Line to Barons Court Station.
- BUS:** Route 73, 73a, 73b, or 73c (direct).
- MARYLEBONE**
- UNDERGROUND:** Metropolitan Line from Edgware Road Station (three minutes' walk to Addison Road Station).
- BUS:** 27 or 27a (direct).
- LIVERPOOL STREET**
- UNDERGROUND:** Metropolitan Line to Addison Road Station, change at Edgware Road.
- BUS:** Route 9 (direct).
- FENCHURCH STREET**
- UNDERGROUND:** District Line from Mark Lane Station (a short walk) to Addison Road (change at Earsl Court), Barons Court or West Kensington Station. Metropolitan Line from Aldgate Station (a short walk) to Addison Road Station, change at Edgware Road Station.
- BUS:** Route 9 from Bank.
- MARBLE ARCH**
- UNDERGROUND:** Central London Line to Shepherd's Bush Station, thence bus route 49 or 28.
- BUS:** Route 73 or 73a, 73b, 73c (direct).
- HYDE PARK CORNER**
- UNDERGROUND:** Piccadilly Line to Barons Court Station.
- BUS:** Route 9, 33, 73 (direct).
- PICCADILLY CIRCUS**
- UNDERGROUND:** Piccadilly Line to Barons Court Station.
- BUS:** Route 9 (direct)
- NOTE:** WEST KENSINGTON STATION is within easy walking distance of Olympia, but bus route 28 or 28 is available.
- BARONS COURT STATION** is a few minutes' walk from Olympia.
- ADDISON ROAD STATION** adjoins Olympia, and there is a specially augmented service of L.M.S. trains from Earsl Court Station, and Metropolitan trains from Edgware Road Station during the run of the Exhibition.

**IN LIGHTER VEIN**

—continued from page 42.

Mrs. Goop's bed. The sidecar was contrived from a soap box and part of the micro-Goops' perambulator.

As soon as our tandem, complete with sidecar, was ready, we set to work upon the "Ether Snatcher." This remarkable set is completely self-contained, the whole of the plate and filament current being provided by a dynamo, belt-driven from a special pulley on the rear wheel.

Turning night into day and seldom snatching more than fifteen or sixteen hours for sleep and six for meals, we had the whole job complete in less than a fortnight. Nothing remained but the practical road test.

"Have you ever ridden a tandem?" I asked the Professor.

"No," he replied, "but, of course, it's quite easy. What about you?"

"I've never actually done it," I

sitting behind to operate the "Ether Snatcher."

We flung our legs over the saddles. The Professor switched on. "Ready? Go!" he cried.

We went. As soon as our speed had reached about 10 m.p.h., the "Ether Snatcher" burst into song.

"Splendid!" gurgled the Professor from behind me.

**A Braking Difficulty**

"Magnificent!" I chortled to him over my shoulder.

Then it dawned upon me that we were gathering speed rather more quickly than I liked, for tandems are queerish things to steer and our course was not proving a very straight one. We had already been twice on to the pavement and missed a lamp-post by millimetres.

I applied my brake. Nothing happened. Then I remembered that Tootle's brake worked on the back wheel, which had been removed.

**OUR FRIENDS TAKE TO THE ROAD**



Left: "Absent-mindedly stepped off the pavement and was promptly knocked down"

Right: "We cannoned off Sir K. N. Pepper . . . to the strains of the Soldiers' Chorus"

Below: "'Home, George,' said the Professor haughtily, with a wave of his hand."



answered, "but, of course, I know the theory. The person in front does the steering and the one behind just sits pretty. Of course, he or she is intended to do a certain amount of work, but the occupier of the front seat can't possibly turn round to see whether or not this is so, and, as the old proverb has it, what the eye doesn't see the heart doesn't grieve."

**The Test Begins**

Without further ado we led our tandem out into the road. The Microfarads stands at the top of a steepish hill, some three-quarters of a mile in length, which leads into the High Street of Mudbury Wallow. This being so, I felt that there couldn't be much work to do, so I was quite willing to occupy the front seat, the Professor

"Put on your brake," I called to the Professor.

"I have, but it doesn't do anything," he cried.

Primpleson's brake, of course, worked originally on the front wheel, and that had now gone.

During the rest of that experimental ride things happened so quickly and so close together

that my memory is a little confused. I recall a crash as we cannoned off Sir K. N. Pepper, who was just issuing from his front gate, and the wild cries of onlookers as we streaked into the High Street to the strains of the Soldiers' Chorus blared forth by the "Ether Snatcher."

Miss Worple saw us coming as she was crossing the road, and began to run all ways at once. With great gallantry Captain Buckettt rushed to

(Continued on next page.)



**IN LIGHTER VEIN**

—continued from previous page.

her rescue, but tripped over the butcher's dog just as he had clasped her in his arms. Such was our speed that we scarcely felt the bump as we passed over their prostrate forms. They merely acted as a springboard which enabled us to leap gracefully over the Vicar in his Baby Austin.

Between trams and buses we hurtled, across the bows of lorries and under the sterns of farm wagons.

The traffic lights in the middle of the town were against us, and Mudbury Wallow's Corporation dustcart was dragging its slow length across them.

"To the right!" I yelled.

"No, to the left!" bellowed the Professor.

I leaned to the right, he to the left, and the tandem went straight on. Fortunately for us, the lid of the dustcart was open and it was nearly filled with a nice soft collection, which broke our fall beautifully.

"Home, George," said the Professor haughtily, with a wave of his hand to the somewhat surprised driver.

