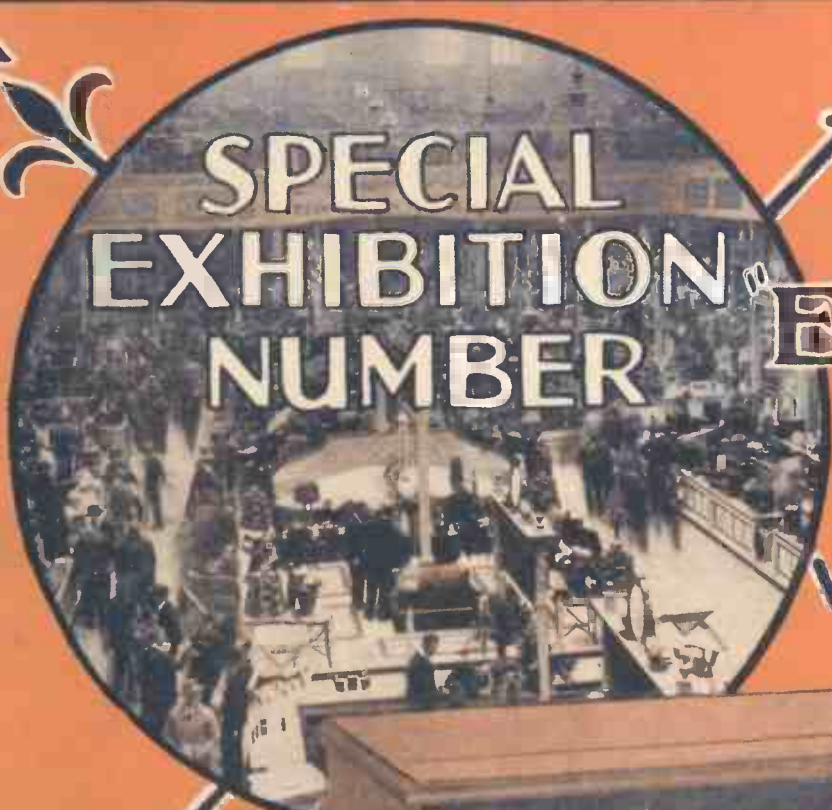


The Wireless Constructor

6^D
MONTHLY

EDITED BY
PERCY W. HARRIS, M. I. R. E.
Vol. X. OCTOBER, 1930. No. 48.



**SPECIAL
EXHIBITION
NUMBER**

IN THIS
ISSUE
**THE
"EXPLORER"
FOUR**
by
VICTOR KING



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|--------------------------------|---|---|---|---|---|------|
| Filament volts | - | - | - | - | - | 2.0 |
| " amps | - | · | · | · | · | 0.2 |
| Max. H.T. volts | - | - | - | - | - | 150 |
| Amplification factor | - | - | - | - | - | 6.5 |
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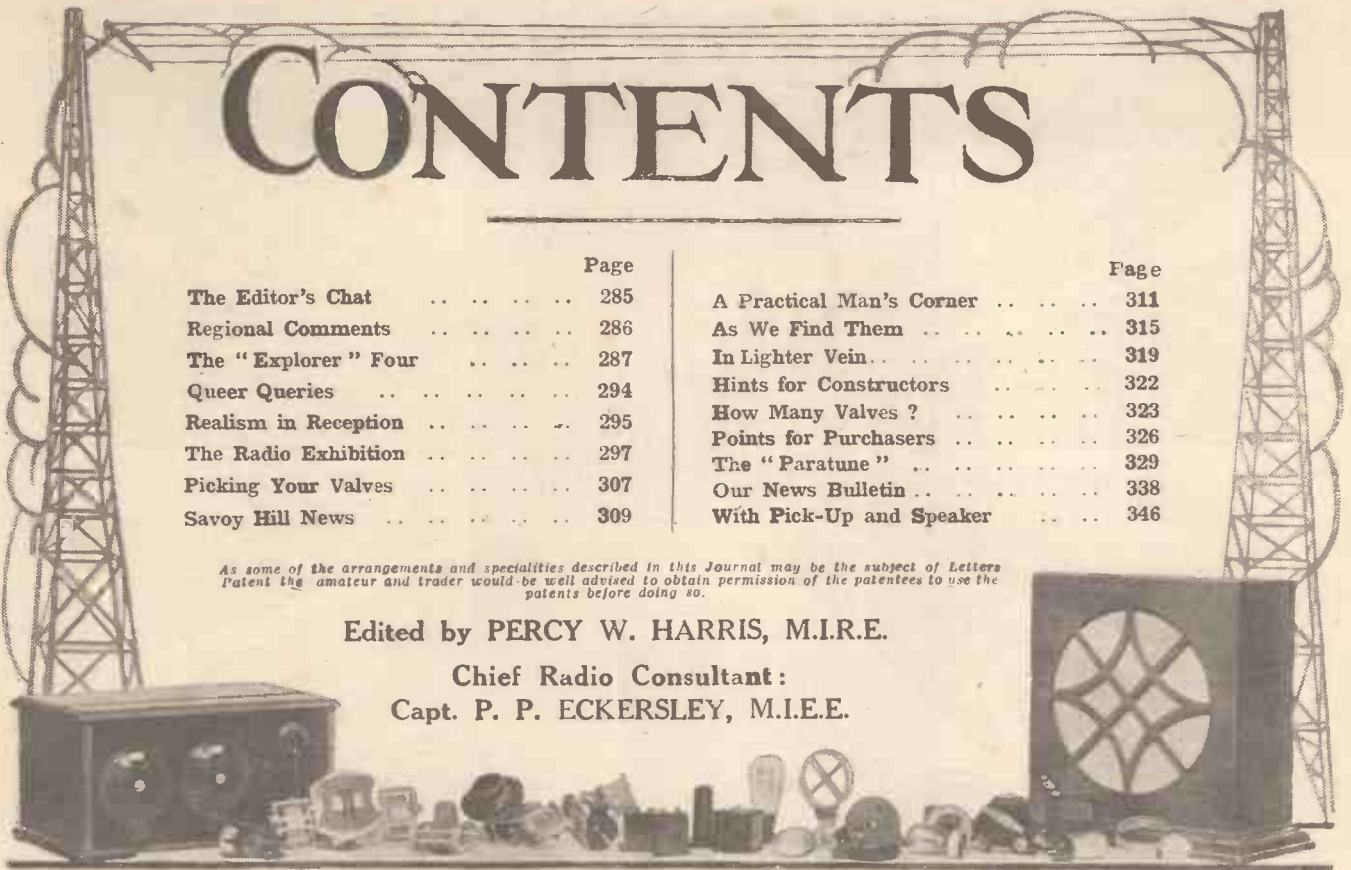
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As some of the arrangements and specialities described in this Journal may be the subject of Letters Patent the amateur and trader would be well advised to obtain permission of the patentees to use the patents before doing so.

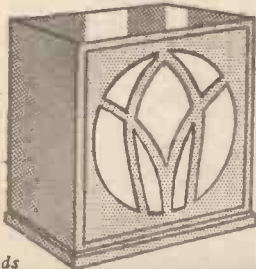
Edited by PERCY W. HARRIS, M.I.R.E.

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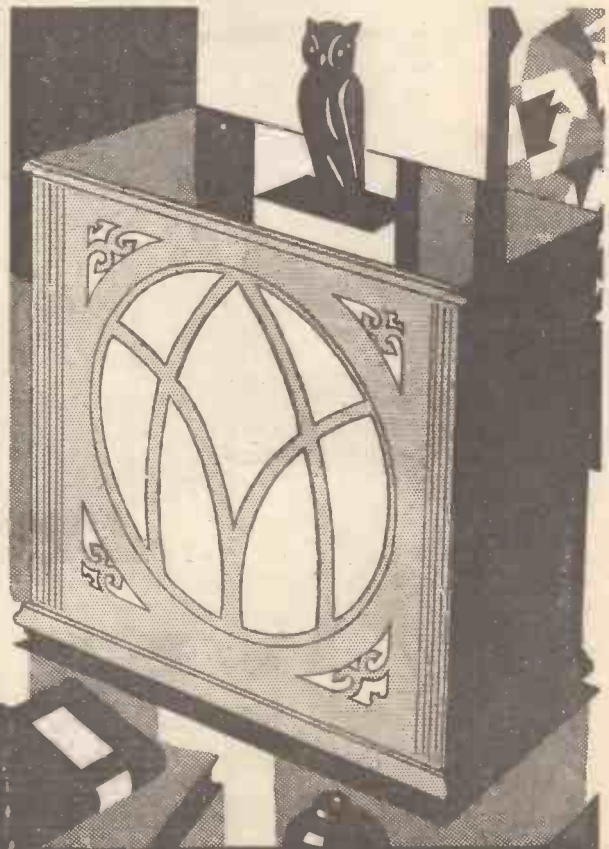
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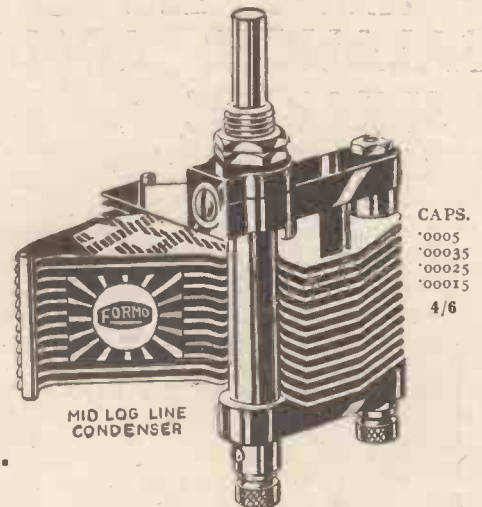
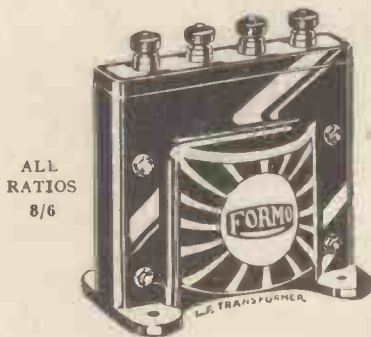
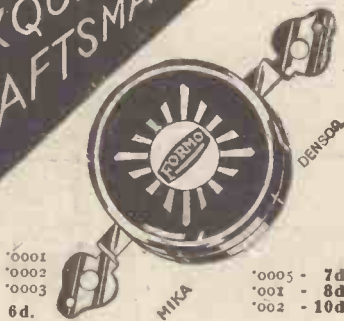
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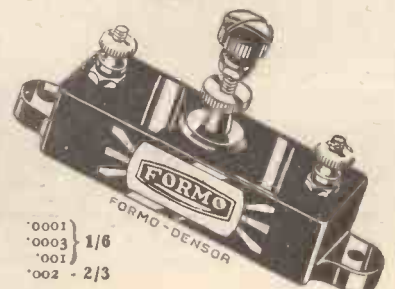


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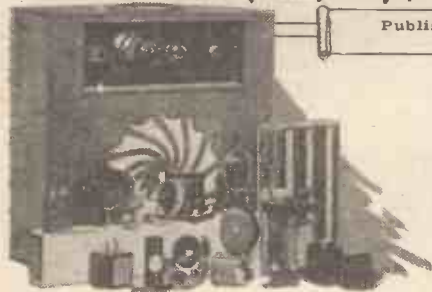
THE NEW
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215 S.G.

HIGHEST ACTUAL AMPLIFICATION

♡ 5686

The WIRELESS CONSTRUCTOR

Published by the Amalgamated Press, Ltd., Fleetway House,
Farringdon Street, London, E.C.4.



THE EDITOR'S CHAT



The Radio Exhibition—Visit Us at Stand 5—The “Explorer” Four On View—Readers’ Suggestions Always Welcome.

ASK any wireless enthusiast which is the most important month of the year and he will tell you September, for then we have the Wireless Exhibition, when all the new sets and components are shown. It is also an opportunity—much appreciated we know by many of our readers—for seeing some of the WIRELESS CONSTRUCTOR sets on our stand at Olympia.

Sets on View

This year, as usual, the keen fan will have an opportunity of inspecting in detail some of the most interesting sets which we have produced in the WIRELESS CONSTRUCTOR, while experts will again be in attendance to assist and guide him in his choice of a new receiver.

Every reader of the WIRELESS CONSTRUCTOR, if he can possibly manage to do so, should visit the Radio Exhibition, not only so that he may be able to bring himself up to date in general technique, but also to make acquaintance with those firms which strive constantly to give the home constructor the very best that can be made.

Better Quality

The admirable quality which is now obtainable in wireless reproduction is largely due to the keenness of the home constructor, who has insisted on getting the proper reproduction of the low notes as well as the high, and by giving his support to the good manufacturers and ignoring the less competent firms he has given the necessary stimulus without which no progress would be made.

The home constructor is always a striver after an ideal—by constant comparison he educates his ear in

such a way that he knows what is missing, and seeks to repair the omission in his own set, whereas the purchaser of a complete receiver is much more inclined to take what is given him without comment.

In turn the component manufacturer, in seeking to meet the requirements of the home constructor, produces additional refinements which are welcomed by the set manufacturer;

VIOLENT OSCILLATION!



An American valve organ in which the “music” obtained is due to the control of oscillating valves.

the additional demand of the set manufacturer makes for cheaper production, and again the home constructor scores.

In this way it is easy to show that, contrary to the opinion held by many people, both home construction and set manufacturing help one another, though the people concerned represent slightly different interests and different points of view.

In the current number, which, of course, is a special one giving a comprehensive review of everything

which is interesting at the Show, the feature set is the “Explorer” Four. This is a four-valve version of Mr. Victor King’s highly popular “Explorer” Three receiver.

Consisting of a screened-grid high-frequency stage, a detector, and two transformer-coupled low-frequency stages, its distance-getting powers and audio volume are quite exceptional. Wave-change is simple by means of the “Explorer” coils, while, the short-wave band is equally available.

Universal Appeal

This set will be especially welcome in those country districts which are some distance from the nearest broadcasting station and in “dead spots” where reception is particularly difficult and where ordinary sets fail to do justice to the programmes.

On the other hand, when listening to the local station, which does not require the tremendous amplification which is a feature of the “Explorer” Four, the first low-frequency stage can be cut out by means of a switch, the volume control remaining in circuit permanently.

Visitors to the Exhibition will be able to see the actual receiver on our stand. (No. 5.)

Bring Your Suggestions

A final word—the WIRELESS CONSTRUCTOR has always prided itself on its close contact with its readers. When you visit the Wireless Exhibition call at our stand and tell us just what you would like to see in future issues. Suggestions from readers are always carefully considered, and in the past have frequently been productive of some splendid sets.

REGIONAL COMMENTS

Is the alternative programme scheme a failure? There is certainly a great deal of dissatisfaction with the way it is being carried out, and readers will find great interest in this discussion of the matter from several points of view.

THE murmurs of discontent occasioned by the B.B.C.'s management of the Regional Plan are daily growing louder—and not without reason. The policy of programme centralisation is becoming more and more evident, and the tendency to use London as the main programme source is so pronounced that—if things go on at the present rate—alternative programmes will disappear altogether.

“Almost Farcical”

As it is the alternative element is almost farcical; it will soon take a microscope to find real “alternatives” when looking through the B.B.C.'s weekly programme budget. This lack of variety in British programmes is undoubtedly responsible for the rapidly increasing interest in foreign programmes, and a glance at the statistics of the sales of complete sets shows that more and more listeners want to “reach out”; they will not be satisfied with a set which will comfortably receive only British broadcasting.

And why? Not so much because the quality or quantity of the B.B.C.'s fare is poor, but because it lacks variety. Alternatives from the National, Midland, and London Regional stations are not distinct enough, and far too often we read that at, say, 7 p.m. the programme from the Midland will be the same as from the London Regional, or from the National.

“Largely a Failure”

As Captain Eckersley pointed out the other day in a characteristic article in our contemporary, “P.W.”: “Variety in listening is certainly a *sine qua non*: choice of programmes is essential.”

Captain Eckersley has hit the nail on the head when he insists that that choice must be forthcoming—and differently from the manner of to-day. The man who originally conceived and planned the Regional Scheme now considers it a failure. Why? Simply because the B.B.C. has jettisoned Capt. Eckersley's scheme and has substituted for it one which

is based on a cheese-paring centralisation policy.

“The Regional Scheme is, to my mind, so far largely a failure,” says Captain Eckersley, “because of the apparent inability of the B.B.C. to attack the root problem of giving us a choice between programmes. Their policy, if there is one, is to give just the power of selection between two similar things.”

“Most people therefore use the Regional Scheme rather as a convenience to avoid items they don't like than as a stimulus to picking the programme they do.”

“Mr. Compton Mackenzie, who usually has something quite useful to say about broadcasting, now comes out with the startling statement that the greater choice of programmes makes him disinclined to listen. Perhaps the continuation of output of

of Mr. Mackenzie's thought, as it is of mine.”

It is a fact that the B.B.C. will spend half a million on the Regional Scheme before they complete it; but what is the good of all this expenditure on technical efficiency if the stations, when built, are not properly used to give benefit to the majority of listeners?

Stop the Rot!

Already we have seen revolt in Birmingham because of interference with local programme talent; and Scotland is getting restive, while Wales still seethes with dissatisfaction. But, instead of providing more varied alternative programmes, including programmes which will give a fair share of satisfaction to listeners in the North, South, East, and West, the signs all point to more single-pattern programmes. Soon they will become definitely stereotyped. Is it too late to stop the rot?

Moorside Edge

Fears have lately been expressed that the Regional station at Moorside Edge would create a “wipe-out” zone which would badly influence

RADIO CONTROL IN THE NAVY



Visitors to the Portsmouth Navy Week show watching the performance of a motorboat which was entirely controlled by radio. It was a 35 ft. boat, and had not been demonstrated to the public before.

books from one author's pen makes one less and less inclined to read that author, but a good library of books should not disincite one to choose and to read.

“If, of course, the books are all the same type and all mediocre, even though by different authors, one is driven away from reading. That, I think, must have been the basis

local listeners—especially those in the West Riding district. Listeners will be glad to know, however, that the B.B.C. considers these fears groundless.

According to a reply by B.B.C. officials, a certain amount of dislocation is expected, but the whole object of erecting the new station at

(Continued on page 344.)



WHEN, a few months ago, I set out to design something entirely new in wave-change receivers—something which, while overcoming the old bugbear of coil-changing, would not sacrifice efficiency for the sake of convenience—I must confess I had hoped that the final scheme would catch on because it seemed to me to offer such an ideal solution to what has always been a very sticky technical problem.

With all due modesty, to say that it has now "caught on" would be to put it far too mildly. Every day my post-bag brings letters from enthusiastic readers in all

parts of the country, testifying to the merits of "Explorer" Two's and Three's.

And now, as an outcome of all this, I have been asked repeatedly for a four-valver using the same scheme. Something a little more ambitious than the three, with a particular appeal to those multitudes of readers who are unfortunate—or ought we, perhaps, to say fortunate—in having no local station.

A Set for Everybody

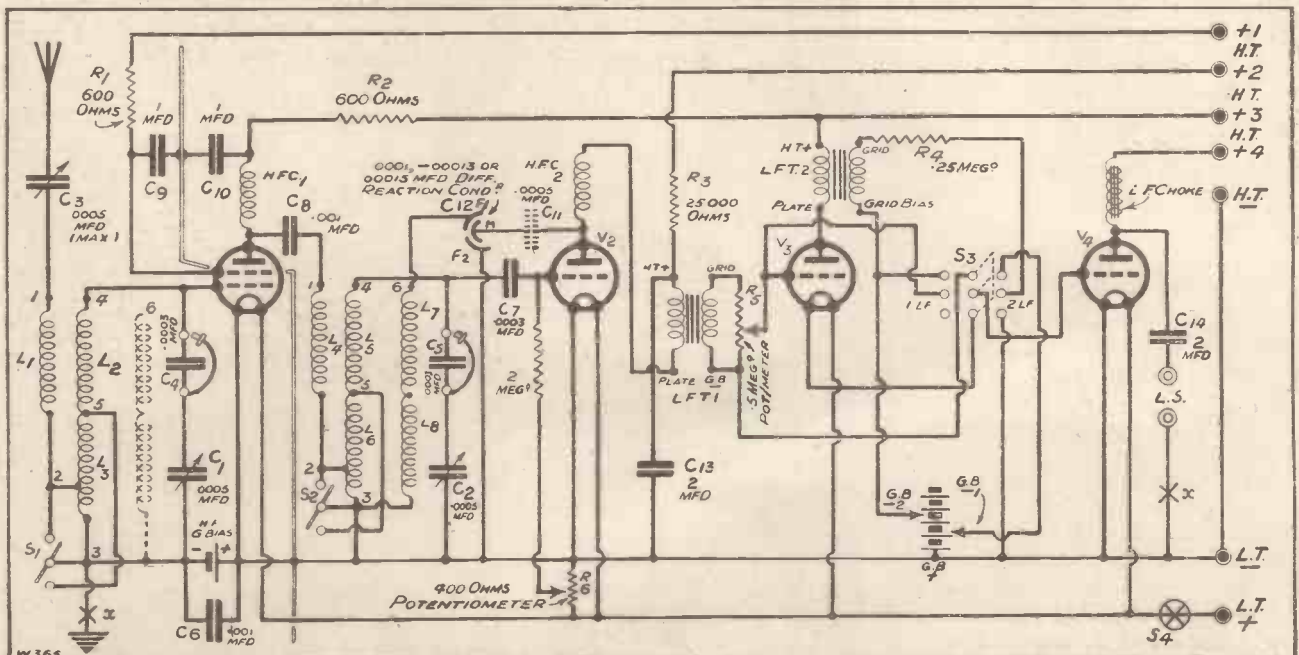
A set for Devon and Cornwall, a melody bringer for those living in outlying districts of Wales, and on

the East Coast; in fact, a set for anybody and everybody.

And so, coinciding with the Radio Exhibition issue (which means to say that you can all come and inspect it at your leisure on the WIRELESS CONSTRUCTOR Stand), here is the "Explorer" Four.

The "Explorer" Four is the three-valve version, almost exactly the same as published originally, with the addition of a very efficient screened-grid H.F. stage. The new wave-change coil arrangement first introduced to WIRELESS CONSTRUCTOR readers in the original "Explorer" design has been utilised in the latest

VICTOR KING'S LATEST AND GREATEST CIRCUIT DESIGN



The "Explorer" Four is built round a circuit that is the result of a great deal of research and experiment. The wave-changing scheme is undoubtedly one of the most efficient ever devised. The system embraces all wave-lengths, from the long waves down to the ultra-short, and, moreover, the set is designed to operate perfectly on all these wave-lengths.

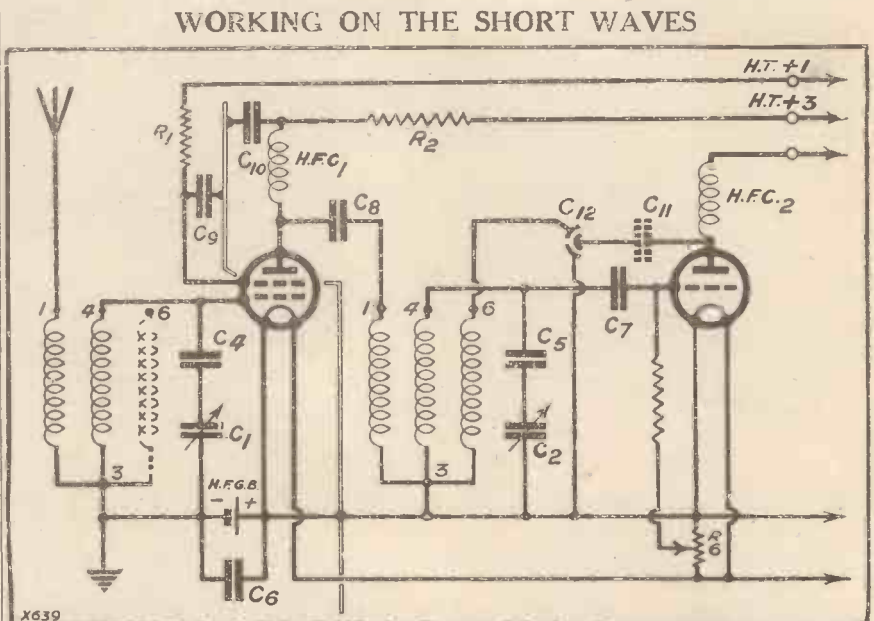
The "Explorer" Four—continued

set, both for coupling the aerial to the screened-grid valve and as an intervalve coupling between the first and second valves.

The changing of the field of exploration from broadcast to long waves is accomplished by two simple switches placed conveniently on the panel. When you have heard all that there is to be heard on these bands—and here I might mention that in the original tests of this set I tuned in many stations at full loud-speaker strength on the long waves alone (a feat which you should be able to do with the greatest of ease)—you merely take out the all-wave coils and put in the special short-wave units, and then you can add to your log America, Australia, South Africa, in fact, the whole wide world.

S.G. on Short Waves

Those of you who have followed short-wave progress at all closely will probably have seen doubts expressed from time to time as to the efficiency of a screened-grid valve on short waves. In fact, you may even have seen it suggested in the past that, far

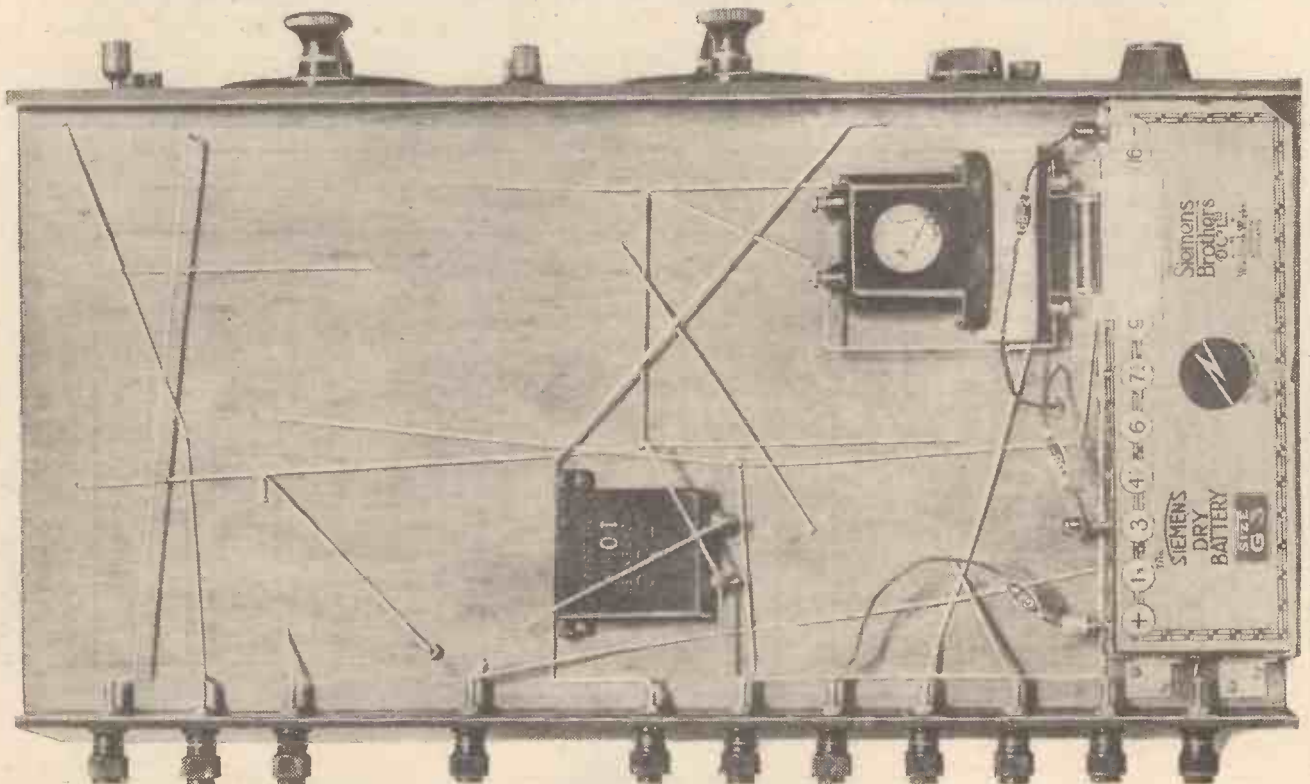


Here are the tuning circuits arranged for the reception of short waves. Note that the condensers C_4 and C_5 are placed in series with C_1 and C_2 . They are shorted when long and medium wave-lengths are required. The potentiometer R_6 is also a most important component.

from giving amplification, an S.G. valve on short waves definitely cuts down signal strength.

Well, perhaps in some cases it does, but that is certainly not the case with the "Explorer" Four.

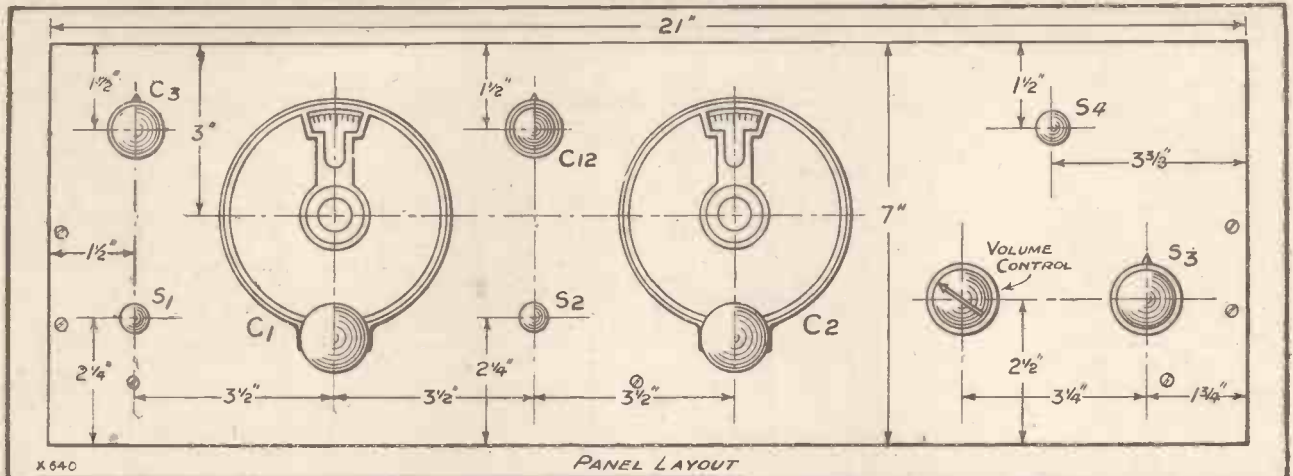
A "WORM'S-EYE" VIEW OF THE WIRING OF THE "EXPLORER" FOUR



Much of the wiring is carried out "below decks," so that the space above the baseboard is comparatively free from connections. The procedure greatly assists in preserving a neat appearance and providing efficiency in operation. This photograph should be consulted together with the wiring diagrams when building the set.