**RADIOLYMPIA 1935**

—continued from page 22.

new range of 5 permanent magnet speakers and 5 energised speakers, which will range in sizes from 6 in. to 10 in. types.

Incidentally, the permanent magnet models embody a new magnet design, which is claimed to give a flux density equal to that obtainable with the mains models.

**SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD.**  
Stand No. 100.

"Full-o'-Power" H.F. batteries are the principal radio line marketed by this firm, and the stand at Olympia is well dressed with these famous batteries.

The standard range includes the "Cadet," which will be particularly popular, for it provides 120 volts at the low price of 7s. 6d., while the 60-volt standard is available for 5s. 6d.

In addition, there is the power 120-volt battery at 16s., and the super radio 50-volt battery at 21s. Torch batteries also form a large proportion of the firm's business, and many standard types will be on view, as will, of course, grid-bias batteries of various types and sizes.

**SOUND SALES, LTD.**  
Stand No. 108.

The Sound Sales stand is always an interesting one, and this year is no exception.

Transformers for mains work, including special high voltage types for big amplifiers, are among the latest products of this painstaking firm, while all sorts of amplifiers for home and public address work come under their activities.

A visit to Sound Sales is always profitable, and it is certain that any technical questions you may care to ask at Stand No. 108 will be most fully and carefully answered.

**STRATTON & CO., LTD.**  
Stand No. 30.

Under this name are launched the world-famous Eddystone short-wave components. And at Olympia a very fine display of the latest in short-wave and ultra-short-wave parts is being shown.

Plug-in coils and coil bases, wire-ended short-wave chokes, intermediate-frequency transformers, and a large range of short-wave condensers are to be seen on this stand.

Whether you are a short-wave transmitter, or merely interested in the receiving aspect, you will find an amazing amount of gear on the Eddystone stand that will take your attention for a long time.

At the moment of going to press it is not certain what will be shown here in the way of ultra-short-wave developments for home-constructed receivers. But Eddystone have for a long time been working on designs for television superhets, and if the actual components are not in evidence at the show they will be available very soon afterwards.

**TELEGRAPH CONDENSER COMPANY, LTD.**  
Stand No. 37.

If anything wants "smoothing" in a radio set it is pretty certain that you will find a T.C.C. condenser that will be exactly right for the job. If anything wants coupling a T.C.C. condenser can be found to do it. "T.C.C.'s," in fact, are in household use throughout the homes of listeners.

And rightly so, for their products are reliable and efficient; well made and so varied in type that there is never any difficulty in finding a condenser that may be required for any normal job.

We say normal, for until lately, of course, such condensers as 2,000 and 3,000—the high voltage types that we are coming to regard as peculiarly "television condensers" were not

often asked for. When demanded, T.C.C. made them "to fit." Now, however, these condensers are coming into the regular lists, for it is not difficult for a firm that is used to making 80,000-volt test condensers for the B.B.C. transmitter to turn to and make a few 1,500 or 3,000-volt working condensers.

But though there are condensers galore on Stand 37, including dry and wet electrolytics, paper and mica types of all sizes and capacities, we must not overlook the fact that what may be termed radio set condensers are by no means the be-all and end-all of T.C.C.'s existence.

No, the activities of this great firm extend further than that. Special units and condensers for the suppression of interference with radio reception have occupied the attention of the designers for some time past, and many are the varieties of "silencers" that are available. These include special types for use in vacuum cleaners, refrigerators, electric sewing machines, hair driers, and so forth.

Then there are condensers for telegraphic work, for power station work, and so on. In fact, anywhere where a condenser, large or small, is required, you can be sure to find something of T.C.C.

(Continued on next page.)

**PETO-SCOTT EVERYTHING RADIO—CASH C.O.D. or EASY TERMS**

PILOT AUTHOR KITS for sets featured in "Wireless" and all other Technical Journals are only obtainable direct from Peto-Scott. Again FIRST with EVERYTHING NEW, in Radio and Television, at OLYMPIA for Cash, C.O.D. or H.P. SEND FOR DETAILED PRICED LISTS OF PARTS.

**IMMEDIATE DELIVERY—CASH—C.O.D. or H.P.**

**S.T.600 BATTERY KIT "A" CASH OR C.O.D. Carriage Paid £5:11:6**

Comprises all components as first specified by Mr. J. Scott-Taggart, including Peto-Scott Structakit, less Valves, Cabinet, Needle Cups, Gramo Motor, Pick-up and Speaker. **OR YOURS FOR 10/-**

and 11 monthly payments of 10/3.

**KIT "B"** As for Kit "A" but with set of specified Valves, less Cabinet, needle cups, gramophone motor, pick-up and speaker. Cash or C.O.D. Carriage Paid £7:16:0, or 12 monthly payments of 14/3.

**KIT "C"** As for Kit "A" but with set of specified Valves and Peto-Scott S.T.600 Radiogram Cabinet, with speaker baffle assembly and needle cups, less gramophone motor, pick-up and speaker. Cash or C.O.D. Carriage Paid, £11:4:3, or 12 monthly payments of 20/6.

**KIT "RC"** Complete Kit of first specified parts, with set of specified Valves. S.T.600 Radiogram Cabinet, with speaker baffle assembly and needle cups, gramophone motor, pick-up and speaker. Cash or C.O.D. Carriage Paid, £16:12:9, or 12 monthly payments of 30/6.

**RADIOGRAM**

EXCLUSIVELY SPECIFIED PETO-SCOTT S.T.600

**RADIOGRAM CABINET**



This exquisite cabinet, exclusively specified and USED by Mr. John Scott-Taggart for the S.T.600 Radiogram, is another outstanding product of Peto-Scott's famous cabinet craftsmen. Modern two-tone finish, contrasting inlaid walnut veneer panels. Ready to take your S.T.600 Radiogram. Cash or C.O.D. Carriage Paid 3/8 (Carriage and Picking 2/6 extra. Speaker Baffle Assembly 3/6 extra)

Or yours for 7/6 down and 11 monthly payments of 6/3 (including carriage and speaker baffle assembly).

**STRUCTAKIT** Comprising Peto-Scott Ready-drilled Walnut faced panel, 16" x 9" Metaplex Backboard 16" x 10" and Ready-drilled Ebonite Terminal Strip. Exactly as first specified by Mr. J. Scott-Taggart. Cash or C.O.D. 6/6, postage 6d. extra. **6/6**

**.....Detailed Price List on request.....**  
You pay the Postman. We pay post charges on all orders over 10/-, GR. **BRITAIN ONLY.**

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- 1 Rothermel-Brush Piezo-Electric Pick-up 2 0
- 1 Rola F624 P.M.00 Speaker ... 2 9 6
- 1 Set of 4 Specified Valves ... 2 4 6

**RECOMMENDED PETO-SCOTT P.M. SPEAKER**



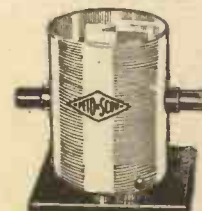
Specially recommended for the S.T.600 RADIOGRAM. FULL-SIZE CONE—not a MIDGET! Power or Pentode. Complete with input Transformer. Send 2/6 with order. Balance in 5 monthly payments of 2/6. Cash or C.O.D. Carriage Paid 19/6.

**2/6 DOWN**

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**POSITIVELY CUT OUT LOCAL STATION INTERFERENCE!**

**PETO-SCOTT 1936 SUPPRESSORS.**  
These entirely new units have been specially designed by Peto-Scott to meet the need for a really reliable suppressor unit that positively cuts out your local station completely.



**MODEL A** (Illustrated), for cutting out Droitwich, 1,000-2,000 metres. Postage 6d. Extra **6/6**

**MODEL B**, for cutting out local stations on medium wave 200-550 metres. Postage 6d. Extra. **7/6**

**PETO-SCOTT CO., LTD.**, 77 W.1, City Road, London, E.C.1. Tel.: Clerkenwell 9406-7. West End Showrooms: 62 W.1, High Holborn, London, W.C.1. Tel.: Holborn 3248.

Please send me your New Season's Catalogues (Strike out that not required.)  
Peto-Scott 1936 Radio.  
Peto-Scott Speaker and Accessories.  
Peto-Scott Short Wave.  
Peto-Scott "Easway" General Radio.

NAME.....  
ADDRESS.....

**RADIOLYMPIA 1935**

—continued from previous page.

**T.M.C.—HARWELL (SALES), LTD.**  
Stand No. 29.

Makers of the famous Hydra condensers, some of the best-value products on the market, T.M.C. have recently extended their ranges into the high-voltage types for use in large amplifiers and in receivers. Most of the old types still stand, with the exception of Type 25, which is now substituted by Type 30, having a higher working voltage.

But there are numbers of new condensers which should be duly noted by constructors. Tubular condensers of 300 V.D.C. and 400 V.D.C. working have been added in the .25, .5 and 1.0-mfd. sizes in the former case and in .2, .25 and .5-mfd. in the latter.

Then there are some 8-mfd. paper dielectric 750-volt working condensers which sell for 27s. 6d. These will be most useful for large amplifiers. 1,000 and 1,500-volt working types are also to be seen for the first time this year, in various capacities from 1 to 4-mfd. These are primarily for specialised purposes.

**C. A. VANDERVELL, LTD.**  
Stand No. 214.

L.T. batteries and high-tension accumulators to fulfil the needs of every battery set owner are to be seen here. Among the most interesting are the non-spillable jelly acid accumulators, of which C.A.V. do a range to meet all requirements, including many special models for the leading portable set manufacturers. These batteries can be used in any position and for any length of time, the jelly acid electrolyte always completely covering the plates and requiring very little attention.

Other interesting exhibits are the dry H.T. batteries, which range includes all the various voltages in both standard, super and triple capacity types, together with grid-bias cells, and the mass plate batteries, which are listed in 20, 45 and 60 ampere-hour capacities, especially to cover the requirements of two- and three-valve receivers.

**THE WESTINGHOUSE BRAKE & SIGNAL CO., LTD.**  
Stand No. 101.

Radio enthusiasts who visit the Show will again have an opportunity of seeing and obtaining first-hand technical information about the well-known and permanent Westinghouse Metal Rectifiers and Westectors.

The range is now so complete that constructors will find a unit to meet their particular requirements, whether a metal rectifier for a mains receiver, battery eliminator, trickle charger or the operation of a moving-coil loudspeaker, or a Westector for detection and/or automatic volume control.

An example of a typical constructors' type Universal A.C./D.C. Reflex Superheterodyne receiver, incorporating a metal rectifier for the H.T. supply and a Westector type WX.6 for second detector, A.V.C. and "reflex" purposes, will be on view, and blueprints and full constructional details will be available.

The Life Test, a familiar feature to visitors at previous Exhibitions, will also be shown. The rectifiers on test have now been operating continuously at full load for over 70,000 hours and show no appreciable falling off in output. As far as can be ascertained, they will continue to give efficient service for at least another 70,000 hours.

High voltage rectifiers for cathode-ray tube supply and various instrument-type rectifiers will also be on view.