The "Explorer" Four—continued

EVERYTHING IS AT YOUR FINGER-TIPS IN THIS SET



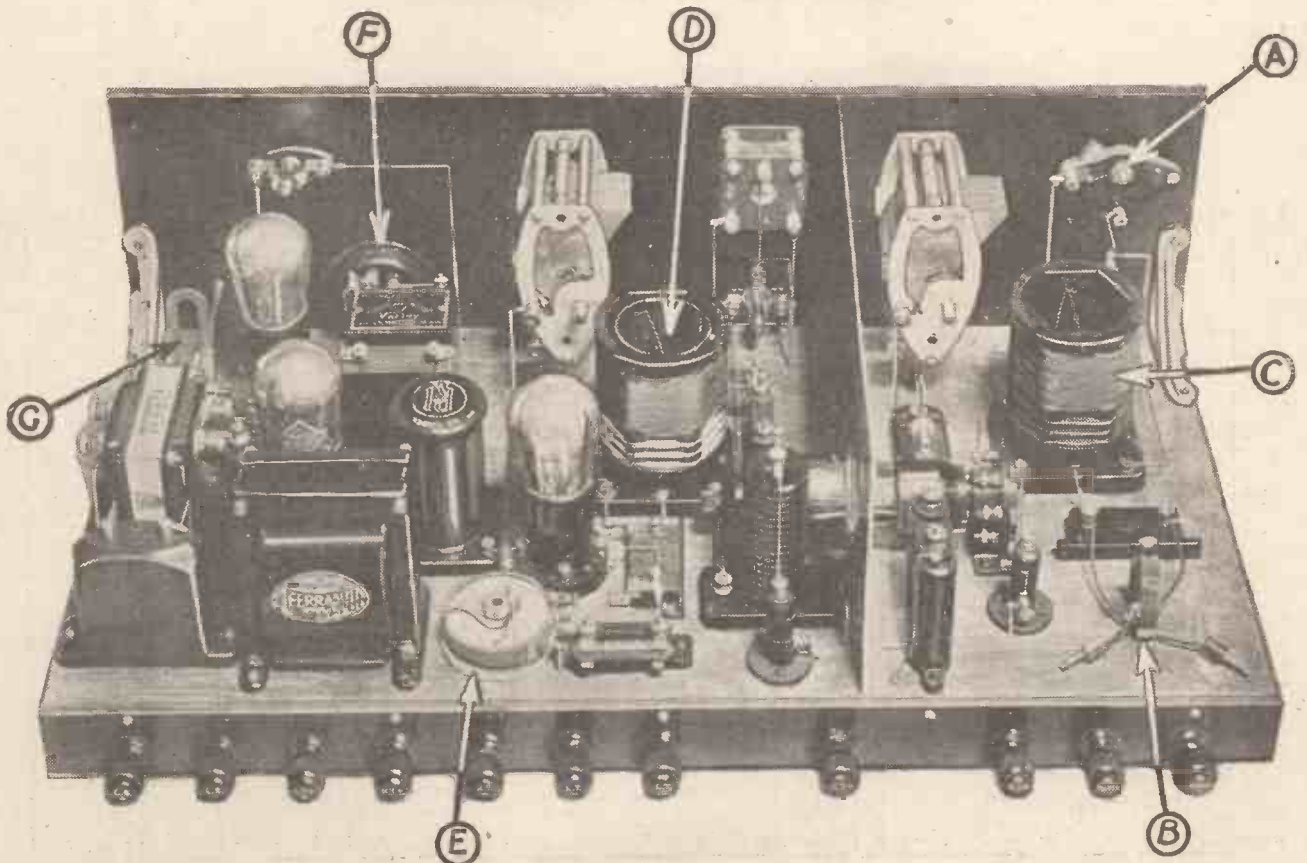
The panel controls have been so arranged that maximum ease of operation is obtained. There is nothing difficult in handling the receiver, and the fact that there are only two tuning controls enables distant-station searching to be carried out with the greatest ease.

While I would not be prepared for one moment to say that the H.F. stage in this case gives a magnification as great, or in fact anywhere

near as much, as on the broadcast and long waves, yet I have proved it definitely to be an advantage, and to give real amplification.

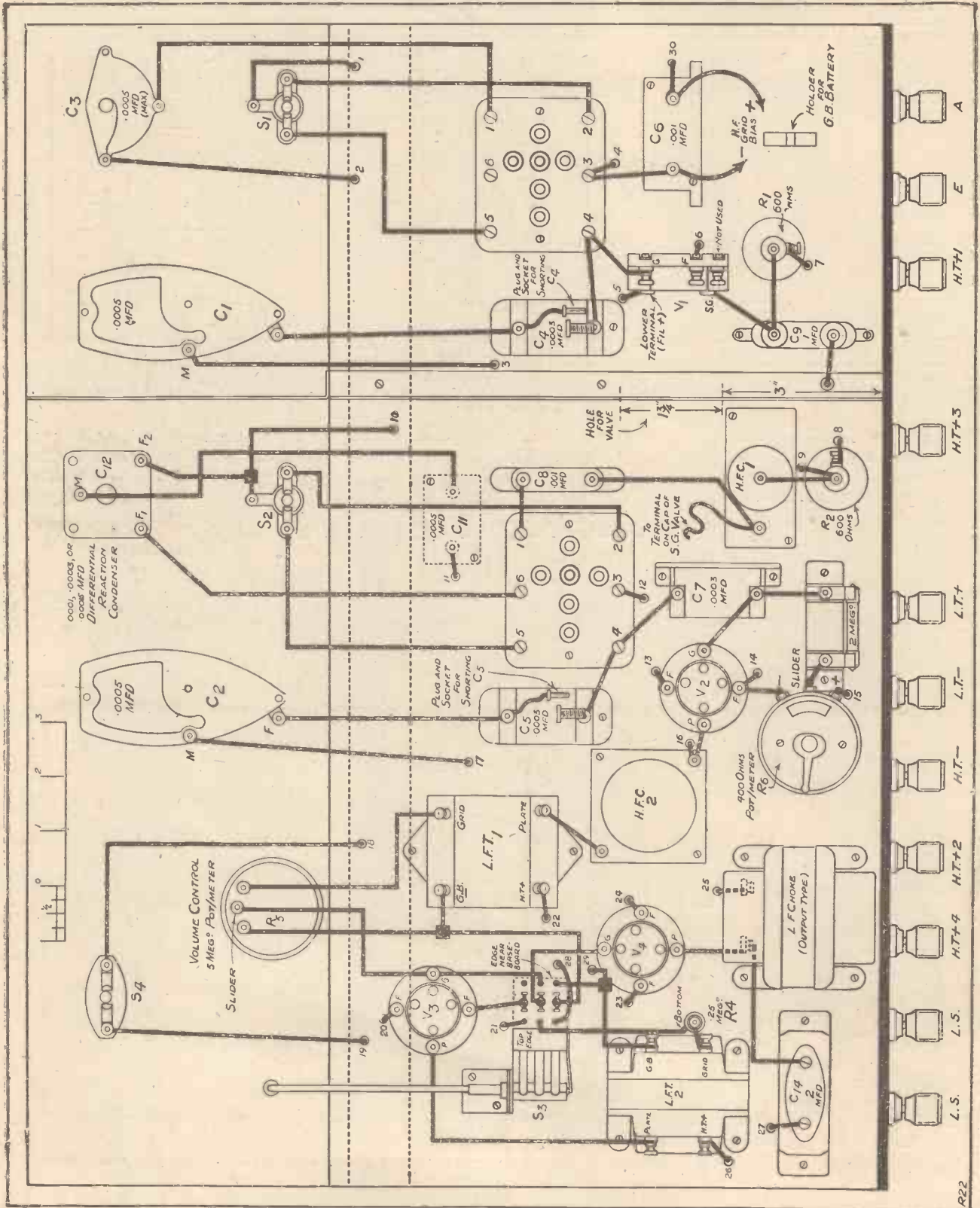
As a matter of fact, quite apart from the question of amplification, having the S.G. valve in circuit on short waves helps considerably to

THE FINEST SET OF THE YEAR



You can see from this photograph how very clean the design is. The use of under-baseboard wiring greatly assists in keeping the top of the baseboard free from wires which would give the set an untidy and complicated appearance. The parts lettered are as follows: (A), aerial series condenser C_3 ; (B), H.F. grid-bias clip and leads; (C) and (D) are the wave-change coil units; (E) is the detector potentiometer R_0 ; (F) the volume control, and (G) the L.F. stage switch S_3 .

The "Explorer" Four—continued



The wiring diagram of the above-baseboard components is shown here; the underneath connections can be seen on the following page. The numbered holes on the baseboard show where the wires are passed through.

The "Explorer" Four—continued

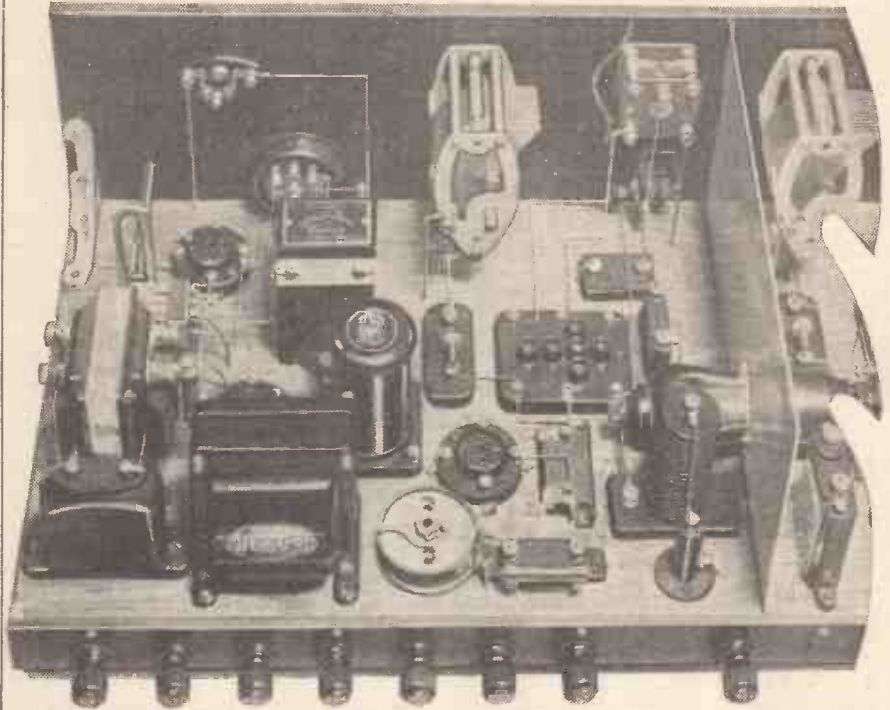
overcome that annoying "dead-spot" difficulty which quite often arises, and in addition it tends to improve reaction control and to minimise hand-capacity effects. So, you see, it is certainly worth while.

As you may well imagine, particularly those of you who constructed the three-valve version, the "Explorer" Four is a very powerful receiver, and although a volume control is provided for limiting the output, it is very unlikely that you will find it necessary to use all four valves for the reception of near-by stations. Provision has, therefore, been made for cutting out the first L.F. valve by means of a switch conveniently placed on the panel.

The Parts You Need

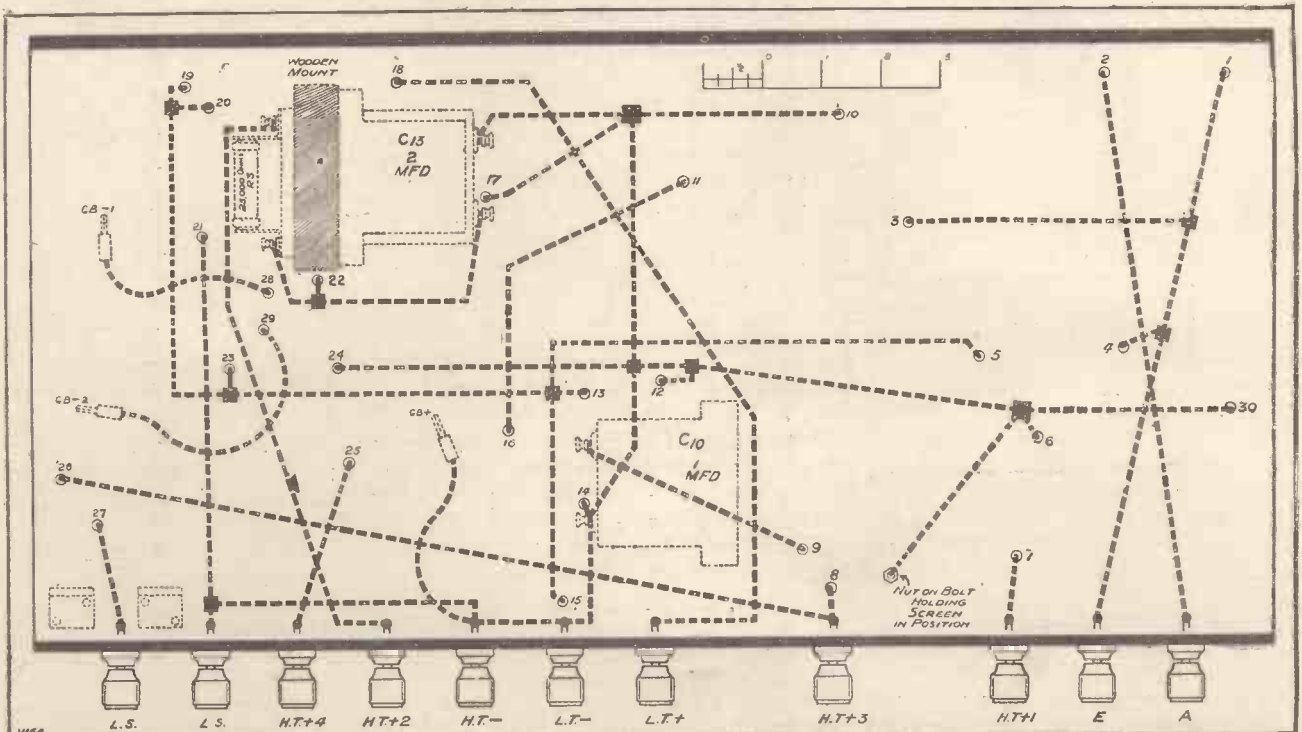
Now, what about the components? You will find elsewhere a complete list of the parts required, and while there will be no need for you to tie yourself down to the particular components used in the original set (mentioned in each case first in the list), I do strongly recommend you to choose from the alternatives given, all of which are of thoroughly reliable manufacture.