Traders and owners of battery charging stations will find interest in the display of charging sets, including a new multi-circuit model with a range of output not already covered by the present range. The price will be strictly competitive, and traders especially should make a point of seeing this new charger.

**WHARFEDALE WIRELESS WORKS.**  
Stand No. 203.

One of the finest permanent magnet loudspeakers that we have heard come from the Wharfedale Wireless Works, and we are looking forward to testing their new models. There are many of them, too, and they are to be seen on Stand 203 at Radiolympia.

All the P.M. series are fitted with the latest type of Nickel Aluminium magnet, and they are dustproof. The Bronze and Auditorium models are fitted with a new type of exponential cone, so that the directional effect so often given to high notes is removed.

Most of the speakers are of the permanent magnet variety, but there are exceptions, and the auditorium energised D.C. model is an example.

The exhibit is a most interesting one, and illustrates the thoroughness and enterprise of the Wharfedale Wireless Works.

**WINGROVE AND ROGERS, LTD.**  
Stand No. 49.

The thought of variable condensers immediately brings to mind the name Polar, and at the home of the Polar Bear at Olympia are to be found representative selections of some of the finest work in condenser manufacture in the country.

A very wide range is being shown by Polar from the famous "Arcuate," "Vertical," and "Horizontal" drives to ganged condenser for superhets, reaction condensers, and special short-wave designs. Of these latter one of the most interesting is the type G, which is a single or two-gang condenser somewhat like the type E, but made with zinc alloy and with an insulated spindle in the case of the two-gang condenser.

But as you will remember, and as you will very forcibly notice at Olympia when you go to the Polar stand, variable condensers are not the only stock-in-trade of this well-known firm. The Polar-N.S.F. volume controls, with or without switches, resistors and tubular and electrolyte condensers make a very attractive show.

It is of interest to notice that though new models have made their appearance in various sections of the Polar lists, and though prices have dropped in certain cases, not one of the last year's models has been withdrawn—a fact that speaks very loudly for the popularity of the Polar components.

**WRIGHT AND WEAIRE.**  
Stand No. 217.

A very full selection of components is being retained for this year's exhibition by this famous firm, though one or two replacements are being made and several new lines are being introduced.

The "Nucleon" coils as we know them are being discontinued, and a new set of iron-cored inductances will take their place, providing better characteristics and improved efficiency. These will cover both straight and superhet types of receiver.

The Standard Universal coil has also undergone modification, and in future will be known as the Universal A type coil. In addition, there are a new volume control and potentiometer obtainable with ganged switch, and a new range of short-wave coils to cover from 12.5 to 100 metres.

Then there is a new wave-trap which was introduced a few months ago and which has proved an excellent proposition to manufacturer and purchaser alike.

(Continued on next page.)



SEE THE FULL RANGE ON  
**STAND 37**  
RADIOLYMPIA

*You'll find* **T.C.C.**  
*in all*

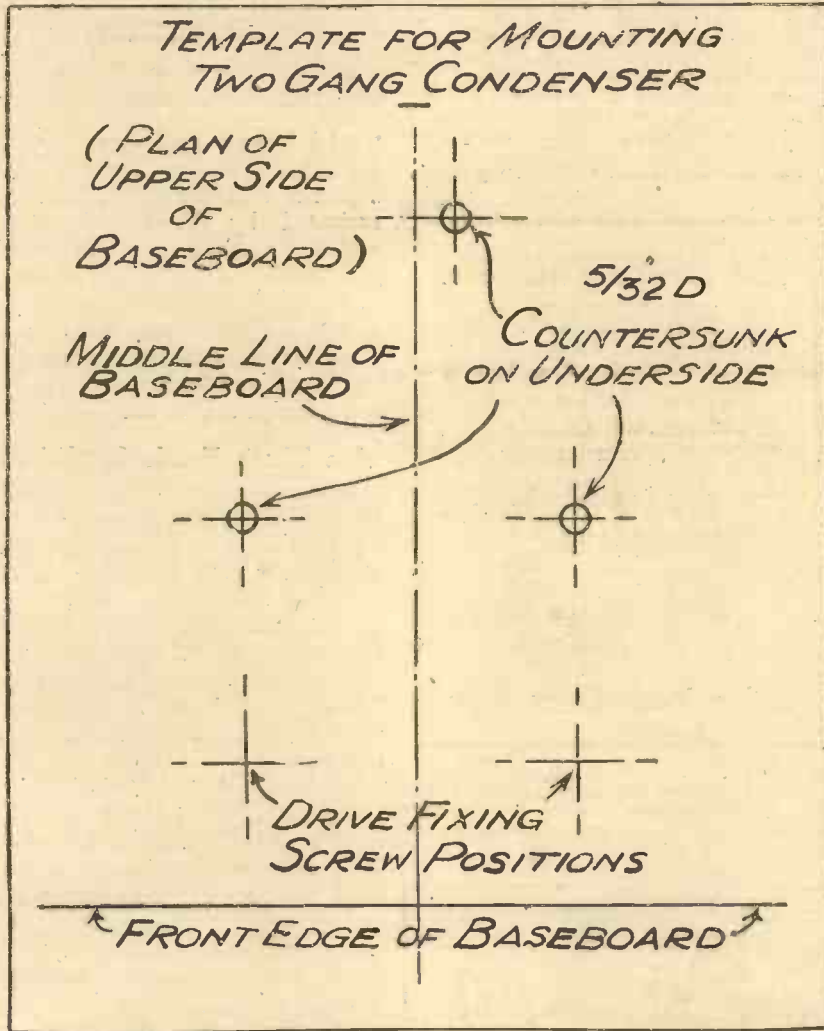
**THE BEST COMMERCIAL RECEIVERS!**

**Y**OUR NEXT set has got to be a "quality" job—just like the best of the commercial receivers. But you haven't—like the set maker—elaborate test gear to help your choice of components. You can, however, be guided by the set maker. Look at any of the leading commercial sets—see how frequently they use T.C.C. Why? Their research has proved T.C.C. efficiency—T.C.C. dependability. They can't afford to put in a doubtful component—that is why they are T.C.C. For the same reason—for dependability's sake—for the sake of your "quality" results use T.C.C. and be sure!

**T.C.C.**  
ALL-BRITISH  
**CONDENSERS**

The Telegraph Condenser Company Limited, Wales Farm Road, North Acton, W.3.

FULL-SIZE "S.T.600" RADIOGRAM TEMPLATE



RADIOLYMPIA 1935

—continued from previous page.

A new Universal coil known as the "Unigen" will be sure to attract attention. It costs 5s., and a series of constructional charts showing how to use it have been prepared.

To the constructor the special circuits and wiring plans will prove a great attraction, and an interesting range of circuits have been treated in this way, including a new short-wave adaptor.

LATEST NEWS.

WHITELEY ELECTRICAL RADIO CO.  
Stand No. 95

We regret that the products of "W.B." are discussed out of alphabetical order, but it wasn't until just before we went to press that we were able to get hold of their latest details.

An entirely new range of loudspeakers, embodying a number of important improvements, are to be seen on the "W.B." stand this year, many of these improvements being entirely novel.

For instance, there is an entirely new method of centring the cone of their speakers, which enables the operation to be done with an accuracy never before achieved. Important claims are also made for the new type of "baked" speech-coil former, which is extremely light and rigid.

Among the most important improvements, however, are elaborations of the "Stentorian" design. In each model a larger and stronger magnet has been fitted, and the now famous "Microcode" unit has been further improved, paper inter-leaving and sectionalised windings being used to increase the range of reproduction at both ends of the scale, besides reducing the audio-frequency losses.

With the exception of the "Midget," all the 1936 "Stentorian" speakers are perfectly suitable for extension work with any commercial set and

a handy innovation this year consists of two small tablets on the tops of models 36S and 36J, giving a list of the leading commercial sets and the correct setting of the speaker-switch for matching purposes.

The cabinet models are particularly interesting, the above-mentioned two speakers being mounted in walnut cabinets designed with a special view to acoustic suitability, and thickly lined with a non-resonant material. The inclusive prices of the speakers, complete in cabinet and with volume control, are 3 guineas and 49s. 6d. each respectively.

Then we must mention the new "Stentorian Duplex"; this is a new permanent magnet dual speaker, consisting of an ordinary cone reproducer and a "tweeter," the horn of which actually protrudes through the hollow centre of the main magnet pole piece. Thus, we have the two speakers in one unit, which obviously has very definite advantages.

Separate volume controls for each of the two speakers are incorporated, and at the price of 4 guineas this unusual instrument should be of considerable interest.

H. CLARKE & CO., LTD.  
Stand No. 83

Here are some latest details which should be added to the information given on page 18.

Atlas this year have gone into the receiver market with six new models. First there is the Radio-gramophone de luxe, with seven tuned stages and giving an output of six watts from two power valves in push-pull (price 39 guineas).

Then there is a de luxe console model, with a similar output, obtainable for 22 guineas.

For 2 guineas more, one can purchase a radio, gramophone popular model, which is a 5-valve receiver, giving an output of 2½ watts; or a console receiver with the same radio circuit known as type A17 for 17 guineas.

There are two table receivers, one of which is slightly similar to the A17, and with an almost identical chassis, priced at 13 guineas; and also a 5-valve instrument which is known as model A758.

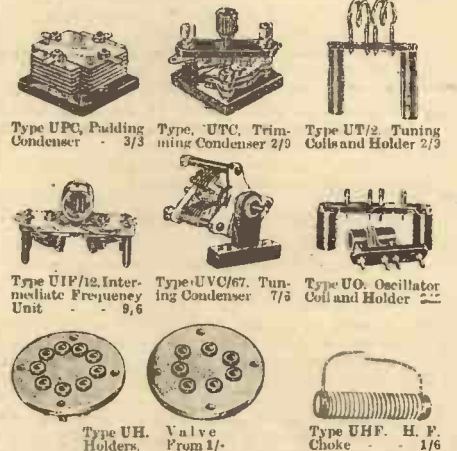
A tilting dial, it should be noted, is being fitted as standard on every model in the 1936 range.

B.T.S. FOR

ULTRA-SHORT  
and SHORT WAVE  
APPARATUS

SEE OUR EXHIBIT AT  
OLYMPIA  
STAND 14

Designed for wide band frequency response, with that extra care and attention to choice of materials and special construction essential to successful Ultra-Short Wave working. Each incorporates Megacite, the new low loss high-power factor insulating material exclusive to B.T.S. All metal parts are silver plated.



Above is a selection of the latest B.T.S. U.S.W. Components which may be seen at Olympia.

SPECIFIED

S.T.600 Battery RADIOGRAM		
1 B.T.S. Aerial Coupler, Variable Con-	s. d.	
denser, Type 601		2 6
1 B.T.S. Aerial Reaction Choke, Type		2 6
S.T.600		

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CABINETS. Write for Free List  
GILBERT (cabinet maker), SWINDON.