PLENTY OF POWER IS PROVIDED



The L.F. end of the "Explorer" Four consists of two transformer-coupled stages, which are arranged with a switch so that one can be cut out if desired. The detector potentiometer is essential for smooth reaction control on the short waves.

HOW THE WIRES RUN WHEN THEY GO BELOW



This "Ghost" picture shows the wiring under the baseboard as it would appear if the latter were transparent. Compare this with the wiring diagram and you will see how the wires link up. The under-baseboard photograph in a previous page will also help you, though that illustration is not of the "ghost" variety.

The "Explorer" Four—continued

This is the WIRELESS CONSTRUCTOR Exhibition set, and the set which we hope to make all you home constructors rave about when you visit the Show. Do not be unduly alarmed, therefore, when I tell you that the first part of the constructional work consists of french-polishing the baseboard.

Perhaps you'd rather not. Well, it will not be likely to affect results however you finish the baseboard,

There is a fair amount of weight to be supported on the panel, and to make it perfectly rigid (a point of particular importance when considering short-wave reception) you would be well advised to use small panel brackets in addition to the ordinary fixing screws.

As a matter of fact, brackets were used in the original set, as you will see from the photographs, but they have purposely been omitted from

to be shorted out on all but the very short waves, and it is really quite immaterial how you choose to short them. A piece of wire between the terminals will be quite satisfactory if you do not fancy the job of soldering sockets to terminal shanks:

Bolting the Screen

Three of the less important components are mounted on the underside of the baseboard, and you can

YOUR SHOPPING LIST

- 1 Panel, 21 in. × 7 in. (Lissen, or Trolite, Paxolin, etc.).
- 1 Cabinet for the above, with baseboard 10 in. deep (Cameo, or Pickett, etc.).
- 2 .0005-mfd. variable condensers, slow-motion type or with slow-motion dials (Lissen, or J.B., Lotus, Ormond, Ready Radio, Dubilier, Formo, Polar, etc.).
- 2 Slow-motion dials (see above) (Igranic, or Ormond, Lissen, Lotus, J.B., Formo, etc.).
- 1 .0001-, .0003-, or .00015-mfd. differential reaction condenser (Lotus, or Lissen, Dubilier, Polar, Ormond, Ready Radio, Magnum, Wearite, etc.).
- 1 .0005-mfd. "Brookmans" type condenser (Ready Radio, or similar type).
- 2 Three-contact type wave-change switches (Ormond, or Bulgin, Ready Radio, Magnum, Pioneer, Wearite, Red Diamond, etc.).
- 1 L.T. on-off switch (Lotus, or Lissen, Red Diamond, Benjamin, Igranic, Bulgin, Wearite, Magnum, etc.).
- 1 5-megohm potentiometer type volume control (Magnum, or Lissen, Igranic, R.I., Gambrell, Varley, etc.).
- 1 Baseboard-mounting type three-pole change-over switch, with extension arm 4½ in. long (Wearite, or Utility, etc.).
- 1 Horizontal-mounting type sprung valve holder (W.B., or Junit, Bulgin, etc.).

- 3 Ordinary sprung type valve holders (Lotus, or Igranic, Lissen, Benjamin, W.B., Magnum, Formo, etc.).
- 2 Six-pin coil bases (Colvern, or Lewcos, Magnum, etc.).
- 3 .0003-mfd. fixed condensers (Dubilier and Graham-Farish in set, or Lissen, Ferranti, Mullard, T.C.C., Ediswan, Igranic, Goltone, Magnum, etc.).
- 2 .001-mfd. fixed condensers (Lissen and T.C.C. in set. See above for other good makes).
- 1 .0005-mfd. fixed condenser (see text before buying) (T.C.C., or Lissen, etc.).
- 2 1-mfd. Mansbridge type condensers (Dubilier and T.C.C. in set, or Lissen, Hydra, Loewe, etc.).
- 2 2-mfd. Mansbridge type condensers (Lissen and Hydra in set, or Ferranti, Loewe, T.C.C., Dubilier, etc.).
- 2 600- or 500-ohm resistances (Bulgin, or Ready Radio, Paroussi, Wearite, Magnum, etc.).
- 1 25,000-ohm resistance and holder (Ready Radio, or Ediswan, Varley, Ferranti, R.I., Lissen, etc.).
- 2 H.F. chokes (Note: These must be of the universal type suitable for waves as low as 20 metres) (Lewcos and R.I. in set, or Dubilier, Magnum, Ready Radio, Varley, Wearite, etc.).
- 1 2-meg. grid leak and holder (Dubilier, or Lissen, Igranic, Ediswan, Ferranti, Mullard, etc.).

- 1 5-meg. grid leak with terminals (Lissen, or similar type).
- 1 400-ohm baseboard-mounting type potentiometer (Igranic, or Lissen, Ready Radio, Wearite, etc.).
- 2 L.F. transformers of fairly low ratio (Varley Nicore 1 and Telsen Radiogrand in set, or Lissen, R.I., Ferranti, Igranic, Lotus, Mullard, Lewcos, etc.).
- 1 20-henry L.F. choke, output type (Ferranti, or Varley, Lissen, R.I., Atlas, Wearite, Magnum, etc.).
- 1 Grid-bias battery clip (Bulgin, or Magnum, etc.).
- Ebonite strip, 21 in. × 1½ in.
- 11 engraved terminals (Belling and Lee, or Igranic, Eelex, etc.).
- 1 Standard-type screen, but 10 in. × 5½ in.
- Wire, flex, screws, wander plugs, etc.

COILS.

- 2 "Explorer" Three type coils ("Ready Radio" and "Wearite").
 - 2 "Explorer" short-wave coils of the above makes.
- Or, if you make them yourself, you will require:
- 4 6-pin coil-formers, 2 ribbed and 2 slotted. (Each 2½ in. in diam.) (Colvern.)
 - Piece of tube 1½ in. diam. and 2 in. long.
 - 2 ozs. each of No. 22 D.C.C. and No. 34 D.S.C.
 - 4 ozs. of No. 26 D.S.C.

and ordinary stain will answer the purpose quite as well except for appearances.

When your baseboard is ready you can prepare the terminal strip and then leave it for a while until the panel is drilled. Do not make the mistake of drilling the screw holes for the baseboard at the base of the panel.

Supporting the Panel

This set is built up on the chassis principle, and in consequence the screw holes should be drilled in such a position that the underside of the baseboard is 1½ in. up from the base of the panel.

the diagram because there is so much variation in shapes and sizes between the various makes. Their omission will prevent you from following the original layout to the extent of drilling the holes in what, in your case, may be the wrong positions.

The component mounting is straightforward enough, and there is not a great deal that I can say in this respect that would be likely to assist you. There are, however, just one or two points to which perhaps I should refer.

In the first case, you will notice plug-and-socket arrangements on the terminals of the condensers C₄ and C₅. This is to enable the condensers

determine their exact positions from the under-baseboard wiring diagram.

By the way, in case it is not quite clear from the diagrams, the bolt passing through the flange of the screen and to which one side of C₉ is joined actually passes right through the baseboard, and is secured with a nut, a washer, and a soldering tag on the underside.

The condenser marked C₁₁, and shown dotted, is merely a safety condenser, and it need only be used if you happen to get hold of a differential reaction condenser which has not a solid dielectric between the moving and the fixed plates.

The "Explorer" Four—continued

THE "WIRELESS CONSTRUCTOR" "EXPLORER" FOUR

(Screened-grid, detector, and 2 L.F. receiver).

VALVES.

1st: Screened-grid H.F.
 2nd: H.F. or special det. type (impedance 20,000 to 30,000 ohms).
 3rd: L.F. type valve.
 4th: Power or super-power type (depending upon volume it is required to handle and nature of H.T. supply).
NOTE.—A super-power valve is not recommended for use with small capacity type H.T. batteries. Valves to suit accumulator, 2, 4 or 6 volts.

COILS

Two "Explorer" wave-change coils. Of special design.
 Two "Explorer" short-wave coils.
NOTE.—These coils can be obtained commercially or made at home. (See the "Wireless Constructor," September, 1930.)

SHORT WAVES.

To receive short waves, change coils and remove shorting plugs on fixed condensers in series with the two .0005 variable condensers.

POTENTIOMETER ADJUSTMENT.

Move slider of potentiometer towards negative end for smooth reaction control, and decrease H.T. voltage on H.T. + 2.

H.T. AND G.B. VOLTAGES.

H.T. + 1 (screen grid), 70 to 90 volts.
 H.T. + 2 (detector), 50 to 80 volts.
 H.T. + 3 (S.G. plate and 1st L.F.), 120 to 150 volts.
 H.T. + 4 (Power or super-power valve), maximum H.T. voltage rating of particular valve in use, or nearest available voltage.
 G.B. for H.F. valve (looking from front of set, plugs to left of screen), 1½ to 4½ volts.
 G.B. — 1 (plug under baseboard), voltage to suit particular L.F. valve as recommended by makers. **NOTE.**—It will usually be between 1½ and 6 volts.
 G.B. — 2 (plug under baseboard), see maker's instructions for particular power valve.
NOTE.—With some types of super-power valves this may be as high as 30 volts.

MAINS OPERATION.

This set is suitable for use with an A.C. or D.C. H.T. mains unit. In the latter case, use a high-voltage type 2-mfd. condenser in earth and aerial leads.

CONTROLS.

Two main dials are for tuning. If coils are constructed correctly the readings should be approximately in step throughout whole range.
 Small knob to left of first dial (upper knob) is extra selectivity control for broadcast waves.
 Small knob at top of panel between two main dials is reaction control.
 Two smaller knobs below selectivity control and reaction condenser are wave-change switches. These should be pulled out for broadcast waves, and pushed in for long waves.
 Left-hand control of two lower knobs on right of panel is volume control.
 Knob next to this on right is for cutting out 1st L.F. stage.
 Remaining small knob on right of panel is L.T. switch.

You will notice if you refer to the under-baseboard wiring diagram that to the left of the loud-speaker terminals clips are provided by which to secure a grid-bias battery. But space is available only for a 16-volt battery, and with fairly large output valves this will not be sufficient, so that the battery may have to be placed externally or on the inside of the cabinet.

A G.B. Tip

Incidentally, if you do use a battery under the baseboard, see that none of the sockets come into contact with any part of the holder or resistance R₃. It is a good scheme to wrap a piece of paper round the battery just at this point to prevent accidents. There is not much else to say about the construction, and with your set completed you will naturally be anxious to give it a try-out.

All details as to voltages and accessories can be obtained from the operating chart, which for ready reference you should cut out and fix inside the lid of the cabinet. Those who wish to make their own "Explorer" coils, instead of buying them, will find the diagrams and full instructions for both coils in last month's "Wireless Constructor." (In the article describing The "Explorer" Two.)

You will require two of each coil—that is to say, two all-wave coils and two short-wave coils. But if you are making your own coils, the reaction windings (those on the smaller former)

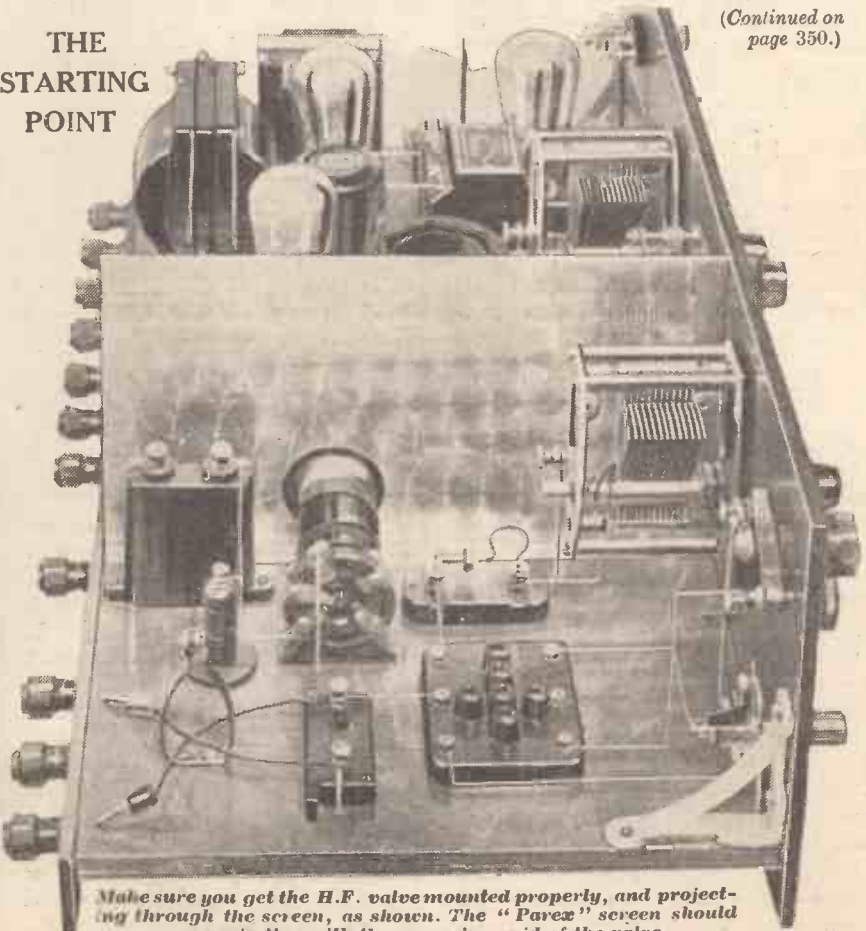
in the case of the all-wave unit for the H.F. position can be omitted.

But if you buy ready-made coils,

in which the reaction windings will be included, it is certainly not worth while to alter them in any way, because

(Continued on page 350.)

THE STARTING POINT



Make sure you get the H.F. valve mounted properly, and projecting through the screen, as shown. The "Pavex" screen should come in line with the screening grid of the valve.



QUEER QUERIES

Some interesting radio faults reviewed and questions answered.

By P. R. BIRD.

Why Is Rome Stronger?

A KENTISH TOWN reader of the WIRELESS CONSTRUCTOR, writing on scented paper with violet ink, and a pen-nib so fine that he must save pounds a year in ink alone, is absolutely at a loss to explain the behaviour of Rome.

He has long tried to get Rome, he says, but without much success, until lately. (From the look of his name I guess that the Romans are friends and countrymen of his!) This last few weeks instead of 'phones he has had the loud speaker fairly dancing and as he has not altered his set he is at a loss to account for it.

He supplies several ingenious theories, but the real explanation has entirely been missed. The simple fact is that as winter approaches long-distance reception gets better and better.

That Accumulator Service!

"Do you get your accumulators brought round to you from a service station, and, if so, do they sometimes fail to work?"

Most of the old hands that I have spoken to on the subject admit that even the best accumulator service people sometimes stray from the path of righteousness, and occasionally provide them with an accumulator which, when connected with the set, might just as well be a plum pudding for all it serves for lighting the valves! They know what to do about it, but for the benefit of those who have just started an accumulator service, and have not had this unpleasant experience, it is worth mentioning.

Let us get clearly in mind exactly what happens. Your accumulator,

which has been operating the set perfectly, is perhaps actually working when the service man calls. The set is switched off, the L.T. leads are undone, the old battery taken to the door and the new one brought in. And that's that!

But after the service people have driven away (never before, of course!) that accumulator is connected up exactly as the other one was connected, the set is switched on to resume the programme—but, alas, silence! Generally the leads are re-examined, the terminals are screwed on tighter just to make sure they are

spot on the metal of the connecting bar, or a rather dirty-looking terminal, may prove fatal to current flow, so that even when the set's switch is placed on there is no filament supply.

If you complain to the service people they will promptly put it right for you, and will promise to do it never again. But the chances are that one day they will, so it's just as easy to see to it yourself.

All that is necessary is to undo the leads, take out the accumulator, and remove all traces of dirt deposit from the metal surfaces which should make contact with the leads or connecting bars. If they appear to be attacked by acid, a rag dipped in a very strong solution of soda will work wonders on them in a moment or two, and only in the most hardened cases is it necessary to get rid of the deposit with a file.

When they are really clean, connect up again and listen to what Tommy Handley or some other gay spark is telling you, secure in the knowledge that even if the service station lets you down again it won't take you long to put that right.

A Very Queer One

Writing from Aldershot (and possibly with a view to pulling my leg!), a member of a certain famous regiment propounds the following poser: "If I put up the voltage on the detector to 150," he says, "and touch the

WHEN THE SET WON'T WORK!

Present-day radio is remarkably reliable. But every set "goes off" sometimes, and it should not therefore be assumed that it is wearing out. All it wants is proper maintenance—like a car or a bicycle, or any other similar contrivance. If you have any knotty little problem requiring solution, remember that the WIRELESS CONSTRUCTOR Technical Queries Department is in a position to give an unrivalled service. The aim of the department is to furnish really helpful advice in connection with any radio problem, theoretical or practical. Full details, including the scale of charges, can be obtained direct from the Techni-

cal Queries Department, WIRELESS CONSTRUCTOR, Fleetway House, Farringdon Street, London, E.C.4. A postcard will do. On receipt of this all the necessary literature will be sent to you, free and post free, immediately. This application will place you under no obligation whatever. Every reader of the WIRELESS CONSTRUCTOR should have these details, which will enable him to ask his questions so that we can deal with them expeditiously and with the minimum of delay. London Readers. Please Note: Application should not be made by telephone or in person at Tallis House or Fleetway House.

O.K., and although this sometimes puts the matter right, very often it does not. What is wrong?

In nearly all cases the trouble is our old friend—bad contact. One of the accumulator terminals is either a little dirty, so that one of the leads to the set is not making proper contact with it, or else, if it is a 4- or 6-volt accumulator, one of the connecting bars is not making contact successfully with its terminal.

There is not much electrical pressure in an accumulator—only 6 volts, or a little more, at the maximum—and consequently an innocent-looking dark

loud-speaker leads with one hand, at the same time putting the other hand right down over the low-frequency transformer, I get a terrific loud howl. How can I stop that?"

It seems hardly necessary for me to say that the most obvious and effectual way of stopping this would be to leave the detector H.T. in its normal position, and refrain from grasping loud-speaker leads with one hand while the other is placed over the L.F. transformer. If the set behaves all right when left alone, I am a sound believer in the theory of letting it do so! Why stir up trouble?

REALISM IN RECEPTION

by NOEL ASHBRIDGE B.Sc.(ENG)A.M.I.C.E.

A fascinating article by the Chief Engineer of the B.B.C., revealing a few more of the many problems encountered in ensuring that listeners get good-quality broadcasting.

THE last article in this series dealt with the question of whether music or speech from a broadcasting station was liable to become distorted during the process of its transmission by the ether.

In this article it is intended to discuss to what extent it is possible to receive a broadcast programme which is a faithful reproduction of the original, and at the same time avoid introducing interference from the two stations using neighbouring wave-lengths.

Such questions as detector distortion or non-linear amplification in the audio-frequency stages will be neglected, and the following remarks may be taken as applying to a well-designed receiver and loud speaker, capable of giving a reasonable measure of response to all frequencies between, say, 50 and 10,000 p.p.s., but not, of course, necessarily giving a "flat" response within these limits.

Two Main Conditions

In this country there are two main conditions to consider:

- (a) When the frequency spacing between stations is 9 k.c.
- (b) When several stations are working on the same wave-length using some method of maintaining extreme accuracy of the carrier-wave frequency. The spacing between the common wave-length and the neighbouring stations being the same as in (a), namely, 9 k.c.

Daventry 5XX provides a special case because the spacing between its carrier-wave and those of its neighbours is slightly greater; this, to a small extent, improves the possibilities of accurate and clean reproduction from this station. However, the advantage is, to an extent, neutralised by the fact that it is less easy to design a distortionless high-frequency circuit for the reception of this wave-

length as compared with the lower wave-lengths.

Turning to the general case of all stations in the ordinary broadcast band of 200-545 metres, i.e. condition (a), it is obvious that if the carrier from the neighbouring stations is received at a strength comparable with that of the side-band frequencies of the wanted station, heterodyne interference at a frequency of 9,000 p.p.s. will become obtrusive.

After Nightfall

At present, no continental station produces sufficient field strength in this country during the hours of daylight to make this effect serious. After dark, however, this is unfortunately quite untrue, and it is not at all unusual to record a field strength

HIDE THAT BLEMISH



If your set panel has unwanted holes these can be neatly filled with "heel-ball" or cobbler's wax.

of 1 milli-volt per metre from several of the distant stations. On occasions, usually for short periods, the strength from certain stations rises to as much as 2 or 3 m.v. per metre.

Imagine then that the receiver is situated at the limit of what the

B.B.C. estimates as the service area of a station; the wanted station will give 2½ m.v. per metre and the unwanted station may give 1 m.v. per metre, or even more, equivalent to modulation of the wanted carrier of 40 per cent.

Again, supposing that the listener is situated in an area of really good field strength, say, 10 m.v. per metre, the equivalent modulation is 10 per cent, but the average modulation of a broadcasting transmitter capable of, say, 90 per cent of linear modulation is only about 20 per cent, so that the 9-k.c. heterodyne may still be objectionable.

It is hardly necessary to point out that interference at a frequency of 9,000 cycles does not produce such a disastrous effect as it would at a frequency of, say, 2,000 p.p.s. Nevertheless it is most annoying when using a receiver which does justice to the higher frequencies.

It will be remembered that even the original spacing between stations of 10 k.c. still produced objectionable heterodynes, even when the stations concerned were working accurately on their allotted wave-lengths.

Receiver Design

Since there is little or no prospect of arranging a great enough separation between European broadcasting stations to prevent this effect, the question naturally arises whether it would not be preferable to design receivers so that the 9-k.c. heterodyne is not reproduced.

It is true that even when the receiver is arranged to cut off at, say, 8,000 p.p.s. there will still be interference between the side-bands of neighbouring stations. However, the strength of the side-bands is much less than that of the carrier-waves, and although such interference certainly does occur in practice, this is usually due to over-modulation at the

Realism in Reception—continued

interfering station; a state of affairs which it is hoped will disappear as technique becomes more and more developed.

Again, it might be argued that if the receivers are not to reproduce frequencies around 9,000 p.p.s., what is the use of transmitting such frequencies at all?

Short Cut-off Required

The B.B.C. has always made a practice of transmitting as much of the complete audio-frequency band as possible, for the benefit of the large number of listeners equipped with good receiving apparatus who live

chiefly those of inferior design, already cut out the normal heterodyne from neighbouring stations, but they also cut off, or at least cut down, all frequencies above about 3,000 to 4,000 p.p.s.

It is probably for this reason that complaints of interference of this type are not as prevalent as they might be. It is most important to note, however, that with the constantly increasing power of continental stations, and the improvement in the standard of loud speaker and receiver used generally, the difficulty is bound to become more and more serious.

p.p.s., so that a receiver cutting off at, say, 8,000 p.p.s. would lose practically nothing if the cutting off were scientifically carried out, at any rate so far as this type of transmission is concerned.

"Synchronised" Stations

When several stations are working on the same wave-length as in condition (b), it is not possible on a theoretical basis to obtain perfect reception even when the carrier and side-band frequencies are exactly in phase at all times, unless the receiver is situated at a point exactly equidistant from all the stations using the common wave-length.

In this country the carrier-waves of such stations are kept accurate to within about ten parts in a million by means of thermostatically controlled tuning forks, operating at a frequency in the neighbourhood of 1,000 p.p.s.; this frequency being stepped-up to the required radio-frequency by frequency doubling amplifiers.

There is a separate tuning fork at each station, and the thermostats are kept continuously in operation, day or night, whether the transmitter itself is radiating or not, owing to the necessity of maintaining steady conditions of temperature and voltage.

This degree of accuracy is sufficient to prevent any danger of a heterodyne note between stations, but it is obvious that when considering any two stations the carrier-wave and side-bands can never be in true synchronism.

Difficult to Detect

It has been found that the imperfections of reproduction introduced by this method of working are almost undetectable by ear, provided that the ratio of field strength from the wanted station to that from all the other "synchronised" stations in the group is greater than 5-1 when the stations are all radiating the same programme. When not radiating the same programme the ratio must be many times as great.

Apart from this consideration there is, of course, no difference between the behaviour of a "synchronised" station and one using an exclusive wave-length, but naturally a group of such stations is more likely to create interference at a distance, other conditions being equal.

"WE ARE IN DANGER"



Pirates have been very active of late in the China seas, so this invention of Mr. Richardson, of York, should have real uses. It is a bullet-proof S.O.S. sender. It continues to give the S.O.S. signal and the ship's position by radio even when under fire.

in areas of very strong field strength, where interference becomes negligible in effect, owing to the large ratio between the strength of the wanted and the unwanted signal.

If a receiver is to be designed with the intention of excluding the possibility of a 9-k.c. heterodyne, it is most important that it should cut off sharply between 8,000 and 9,000 cycles. Many existing receivers,

There are many occasions when it is not possible even to transmit frequencies above about 7,000 p.p.s., particularly when trunk telephone cable circuits are in use. The modern lightly-loaded cables, both in this country and abroad, should greatly improve the quality of programmes relayed from a distance, but in general it will not be possible to transmit over cables frequencies as high as 9,000



AMALGAMATED PRESS, LTD., The Fleetway House, Farringdon Street, E.C.4.

Stand No. 5.

Nowhere in the whole exhibition will you be so cordially welcomed as at Stand No. 5. Arrangements have been made for members of the WIRELESS CONSTRUCTOR Editorial Staff to be in attendance to meet our readers, and here you may meet in the flesh set-designers and technicians who have given their lives to the great game of radio.

If you have radio troubles—bring them. If you have a grouch—bring it. If you feel like dropping in simply to say "that so-and-so was a great set"—drop in and say it. That is, if you can get near the stand for the crowds!

As usual, blue prints, periodicals, the WIRELESS CONSTRUCTOR, MODERN WIRELESS, POPULAR WIRELESS and the BESTWAY books will be on sale—simply because there is sure to be a great demand for them! But do not dodge the stall simply because you have already got your copy of the WIRELESS CONSTRUCTOR. Remember, that of all the stands in the Exhibition this is YOUR stand, where YOU will be welcomed and where YOUR point of view will be appreciated.



Looking for a cone and speaker unit? This is the Six-Sixty product.

Here, too, will be some of the most famous sets in the world in their original form before they were described in the pages of the WIRELESS CONSTRUCTOR. So, however you may hesitate about sparing a few moments for this stand or that one, do not fail to look in on us at Stand No. 5.

A brief summary and review of radio apparatus on show at the National Radio Exhibition.

Held at Olympia, London, W., this great show, opening on September 19th, closes on September 27th. The price of admission is 1s. 6d., and the hours are 11 a.m. to 10 p.m. daily.

The "Wireless Constructor" Stand is Number 5.

ARDING & HOBBS, LTD., Clapham Junction, London, S.W.11. Stand No. 262.

Every housewife in South London knows Arding & Hobbs, Ltd., of Clapham Junction, famous for furnishing bargains and household requisites of every description. With characteristic go-aheadness this firm now specialises in radio, and a large selection of this season's latest models will be on show here.

ATALANTA, LTD., 1-3, Brixton Road, London, S.W.9. Stand No. 232.

This firm specialises in small tools of the just-the-thing-for-the-job type. No enthusiastic amateur should miss this year's display, which includes every conceivable time-saver and trouble-preventer that experience of this firm of specialists has evolved. The prices are extremely attractive.

AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO., LTD., Winder House, Douglas Street, S.W.1. Stand No. 107.

As the name implies, this is a firm not to be missed by the constructor and handyman. Not only coil winding, but many of the operations in radio construction are dealt with by this firm, and every constructor who is able to spare a few

moments should make a point of seeing the apparatus displayed here, and noticing how his wants have been visualised and his needs catered for by the Automatic Coil Winder and Electrical Equipment Company.

BAKELITE, LTD., 68, Victoria Street, S.W.1. Stand No. 255.

A wide variety of insulating materials and various types of mouldings, sheet insulators, and other specialised classes of insulation work.

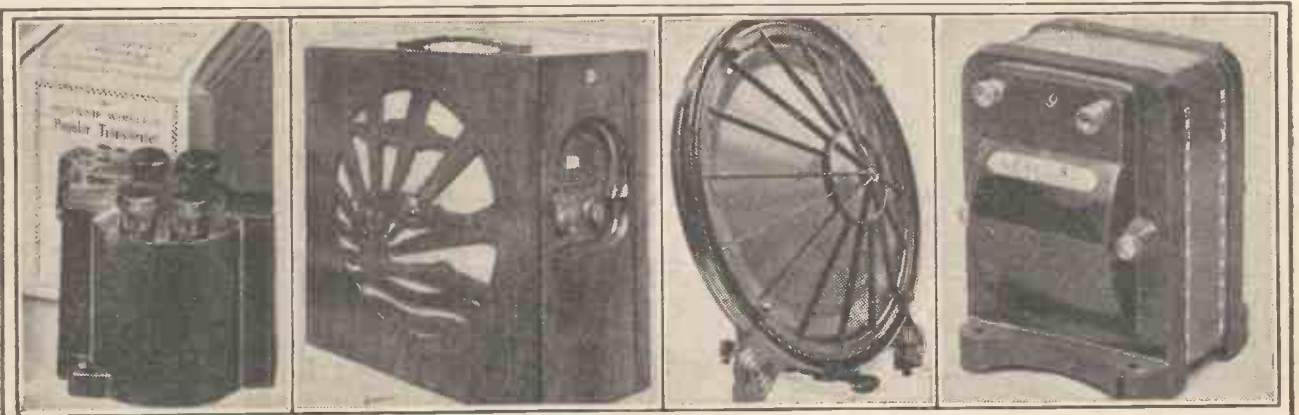
BAKER'S SELHURST RADIO, 89, Selhurst Road, South Norwood, S.E.25. Stand No. 137.

Three moving-coil loud speakers are the star turns of this stall. One is the Baker permanent-magnet moving-coil speaker for those users who do not possess electric light or have no convenient facilities for charging-up accumulators. In addition there are the Baker's Super and the Baker's Super Power models, both of which are obtainable in the forms for working from D.C. mains, A.C. mains or from six-volt accumulators.



The Cossor Two is a fine example of compact set design.

The A.C. models include Westinghouse rectifiers, transformers and full smoothing equipment, including high-capacity electrolytic condenser. In addition to these models there is a new permanent-magnet speaker, so that all who are interested in moving-coil reproduction will find plenty to linger over.



This composite illustration shows a fine collection of radio gear. From left to right we have a "Brownie" transformer, the Pye Portable, a Mullard loud speaker, and a "Levcos" L.F. transformer.