S.T. 600 BATTERY RADIOGRAM COMPLETE KIT SPECIFIED COMPONENTS 75/- EXACT TO S.T. SPECIFICATION or 8/6 monthly. Thousands of similar Bargains to choose from—LISTS FREE

**MELFO-RAD QUEENS HOVE**  
TRADE SUPPLIED  
All Radiolympia Goods Available, CASH, C.O.D., H.P.

All applications for Advertising Space in WIRELESS & TELEVISION REVIEW should be addressed to the Advertising Department, John Carpenter House, John Carpenter Street, London, E.C.4.

Please be sure to mention "WIRELESS AND TELEVISION REVIEW" when communicating with Advertisers. Thanks!

# W.B.'s LATEST MODEL

AT the moment of going to press with this special exhibition number of WIRELESS AND TELEVISION REVIEW, we have received from Messrs. The Whiteley Electrical Radio Co., Ltd., advance details of their range of speakers for 1936, and from information at present available it is apparent that W.B. has eclipsed even its previous high standards of speaker performance.

It is unfortunately impossible at this juncture for us to include the results of our tests of these new models—that is a subject upon which we shall be dealing at length in our next issue—but we consider the advent of this new range to be an occasion of such importance to home-constructors and to all who are interested in the science of sound reproduction that no review of the exhibition would be complete without a reference to this remarkable speaker development.

### Remarkable Sensitivity

It will, we feel, be common knowledge among our readers that W.B. has been responsible for some of the most noteworthy speaker developments of the past decade, and that as a result of their researches into magnet systems and metallurgy generally, they have for some time past been manufacturing permanent magnet moving-coil speakers with remarkable sensitivity characteristics. In the popular "Stentorian" range which was introduced last year, however, sensitivity was of such a high order that it was felt that no amount of investigation into the question of flux density could possibly result in the production of an alloy to better the magnet systems used in the "Stentorians."

It is, therefore, an achievement of which W.B. has every reason to be proud that the 1936 "Stentorians" are even more sensitive than those of last year.

There are, too, in these new "Stentorians" several improvements apart from the magnet system, the most important of which are the "baked" speech coil and an entirely new and ingenious method of centring which makes for greater sensitivity and increased power-handling capacity.

The models in this new range comprise the

## The SEPTEMBER NUMBER

of "Wireless" will contain full constructional details of a

### FOUR-VALVE SUPER WITH A.V.C.

Don't forget that this number will be on sale August 31st.

**Order Your Copy Now**

type 36S. at 42s., 36J. at 32s. 6d., and the 36B. at 23s. 6d. There is also a "midget" chassis with four-inch cone and three-ratio transformer at 17s. 6d.

## ROUND THE WORLD OF TELEVISION

—continued from page 36.

"mask" to cover up a certain part of the sensitive screen. This part of the screen is then prevented from being activated by the cathode stream, with the result that at the receiving instrument a bright image of the call sign is visible constantly. It is obvious that the same arrangement can be used for transmitting a distinctive mark such as a trade mark, an advertising design and so on.

### Are These Freak Conditions?

I was present at an interesting technical discussion the other day as to whether the ultra-short waves, which are to be used for high-definition television broadcasting, will really be limited to a range of some 25 miles, as commonly stated, or whether it will be possible in certain conditions—"freak" conditions, if you like—to receive them over much longer distances.

We have yet a great deal to learn about the behaviour of short and ultra-short waves, and until we have had a good deal more experience of them, there is no saying what they will do under special conditions. It is a well-known fact, which has been demonstrated innumerable times, that short-wave transmissions can travel over immense distances even with very small power in the transmitter, presumably passing by successive reflections at the various layers in the upper atmosphere. The known layers have been added to recently and, for all we know, there may be others yet unidentified, which nevertheless play their part in the long-distance transmission of short wireless waves.

### Is the Range Really Limited?

Some were of the opinion that the transmissions would be definitely limited, whilst others thought that "anything might happen," and were quite prepared to discover that the high-definition transmitters from London might in special cases be received perhaps in the north of Scotland or on the Continent.

Unfortunately, if this sort of thing does happen, it will surely be only in the nature of a chance happening, but one never knows, perhaps some day we may find out how to send these waves in regular fashion over immensely greater distances. If so, this will enable a reduction to be made in the number of television relays necessary.

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**FROM MY ARMCHAIR**

—continued from page 40.

radiation will be television on ultra short wavelengths. You will be able to take either the sound or the actual complete television, but the absence of vision may be as strange as the absence of sound would now be on the films. But that time is so remote that we need not contemplate it.

Meanwhile, I hope and believe that television will grow up as a separate entertainment without affecting the prosperity of our radio industry. As I see it, the great drawback to television is the concentration necessary. If housewives look in as much as they listen they will do very little work. Many are the dishes washed to-day to the accompaniment of broadcast music. But what will be the effect of illustrated fashion talks?

Perhaps there will be rest intervals: "You may now rest your eyes, lookers." Then will follow an interval signal picture, perhaps—a pictorial equivalent of Bow Bells—the bells ringing, say, or a picture of Mr. Baldwin.

**"Going To Be Good Fun"**

It's all going to be good fun and I for one am eagerly joining in—socially, technically, editorially, and in every other way. It's the coming thing!

Will television call for special customs on the part of its technical chiefs? Will a pipe, for example, endow a designer with authority as it does in sound broadcasting? Would not the smoke obscure the picture? Will the future television designer gain prestige by his clear, bright eyes and his distaste for tobacco?

Of course, it takes more than a pipe to make a designer, just as it takes more than a check tweed jacket to produce a television expert.

These are but the outward trappings of an inner brilliance.

All the same, the recurrent views of a genial and intelligent face—rugged in the Irish tradition—does produce a feeling of confidence in the smoker and in his views and sets. There is a strong personal flavour to what he says—usually quite provocative—and often too true to be really palatable to his public.

Snatch his pipe from him and Mr. Murphy—how did you guess?—would lose some of his appeal. We wouldn't have quite the same blind trust in his utterances. Of course, he is a bit of a dictator, but most clever men are. To admit in advertisements that people

did not wholly approve his cabinet was courageous. I sided with the dis-approvers, but to make the public side one way or the other is a feat in itself.

Mr. Murphy has a strong social streak; he has ideas about work and workpeople. He is an idealist, but tells no one about it. His workpeople work five days a week—a sensible system which I put in force ten years ago when I owned the periodicals of Radio Press, Ltd. He also believes in paying his junior staff—the workpeople—more and his senior staff rather less than some people think expedient. It is part of a theory, I feel. It certainly has nothing to do with profit-making.

Incidentally, ten years ago Mr. Murphy's firm—not a radio one then—used to do cover designs for my books and periodicals. Since when I have not seen his genial pipe, except in print.

The disadvantage of his recurring photographs is that no wireless man can really smoke a pipe with complete ease; he is so likely to be accused of "doing a Murphy." I feel that we are wiser if we leave pipes alone; a hookah might do, but what about beards?

I do not know any radio engineer with a beard. I stake a claim on the idea. Val Gielgud can keep his, of course, because he's not technical. A beard would have terrific influence. Where would W. G. Grace have been without his? It would inspire great confidence in all television lookers.

My only fear is that it would breed more moths than confidence.

J. S.-T.

Everybody will soon be calling  
"BOBS Y'R UNCLE"

MAy we introduce you to BOBS Y'R UNCLE?

It is every bit as cheery as its title suggests. It is novel yet simple, and can be played by any number of persons from two upwards. It is a game for grown-ups and for children—everybody can join in the fun and the more the merrier.

The game consists of 54 highly coloured cards in a novel container with full rules of the play, which are very easy to remember.

Forty-eight of the cards represent familiar nursery rhymes, three others are known as "Uncle" cards, and three "Nigger Boy" cards. The object of the game is to "declare," which a player does on getting rid of all the cards in his hand or when he has collected all three of the "Uncle" or "Nigger Boy" cards.

Each player is dealt six cards, and the remainder—the stack—are placed in the centre, face downwards. The first player puts down the first line of a rhyme. If he has not such a card in his hand he takes a card from the stack, and then the player on his left can either play the first line of a nursery rhyme or continue with the next of the rhyme already started. If he is unable to play, he, too, must take a card from the stack, and so the game proceeds, but when the stack is exhausted the fun really begins to get furious. The cry of "Bobs Y'r Uncle" rends the air, and the merriment increases until everyone is in peals of laughter.

BOBS Y'R UNCLE is going to be the craze of the season; its furious fun and exciting laughter will be catching. Get this new game now. 1/6 buys it from any store or wherever games are sold.

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**"THE MASTER CRAFTSMEN OF RADIO"**

—continued from page 25.

This is a design applicable to both D.C. and A.C. supplies without any modification, and is, therefore, just the set for the man living in one of the areas likely to be changed over on to the grid system in the near future.

The actual circuit arrangement is of the most modern type and the undistorted output is  $2\frac{1}{2}$  watts; this is obtained with a total power consumption from the mains of approximately 90 watts.