The Radio Exhibition—continued



An example of cabinet design by W. & T. Lock Ltd.

BEAVER ELECTRICAL SUPPLY CO., 5, Gt. Chapel Street, W.1.

Stand No. 206.

Here will be shown the "Corona" portable set, "Elite" coils, and some new and improved H.F. chokes.

THE BEL-CANTO RADIO CO., LTD., Warple Way, Acton, W.3.

Stand No. 264.

The Bel-Canto loud speakers have attained an enormous popularity in the United States and created great interest in this country, so the name will be familiar to many readers. The firm specialises also in amplifiers, sets, and radio-gramophone equipment.

BELLING & LEE, LTD., Queensway Works, Ponders End, Middlesex.

Stand No. 134.

Probably every British radio constructor has in his time used Belling-Lee terminals, conspicuous by their well-thought-out design, adaptability to all purposes, get-at-ability in use, and handsome appearance. The firm is still turning these out in millions.

In addition there are many lines, such as safety plugs and sockets where it is impossible to touch metal parts in use, these being fully insulated, plainly marked, and provided with such excellent contact that soldering is not necessary; indicating wander plugs; and indicating spade terminals.

The Belling-Lee "Spadensor" contains a 0002-mfd. condenser connected to a clip-on spade-terminal at each end, so that placing a condenser in series with the aerial is but the work of a moment, and there are many other lines which will cause the constructor to think hard at this stall.

An excellent line is the radio fuse holder, available in different forms, and battery cords, twin plugs and sockets, and terminals will also claim notice.



This fine A.C. mains receiver is a Graham Amplion product.

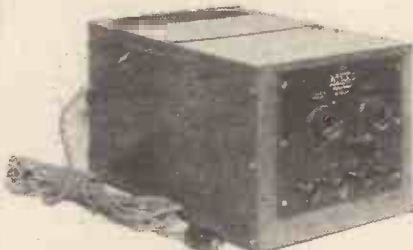
Finally there are "radio-legs," an ingenious device which stretches out and slips on to the base of any table radio set or gramophone, immediately converting it into a pedestal model.

For use with a portable the legs become part and parcel of the instrument so that the whole can be moved about as one piece of furniture. Like all other Belling-Lee devices these will readily be demonstrated and explained to all interested.

BENJAMIN ELECTRIC, LTD., Brantwood Works, Tarrif Road, Tottenham, N.
Stand No. 115.

The whole range of Benjamin products for radio work will be on-show at this stand, and the display will be sure to gain plenty of attention this year, as in the past.

The firm is famous for many lines, and most readers will have used the Benjamin anti-microphonic valve-holders, or switches, self-contained



An "Atlas" mains unit. H. Clarke & Co. (Manchester), Ltd.

rheostats, or earth plates with which the name of this firm is associated. Of special interest this year is the Benjamin turntable, claimed by its makers to be quite unique.

There are folding legs to this and several other new features, the whole device being capable of being opened out for outdoor use, and invaluable to the owner of a portable set which is not fitted with a turntable.

An advantage of the folding legs is that they reduce the capacity of the set to earth. The device is fitted with rubber buffers which prevent



This is one of a large range of accumulators to be seen at the stand of the National Accumulator Co., Ltd.

damage to a polished receiver or the article upon which the receiver is placed. Ball bearings are fitted so that the running is very smooth, thus making the direction-finding properties of a portable really accessible to its owner. The price complete is 7s. 6d.

BERNARD JONES PUBLICATIONS, LTD., 33, Fetter Lane, E.C.4.

Stands Nos. 1, 2, and 3.

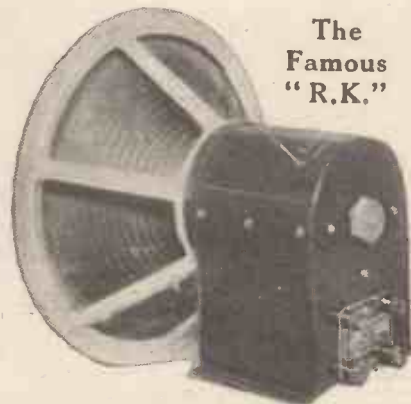
Various wireless journals, books, etc., will be displayed here.

SYDNEY S. BIRD & SONS, LTD., Enfield Town, Middlesex.

Stand No. 73.

All constructors who have had more than a year or so of radio set building will associate the name of Sydney S. Bird & Co. with first-class condensers, for at one time this firm's products in that line had fair to become a radio fashion.

Ganged condensers, double-drive condensers, condensers which interlocked, rocked, and generally behaved themselves exactly as the constructor wanted, were specialities of this firm.



The Famous "R.K."

One of the Rice-Kellogg moving-coil models marketed by Ediswan.

Every sort of extension rod handles—double jointing, adjacent mounting, or other special requirement—seem to come naturally to these specialists in condenser construction.



"And don't forget that new bias battery"

BRITISH BLUE SPOT CO., LTD., 204, Great Portland Street, W.

Stand No. 217.

Everyone has heard or heard of the Blue Spot loud speakers, and at this stand will be represented the British firm which is now taking over the all-British manufacture of certain of the famous Blue Spot lines.

In addition to a new loud speaker, there will be a variety of L.S. units and associated apparatus displayed, ensuring that the reproduction enthusiasts will have plenty to interest them here.

BRITISH EBONITE CO., LTD., Nightingale Road, Hanwell, W.7.

Stand No. 253.

The display at this stand will consist this year of ebonite panels of all sorts, black polished, matt and mahogany grained, etc., to suit all individual needs.

In addition there will be a large range of ebonite formers, and also the new formers and base which have been recently introduced. This new improved type is somewhat smaller than the old type, is much easier to handle, and in addition the price is reduced from 10s. 6d. to 7s. 6d. for the complete former and base.

"Beol" components have always had a good name for reliability and good appearance, and this year's display will certainly go far to enhance it.



This mains unit is one of the Tannoy products.

The Radio Exhibition—continued

THE BRITISH GENERAL MANUFACTURING CO., LTD., Brockley Works, Brockley, S.E.4.
Stand No. 59.

In the radio field, as well as on the field of battle, the British General has done great work. This year the firm is showing several special lines, including a Triumph L.F. transformer.



The new "Donotone" loud speaker.

This transformer is suitable for either first or second stages of L.F. with a ratio of 3½ to 1. The B.G. anode unit has been specially designed for screened-grid or triode coupling, and is suitable for use with all types of aerial coupling. Enclosed in a bakelite case, its range is from 200 to 2,000 metres. With each unit the suggested circuits are enclosed.

There is also an H.F. choke totally enclosed in a neat bakelite case, shielded against atmospheric changes, etc., whilst the new B.G. Tuner makes possible five different methods of coupling, all of which are controlled by the small lever on the unit. The tuning range here is from 200 to 2,000 metres, with a .0005-mfd. variable condenser, and the retail price is 14s. 6d.

BROWN BROS., LTD., Great Eastern Street, E.C.
Stand No. 17.

This great wholesale firm will be showing an enormous variety of selected British radio goods of special interest to those wanting complete sets, etc., and to dealers.

S. G. BROWN, LTD., Western Avenue, North Acton, W.3.
Stand No. 78.

Every year at the Olympia show the S. G. Brown stand has been a centre of interest to the loud-speaker enthusiast, and this year is likely to be no exception. Advance details of the products indicate that there will be a wide variety on show.

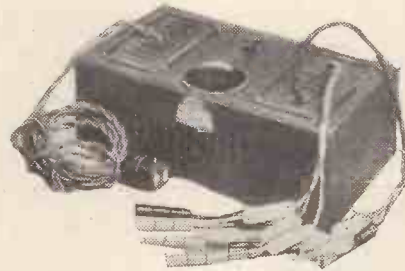


If it's batteries you want, these are ever ready!

The Brown screened-grid receiver is a host in itself. It is obtainable as a kit of parts, with or without the speaker. In addition there is the Brown S.G. Four-Valve Portable, a new receiver that will have to work very hard to oust the other Brown receivers out of popularity!

For £6 5s. there is the Brown Two-Valve Regional Receiver, with valves complete. In loud speakers there are so many distinctly noteworthy models that the visitor to the exhibition must see these for himself.

The new moving-coil model will be sure to attract enormous attention, and the whole display is backed up by such well-known accessories as the Brown headphones of various types, moving-coil movements, L.F. transformers, electrical pick-ups and the famous Brown Vee loud-speaker unit, with its associated apparatus.



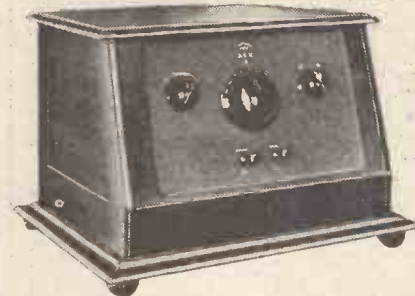
No larger than an H.T. battery, this "Ekco" unit supplies your high tension and charges your accumulator.

BROWNIE WIRELESS CO. (G.B.), LTD., Nelson Street Works, Mornington Crescent, N.W.1.
Stand No. 102.

One attraction at this stand (to listeners who are in trouble with interference, at any rate) will be the famous Brownie selectivity unit. This device retails at 10s. 6d.

The makers claim that fitted to an ordinary set it will give you screened-grid selectivity, for it is a combined wave-trap and selectivity unit. Full instructions for using the device are given with it, and when used as a wave-trap it cuts out the interfering station with remarkable ease.

In addition the other Brownie lines will be in evidence, and as these will include old favourites as well as new ones, the constructor is sure to find plenty to interest him.

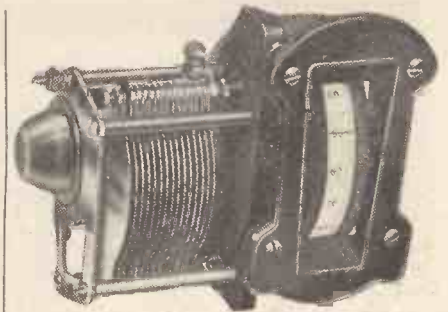


This Dubilier two-valver is run entirely from the A.C. mains.

A. F. BULGIN & CO., 9-11, Cursitor Street, London, E.C.4.
Stand No. 103.

A fine-looking lot of components is displayed here, including plugs, jacks, etc., for loud-speaker attachment, distant-control apparatus, Bulgin miniature panel-mounting instruments, of various types, and all sorts and shapes of gadgets.

Here, too, is the Bulgin "Multicoil," which incorporates a push-pull switch changing from 220/600 metres to 1,000/2,500 metres. The short-wave man will find that his requirements have been specially catered for, and there is such a host of gadgets, switches, lamp-holders, valve-holders, terminal strips, signal lamps and sundries of all varieties that no one who contemplates building a set should miss this stand.



One of the famous "Polar" condensers (Wingrove & Rogers).

BULLPHONE, LTD., 38, Holywell Lane, London, E.C.2.

Stand No. 33.

Loud-speaker enthusiasts will find something to interest them here, for the firm have been specialists not only in complete loud speakers, but also in the well-known Bullphone units, with which the home constructor is enabled to make a loud speaker for himself.

Advice on this head, and also all particulars, etc., will willingly be given upon application at this stand.



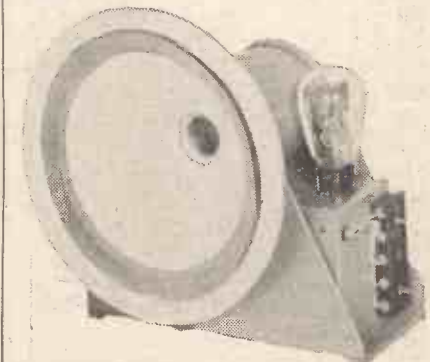
The Benjamin turntable for portables has collapsible legs.

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

Stand No. 56.

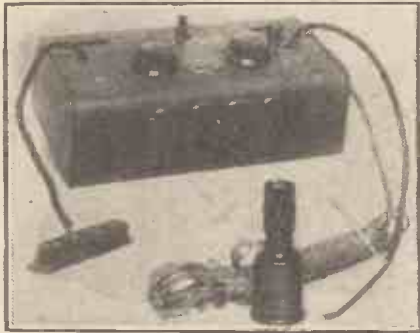
Old fans as well as new will crowd round the Burndept stand, where this famous firm will again be showing the Screened Ethophone, the Empire Screened Ethophone, a screened four, a screened portable, the super-screened portable, the A.C. Ethogram, the Universal Screened Five for battery and A.C. models, and the De Luxe Radio-Gramophone.

With a list of successes like that many firms would be content to rest upon their laurels, but we understand that Burndept are also bringing out new apparatus for this season, although at the moment of writing details are not available. The high standard of efficiency of the Burndept wireless products is too well known to enthusiasts to need restatement; no matter what kind of a set you may contemplate buying, a look over this stand is certainly not to be omitted from your review of the exhibition.



A G.E.C. loud speaker for A.C. mains, the necessary rectifying valve being incorporated as shown.

The Radio Exhibition—continued



This "Regentone" combination unit supplies H.T. and charges the L.T. battery when the set is "off."

BURNE-JONES & CO., LTD., 238, Borough High Street, London, S.E.1.
Stand No. 121.

No less than eight of the famous Magnum sets will be on view here, as well as a host of components. The Magnum sets include the Bandpass Four for A.C. mains, and the A.C. Mains Two, a transportable, a radio-gramophone, the Suitcase S.G. Four, the Universal S.G. Four, and the Universal Three, and the Magnum short-wave adaptor.

This latter plugs into an ordinary set and enables it to tune to short waves without any further complication or bother.

Of special interest are the Magnum components, consisting as they do of such a diversity as L.F. chokes, the "Magnascreen" complete screening boxes, all-wave coils, condensers of various types, panel brackets, grid-leak holders and "Magna-filters."

In addition there are H.F. chokes, coupling resistances, Spaghetti resistances, differential condensers, pick-up, volume control, and wire-wound potentiometers. In fact, the stand is one to make for and linger at.

C. F. and H. BURTON, Bernard Street, Walsall.
Stand No. 44.

A large variety of small gadgets, components and accessories is on show here, the firm being famous for its valve holder and for variable condensers, of which a large variety will be displayed.

The whole Burton range is of special interest to the set builder, including as it does on-off switches, reaction condensers, various forms of connectors and links, plugs and sockets, etc., of an eminently practicable and serviceable nature.

CARRINGTON MANUFACTURING CO., LTD.,
24, Hatten Garden, E.C.1.
Stand No. 140

The "Camco" cabinets are so well known that there is sure to be a big crowd round this stand.



The famous Lissen moving-coil speaker is available in models which are mains-driven, and also in permanent-magnet form for the listener without electric light facilities.

There is an amazing variety this year, the prices varying according to the design and the quality of the model selected, as well as the finish required. Of special interest is the new radio-gram cabinet, which will take a set having a panel of up to 18 by 7 inches, and is supplied with a 15-in. baseboard.

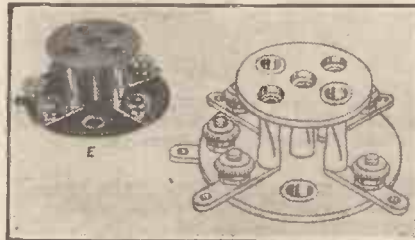
Any electrical clockwork motor may be fitted to this cabinet. Another new line is the Triumph loud-speaker cabinet, a handsome design which takes a 12-in. chassis and cone, and can be had in ebonite finish with an oxidised silver, or in oak finish.

CELESTION, LTD., London Road, Kingston-on-Thames.
Stand No. 53.

Loud-speaker enthusiasts will crowd round this stall in their thousands, for here are to be seen famous Celestion speakers which are old friends, in addition to a very attractive range of later models.

All music lovers and enthusiasts in radio reproduction will find a warm welcome at this stand, and any of the Celestion models will willingly be explained in detail.

The later models include a radio-gramophone set incorporating two S.G. stages, and an entirely new pick-up, developed during the past few months. From all accounts this will be a real winner.



Lectro Linz have produced an entirely new departure in the valve-holder line, shown above.

CHLORIDE ELECTRICAL STORAGE CO., LTD.,
217-229, Shaftesbury Avenue, W.C.1.
Stand No. 54.

Here is displayed a full range of Exide batteries for wireless high- and low-tension purposes. Of special interest is the new Exide Gececl, which is an entirely new departure in Exide wireless batteries, and now obtainable, as the name implies, with a jelly electrolyte of unspillable type, invaluable in a portable receiver.

In addition there are new Exide unspillable cells of liquid electrolyte, which have a very large ampere-hour capacity compared to their small size. On the low-tension side there are four main types, including the famous mass type of cell which hold the charge for long periods without deterioration. Here, too, are the Exide high-tension batteries of all types, and the display will include a selection of loose plates, separators, and other component parts illustrating the constructional and technical details of the Exide wireless batteries.

H. CLARKE & CO. (MANCHESTER), LTD.,
"Atlas" Works, Old Trafford, Manchester.
Stand No. 211.

"Atlas" coils will, of course, figure here in large variety, different types for long, ordinary, and the very short waves being represented in great profusion. In addition, there will be seen a full range of the firm's other lines, special attention having been paid to the requirements of the man with electric mains in his house.

Units for high tension, low tension, accumulator charging, etc., are all available, both the design and workmanship being right up to the well-known Atlas standard.

CLIMAX RADIO ELECTRIC, LTD., Haverstock Works, Parkhill Road, Hampstead, N.W.
Stand No. 27.

Listeners who have electric light in the house will be particularly interested in this series of stands, on which are displayed all the varied and interesting "Climax" radio products.

As well as the various ranges of transformers, etc., the associated apparatus for use with A.C. and D.C. mains will be found, together with potential dividers and a wide variety of other apparatus of an eminently practicable and well-designed nature.

This will be backed up by aerial and earth

equipment, so there is plenty to interest the "crystal" and "battery" man, as well as the mains enthusiast.

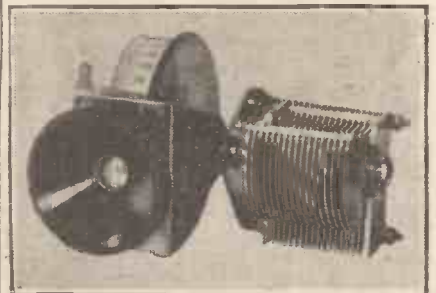
E. K. COLE, LTD., Southend-on-Sea.
Stand No. 48.

The advantage of obtaining radio power from the electric light mains was realised by the firm of E. K. Cole, Ltd., right at the beginning of radio, and by specialising in this branch they have gained an enviable reputation amongst constructors and other listeners.

The firm claims to have been the first in Britain to have placed a high-tension unit on the market as a commercial proposition, and to-day they have a remarkably fine and comprehensive range of all branches of wireless-from-the-mains apparatus, which will be exhibited at this stand.

Ranging from quite small components to large and imposing complete receivers, there is something of interest to all.

Of special attractiveness is the "S.P.G." Three, a wonderful receiver employing A.C. valves, the whole power to the set being obtained by means of a flexible lead terminating in a plug which goes into the electric light socket.



One of the famous "Utility" condensers—a Wilkins & Wright product with rotary drum-drive.

The wave-length range is a dual one, one position covering 200 to 500 metres and the other from 1,000 to 2,000 metres. Under favourable conditions, especially after dark, a very large number of stations can be received on this set, and the receiver in actual use has proved to be capable of bringing in twenty to thirty stations easily in one evening.

Provision is made for attachment of a gramophone pick-up, and, of course, like the rest of the Ekco apparatus the receiver complies with the regulations of the Institution of Electrical Engineers. It is available also for D.C. mains, and incorporates in the A.C. model a Westinghouse metal rectifier of proved long life.

Mains units (for giving H.T., L.T., or supplying both L.T. and H.T.), as well as trickle chargers, rectifier units, transformers of various kinds, will be shown, and, in fact, the whole gamut of radio from the mains will be found at this stand, to which all electrically-minded listeners will naturally gravitate.



A transformer that speaks for itself!

The Radio Exhibition—continued



The Marconiphone moving-coil speaker is available in A.C., D.C., or battery-driven models.

COLUMBIA GRAPHOPHONE CO., LTD.,
92, Clerkenwell Road, E.C.1.
Stand No. 71.

The close alliance between the radio and the gramophone industries has resulted in this famous firm developing an extensive trade in radio-gramophone interests, the results of which will be displayed here. No music lover should fail to see this part of the exhibition.

COLVERN LTD., Mawneys Road, Romford, Essex
Stand No. 45.

A host of good things is shown here, from complete sets fitted with Colvern components to items like switches, wire-wound resistances (interestingly enough wound on glass), screening boxes, etc.

The famous Colvern coils with interchangeable primaries will, of course, be in evidence; also there will be a new type of coil with switch incorporated, retailing at the attractive figure of 8s. 6d. Altogether a stall to linger over.

A. C. COSSOR, LTD., Cossor House, Highbury Grove, N.
Stand No. 52.

Valves! All kinds of valves! COSSOR valves! And as Cossors have been in the valve business right from the beginning, that means an endless variety of right up-to-date valves for every conceivable radio purpose.

If you want valves that run from the mains—Cossors have them. Pentodes? You can get Cossor pentodes. Want a screened grid? Cossors will show you screened grids in abundance, and will explain with curves and graphs the advantages of every Cossor type.

At this stand, too, will be obtainable particulars of the famous Cossor sets (including the new Empire Melody Maker), of which no prospective set purchaser should fail to get full particulars.

D. X. COILS, LTD., 542, Kingsland Road, E.8.
Stand No. 237.

A collection of the famous D.X. coils, which—as most readers will be aware—are designed for a wide variety of radio uses. Coils for long and ordinary waves, and short-wave paraphernalia as well, all are here at attractive prices.

DAYZITE, LTD., 19, Lisle Street, W.C.2.
Stand No. 25.

Regular visitors will realise that this year's Dayzite display is as attractive as ever.

The firm specialises in carrying a complete range of all H.M.V. and Columbia gramophones, and also portable wireless sets of every description, so that all listeners interested in quality reproduction on the loud speaker will find plenty here to engage their attention. The pick-up enthusiast will also find such aids to good reproduction as eliminators and all-mains units, especially made for portable and built-in sets, and an astonishingly wide range of accumulators, H.T. batteries, and components of all kinds will be available for listeners whose tastes lie in other directions.



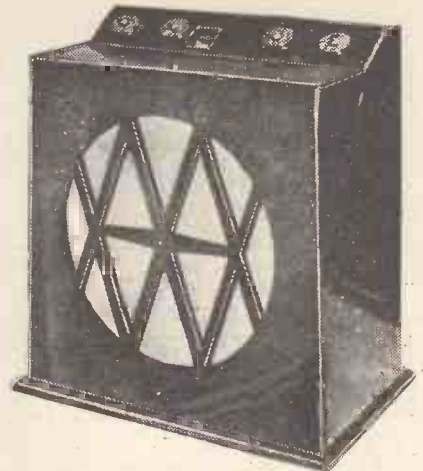
A well-finished L.F. transformer.

This firm also is interested in the N. K. Farrand Inductor loud speaker, for which is claimed "moving-coil quality without its drawbacks." It is cheaper to buy, and its sensitiveness and clarity are combined with simplicity of operation, for no mains or batteries are required to keep the speaker in operation.

Full details of this and all the other Will Day specialties would form a catalogue of radio exhibits, so listeners must look for themselves at the varied activities of this firm.

A J. DEW & CO., 33, Rathbone Place, Oxford Street, W.
Stand No. 15.

Wholesalers and those desirous of seeing a wide range of representative radio components will be particularly interested in this stand, which is run by one of the most famous wholesalers in the radio trade.



The "Murphy" portable set.

WM. DIBBEN & SONS, LTD., Antelope Buildings, St. Mary's Road, Southampton.
Stand No. 11.

This firm has its headquarters at Southampton, but London listeners will remember the attractive display on the stands last year, where receivers and loud speakers formed the main attraction. It is understood that this year's models will be particularly attractive. The firm has specialised largely in loud speakers, so that those looking for novelties in this line will do well to pay this stand a visit.

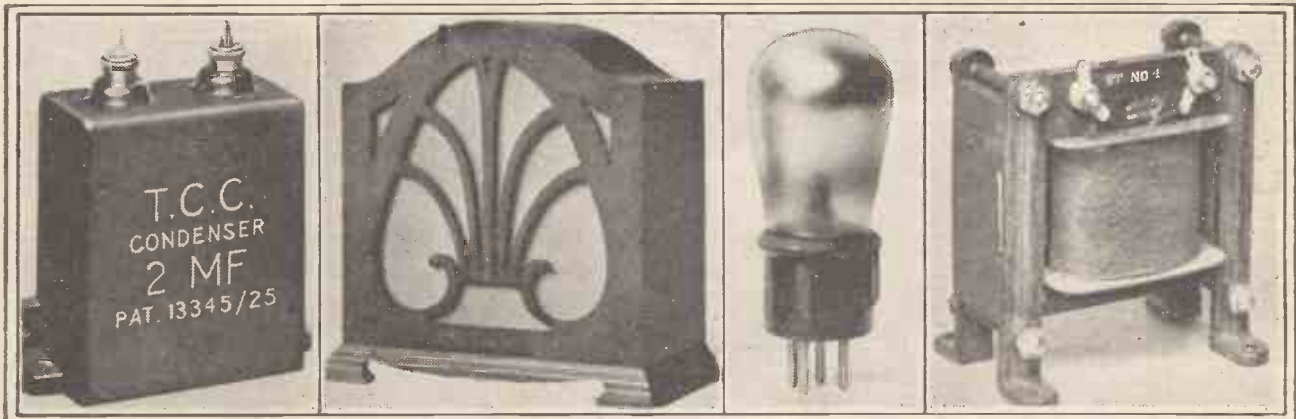
DONOTONE (Regd.) LOUD SPEAKER, 40, Furnival Street, E.C.4.
Stand No. 139.

In addition to samples of the new Ideal Donotone loud speaker (which retails at six guineas), this stand will contain samples of the ten-guinea Donotone, fitted with the well-known tuned gong, which is a feature of this firm's loud speakers.

Also shown will be one of the "Donograms" operating from both gramophone records and wireless, and the model of the Donotone public address system complete with microphone. A particularly interesting exhibit here will be a ten-guinea Donotone speaker which has been fitted to the outside of one of the company's delivery vans for the past eighteen months without any protection whatsoever and is now in perfect condition!

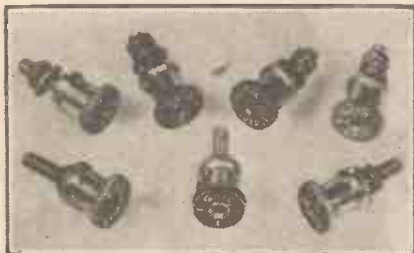
JOHN S. DOWNING & SONS, LTD., Crown Works, Commercial Street, Birmingham.
Stand No. 210.

A variety of cabinets will form the chief attraction here.



The T.C.C. condenser (left) needs no introduction to wireless constructors, and beside it is an "Efesca" loud speaker (Falk; Stadelmann). Next is a P.R. valve, and beside that a Wright & Weaire L.F. choke.

The Radio Exhibition—continued



Every constructor knows them—the "Eelex" terminals, to be found at the stand of J. J. Eastick & Sons.

DUBILIER CONDENSER (1925), LTD., Victoria Road, N. Acton, W.3.
Stand No. 50.

In addition to old favourites here will be shown models of radio-gramophones entirely new to the reader. One will be a £75 power amplifier incorporating a moving-coil speaker and all-electric equipment; the second, a three-valve radio-gram, also of the super type, and costing about £56; and there will be an all-electric two-valve radio-gramophone.

The present Dubilier three-valve all-electric set has undergone considerable modifications as regards construction, so there is no doubt that this year's productions will appeal to the better-class buyer who really requires a set which will give the best reproduction and embodies all the latest improvements. These, of course, are in addition to the great range of Dubilier condenser activities—an exhibition in itself!

DUNHAMS, LTD., Bellerophon Works, New Wharf Road, N.1.
Stand No. 2.

A very attractive range of complete sets is the mainstay of this display, the firm catering for a very wide range of customers interested in ordinary battery sets or in receivers for running from the mains.

Apart from the sets themselves, there are a number of smaller fittings and gadgets that will prove of interest to the discriminating visitor to the exhibition.

J. DYSON & CO. (Works), LTD., 5, Godwin Street, Bradford.
Stand No. 104.

This firm will be remembered for its Godwinex and Airmax specialities, including the six-pin and two-pin coils, chokes, valve holders, and so forth. In addition now there are some very attractive receiving sets at various prices, the whole making a noteworthy display.

EAGLE ENGINEERING CO., LTD., Eagle Works, Warwick.
Stand No. 43.

Here a very wide range of attractive exhibits is staged, including A.C. and D.C. all-mains receivers, as well as the famous "Chakophone Senior" Two, which has been standardised for the forthcoming season (price, with valves and royalties, £6 5s.).

In addition is the new all-in series of sets, consisting of two- and three-valvers operating from frame aerials. The "Warwick" portable five and the new screened-grid four receivers are also shown, and an entirely new range of radio-gram receivers is available.

Moving-coil speakers of the latest type are fitted to these, the radio-grams being available in A.C., D.C., or all-battery types. Additionally there are the well-known "de-luxe tuner," the Eagle range of dry H.T. batteries, and the new Chakophone speaker.

J. J. EASTICK & SONS, 118, Bunhill Row, E.C.2.
Stand No. 236.

The real constructor is sure to linger long over the display of J. J. Eastick & Sons, for here will be found in abundance those handy little plugs, sockets, terminals, etc., which are dear to the heart of every set builder.

A very attractive feature of these items is their low price, the standard plugs and sockets coming out at 1d. each, name plates 1d. each, and so forth. As there are forty different kinds to choose from, there is certainly no excuse for untidy connections or poor contacts nowadays, and there is sure to be a big rush at this stand for the handy little plugs and sockets which have earned such a great name for themselves and for J. J. Eastick & Sons.

EDISON BELL, LTD., Glengall Road, S.E.15.
Stand No. 29.

Complete sets working from batteries or from the mains and dealing with either radio or gramophone have long been associated with Edison Bell, Ltd., and in addition the firm will show a variety of smaller components, such as condensers, loud speaker, loud-speaker units, volume controls, and so forth.



This is the famous "P.W." "Magic" Three, in a Peto-Scott cabinet.