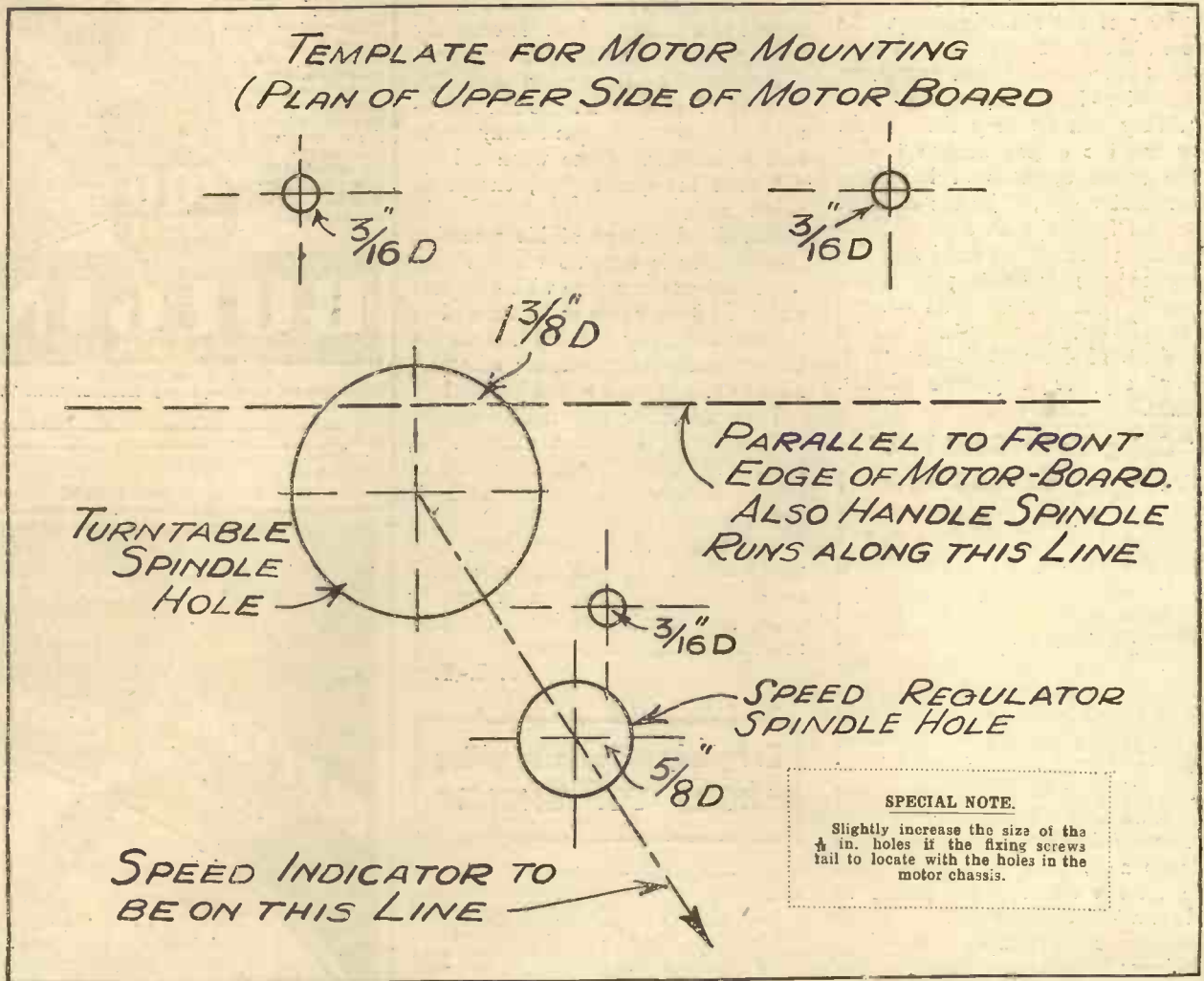
**The Battery Sets**

The battery user is well catered for in the model 273, a powerful 5-valve 9-stage receiver utilising the most advanced type of superhet circuit. This receiver can compare

with the best all-electric design and its specification includes delayed A.V.C.

Two other battery receivers are the model 257—a 4-valve superhet with delayed A.V.C., a full-size moving-coil loudspeaker and super selective Litz-wound tuning circuit—and last, but by no means least, model 284, an inexpensive 3-valve S.G. set giving a very good all round performance. The L.T. and H.T. units are accommodated in the cabinet.

**FULL-SIZE TEMPLATE FOR THE "S.T.600" RADIOGRAM**



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Makers of the World's  
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*'Three-way Diffusion' and  
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## EKCO Radiogram supreme

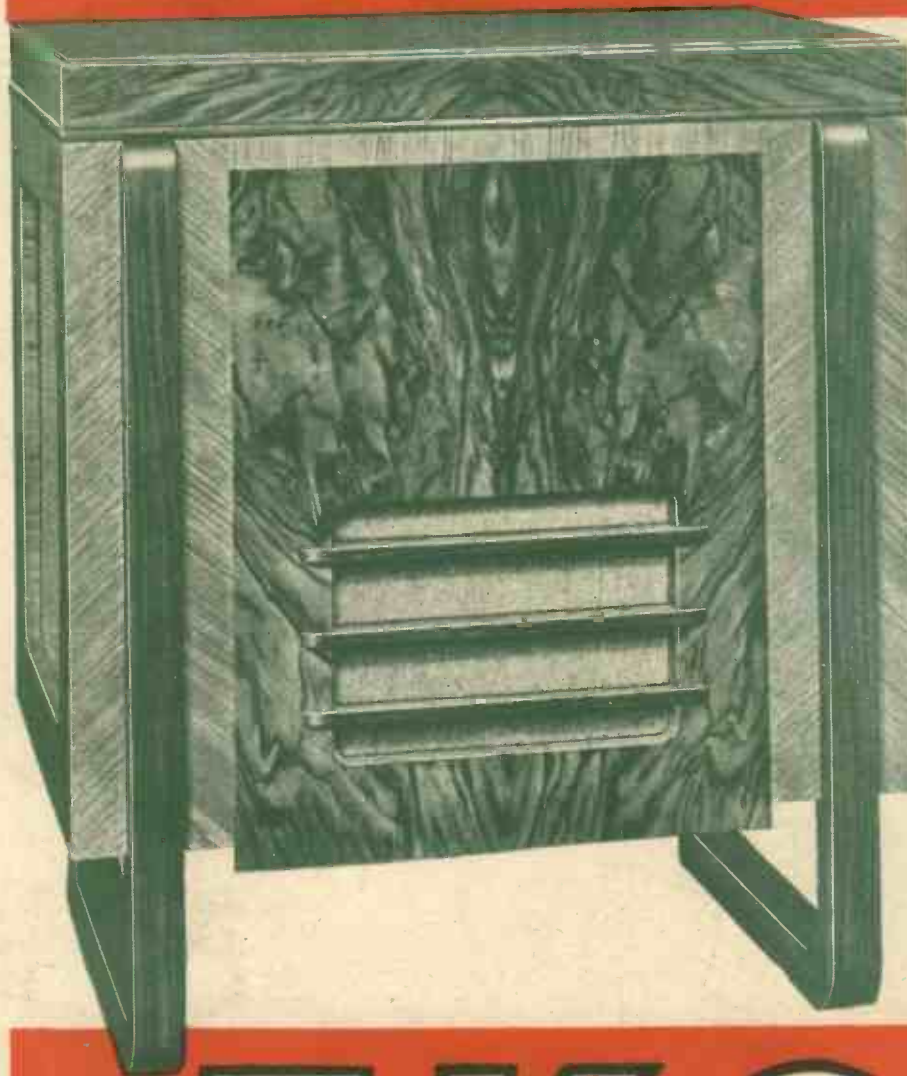
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