EDISON-SWAN ELECTRIC CO., LTD., 1a, Newman Street, W.1.
Stand No. 67.

The research and engineering resources of the Ediswan Company are now allied to those of the British Thomson-Houston & Metro-Vick Supplies, resulting in a display that is both vast and varied. It would be impossible to mention all the attractions here, but pride of place so far as interest goes will probably be voted to the new types of receiving valves, backed up by the rectifiers and other special types.

There are, of course, all kinds, for all sorts and conditions of operation, and the stand will bristle with super-powers, pentodes, and other



Here are two firm favourites—the Varley Nicore L.F. transformer, and (right) one of the Chloride Co.'s accumulators.

"last word" evidences of last-minute valve technique.

Here, also, the enthusiast will find plenty to interest him in the pentode output chokes, transformers, and, of course, in the ever-famous R.K. loud speaker. Pioneer of moving-coils, this has now blossomed out into different models for different classes of work, and is backed up by the Ediswan rectifier unit which provides the necessary field excitation to loud speakers worked from A.C. mains.

Full details of the various devices are obtainable on application, and in addition there is a host of information to be obtained about pick-ups, transformers, and similar aids to quality reproduction.

The famous B.T.-H. pick-up wjll, of course, be seen, as well as the electric gramophone motors for the de luxe enthusiast. Apart from the moving coils, the loud-speaker enthusiast will find plenty to interest him, for taken all round the variety on these stands is amazing.

EPOCH RADIO MFG. CO., LTD., 3, Farringdon Avenue, E.C.
Stand No. 203.

This firm will be remembered for their comprehensive range of moving-coil loud speakers, of different types, ranging from the essentially family receivers to large public address systems developing enormous power. It is understood that many of last year's models are being retained.

EVER-READY CO. (G.B.), LTD., Hercules Place, Holloway, N.7.
Stand No. 49.

The famous Ever-Ready batteries have recently been reduced in price in certain lines in which increased production has enabled a price cut to be made.

The wide variety of batteries shown here, ranging from the small popular types, right up to the high capacities, and incorporating a number of special batteries for special requirements, will be evidence of the radio public's appreciation of the value offered by the Ever-Ready company.

FALK, STADELMANN & CO., LTD., 83, Farringdo. Road, E.C.1.
Stand No. 119.

Efescaphone receiving sets for use with outdoor aerials, operated from batteries or of the all-electric type, will be the main features here. In addition will be self-contained portable receivers, both local-station and long-range models, portable radio-gram sets, the Efescaphone mains units for A.C. and for D.C., and an Efescaphone all-power unit which provides both the low- and the high-tension supply from A.C. mains.



Three representative Vandervell accumulators are shown to the left, and to the right is the Janit soldering outfit. In the centre is a Graham Parish grid leak.

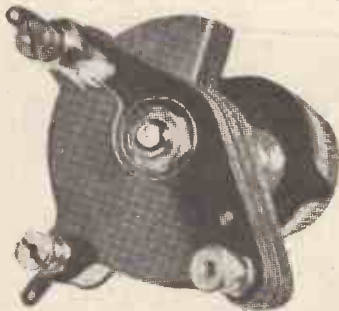
The Radio Exhibition—continued



The Igranic A.C.2 is a quality all-from-the-mains receiver.

FERRANTI, LTD., Hollinwood, Lancs.
Stand No. 47.

The whole Ferranti range will be represented on this stall, and every one familiar to British radio knows that this means an exhibition in itself. In addition to the famous L.F. transformers, A.F.3, 4, etc., the push-pull types, mains transformers, chokes, condensers, mains units, radio meters, valve testers, and testing instruments, etc., a whole host of new lines will be demonstrated.



One of the "Ready Radio" condensers to be seen at the stand of the Quest Radio Manufacturing Co.

One new audio transformer, to be known as the A.F.7, is designed for use with anode-bend detector. Of special interest to the set builder will be the new constructional chart covering H.T. supply units.

Among the Ferranti sets will be the new screened-grid three, as well as the new screened-grid four with push-pull (battery or mains operation). Loud speakers, of course, will be an essential part of the display, and a demonstration room has been booked at which all those interested may hear the performance of these instruments.



This valve holder is one of the well-known Paroussi products.

And then the new Ferranti sets! One three-valve A.C. mains receiver will be shown rather like last year's model, except that it will be provided with only one window, and will be calibrated in wave-lengths.

Another model of this particular receiver will be furnished with a metal cabinet finished in leather. It is available in three different colours to match your furniture—blue, green, etc.—and a variety of other colours will soon be obtainable.

Backing up the new three-valvers will be two new two-valve sets. Contained in leather-finished metal cabinets, these are designed to tune-in two regional programmes and 5 X X, and will have an average range of about 70 miles.

Another two-valver is sent out permanently tuned to two of the regional wave-lengths, the choice of programme and the control of volume being made by turning a single knob. Each of these sets is priced at £15 inclusive, and includes provision for use with gramophone pick-up.

A very important development is the Ferranti magnodynamic speaker, which the makers confidently claim will supersede the mains-operated models. It is fitted with a permanent magnet, and such a claim coming from so great a firm is bound to attract wide attention.

Other new lines too numerous to mention in detail will be shown, so that on no account should you miss Ferranti's.



Here is a Siemens sixty-volter.

FORMO COMPANY, LTD., 23, Golden Square,
Piccadilly Circus, London, W.1.

Stand No. 72.

The Formo Products (Arthur Preen & Co., Ltd.) are so well-known that the prospective constructor will tend to congregate round this stand, especially if he is looking for a condenser. From the famous little Formocondensers, obtainable with maximums of '0001, '0003, '001, or '002, right up to the large ganged condensers, there is an inconceivable variety of the just-what-you-want types.

Of special interest, perhaps, is the differential condenser, and the little Midget reaction condenser which can really be "condensed" into a small set, while retaining tremendous efficiency. The ordinary capacity tuning condenser, with its sound construction and locked moving vanes, robust appearance and long life, are here backed up by vernier dials, and all the other refinements which the constructor will appreciate.

A. W. GAMAGE, LTD., Holborn, E.C.
Stand No. 244.

On this stand will be found the famous sports outfitter's radio lines in wide variety.

GAMBRELL RADIO, LTD., Buckingham House,
Buckingham Street, W.C.

Stand No. 106.

This firm, long famed for its all-electric sets and its radio-gramophone activities, as well as for the famous Gambrell coils, "Neutrovernier" condenser, vernier controls, etc., is showing a very attractive exhibit at this stand.

So far as interest goes, one favourite is bound to be the "Novotone," a special filter to compensate for the serious losses when gramophone records are reproduced through the medium of pick-up and amplifier and loud speaker, under certain conditions.

The "Novotone" has not long been introduced, but has already caused an enormous sensation,



This Whiteley Boneham speaker is of distinctive design.

full details of the device being obtainable in a free sixteen-page booklet entitled "Realism From Records." No music lover should miss this.

GARNETT, WHITELEY & CO., LTD., Mill Lane,
Old Swan, Liverpool.

Stand No. 30.

The makers of the "Lotus" wireless sets and components need no introduction to WIRELESS CONSTRUCTOR readers.

Famous for variable condensers, remote-control house-wiring systems, mains units, chokes, transformers, etc., the components alone would ensure us a good show here. But on this stand will be



Ferranti's are bringing out some fine new sets this year, including the one shown here.

found some new lines of special interest, one of which will be a new type of drum dial for ganged condensers.

"Music Magnet" owners will be interested in the all-mains unit for converting the "Music Magnet" into an all-electric receiver, and, in addition, there



A Blue Spot L.S. unit and chassis.

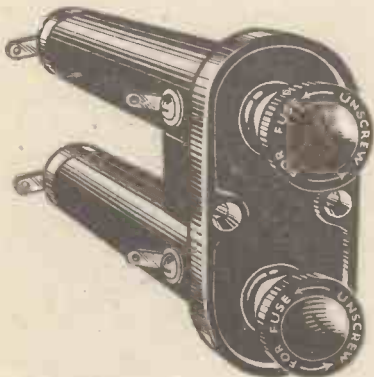
The Radio Exhibition—continued



The Celestion "Tiltatone," which enables you to bring out your high or your low notes.

is a power rectifier unit which is sure to attract considerable attention. In the complete range of receivers will be a three-valve transportable all-mains set, two types of three-valve all-electric receivers, a three-valve battery set and a three-valve battery kit model.

All this is backed up by valve holders, switches, plugs, drum dials, dual-wave coils, etc., and it will be realised that the Lotus stand is one not to miss.



The Gambrell twin fuse—a valve—and temper—saver.

GARRARD ENG. & MFG. CO., 17, Grafton Street, W.1.

Stand No. 256

This firm is well known in connection with gramophone motors, of which a variety will be on show.



This fine-looking set is a "Lotus" product (Garnett, Whiteley & Co., Ltd.).

GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C. 2.
Stand No. 68

A separate stand having been reserved for the Osram valves marketed by this firm, Stand Number 68 will be given over to other Geophone products. A very wide range of receiving sets will, of course, be on view, both for battery and all-electric operation—portables, radio-gramophones, and, in fact, every conceivable kind of complete receiver.

Almost as varied is the range of Geophone loud speakers, including plaque models, cone cabinets, and various old favourites and new designs.

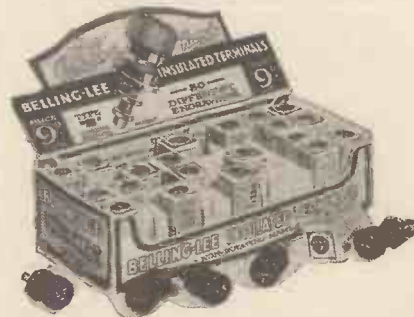


In this illustration the base has been cut away to show the construction of the "Colvern" dual-range coils.

Another very large line in which Geophone specialise is the various types of mains apparatus, battery eliminators, and so forth, while such well-known components as the Geophone transformer, condensers, etc., are well to the fore, backed up by a wide range of "Geeko" batteries, accumulators, and similar apparatus.

Speaking of sets, the famous Osram Music Magnet will leap to the mind, and it is interesting to note that this very successful receiver has been modernised and brought right up to date for the present season in the confident expectation that it will outstrip even its predecessor in popularity.

So comprehensive is the display here that it is impossible to name all the points of interest, but the discriminating constructor will no doubt quickly find his way to this stand and take advantage of the excellent literature which fully explains the various G.E.C. productions and outlines the many advantages of dealing with a famous firm of this calibre. (Osram valves will be found at Stand No. 46.)



Belling & Lee's stand is full of good stuff again this year.

GRAHAM AMPLION, LTD., 25-26, Savile Row, W.1.

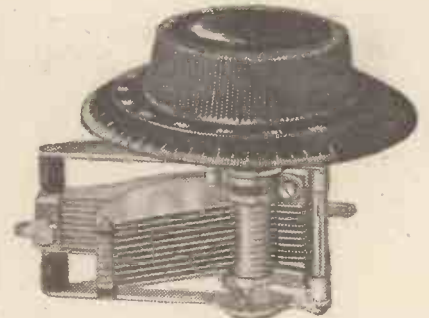
Stand No. 62

Originally famous for its loud speakers, this well-known firm has branched out into other lines with great success.

The whole of the Graham-Amplion range will be exhibited, and in particular we would like to draw readers' attention to two new models which are now being introduced to the public.

First, there is the Amplion two-valve all-mains receiver, incorporating two aerials, one for volume and the other for more selective long-distance work. Provision is made for gramophone by means of a jack, and the cabinet is supplied in walnut finish. This receiver will work off the A.C. mains.

Another new departure is the Amplion A.C. mains cabinet set, which is a standard five-valve all-electric receiver, of particularly handsome appearance and designed for quality reception. With this set the house wiring can be used as aerial for reception of the local and high-power station, the whole being contained in a handsome mahogany cabinet with walnut panel.



Jackson Bros. are turning out the famous "J.B." condensers in great variety.

GRAHAM FARISH, LTD., Masons Hill, Bromley, Kent.

Stands Nos. 76 & 108

This well-known firm specialises in a number of useful components, including small variable condensers for portable sets, which have found wide popularity. Various kinds of resistances, condensers, and R.C. units will be of special interest in the Graham Farish display.



One of the Standard Battery Co.'s business-like wet H.T.B.'s.

GROSVENOR BATTERY CO., LTD., 2-3, White Street, Moorgate, E.C.

Stand No. 263

Apart from the firm's standard and special batteries, which have been so popular in the past, a completely new battery to be known as the Grosvenor Straight-Line High-Tension Battery is now being shown, the special advantages of which lead the manufacturers to claim an 80 per cent higher constancy for this product.



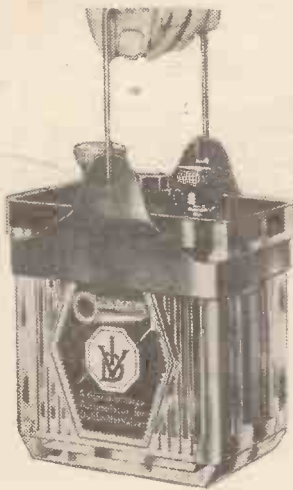
The Ultra Air-Chrome loud speaker has a linen diaphragm.

The Radio Exhibition—continued



Two excellent examples of component design—The Watmel tapped choke, and (right) a Burton L.F. transformer.

Another popular range of batteries is the Red Line, the Brown Line, and, lastly, the Blue Line, which batteries are similar to the Brown Line, but of higher capacity. Here, too, will be found double- and triple-capacity batteries and grid-bias batteries.



An excellent feature of this Oldham accumulator is the fact that it is supplied with a convenient carrier, which already has saved many a carpet from catastrophe.

HARLIE BROS. (EDMONTON), LTD., Balham Road, Lower Edmonton, N.9.
Stand No. 141.

There are quite a number of Harlie lines which will be familiar to readers, including a low-priced moving-coil loud speaker, and the Harlie volume control, which has a variety of uses. In addition there are some new lines, including the Harlie silent electric gramophone induction motor.

This has no reduction gear, but incorporates a special speed control with indicator, a twelve months' guarantee being given with each motor. Here, too, will be seen the Harlie gramophone pick-up, which incorporates a new device enabling



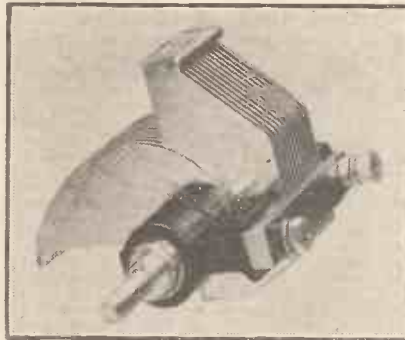
The Loewe cone loud speaker.

one to change the needle with much more than ordinary convenience.

The 1930 model has a new parallel tracking and new bakelite mouldings, and is designed to compensate for the deficiencies in the ordinary record. Normally chromium-plated finish, the model can be supplied in copper bronze if required, at the additional cost of one shilling, and is sure to attract a good deal of interest amongst the radio-gramophone fraternity.

HOBDAY BROS., LTD., 21, Great Eastern Street, E.C.2.
Stand No. 13.

This well-known firm of wholesale dealers is interested in all the leading popular lines which are supplied to the trade, and thus the stand is of special interest to dealers.



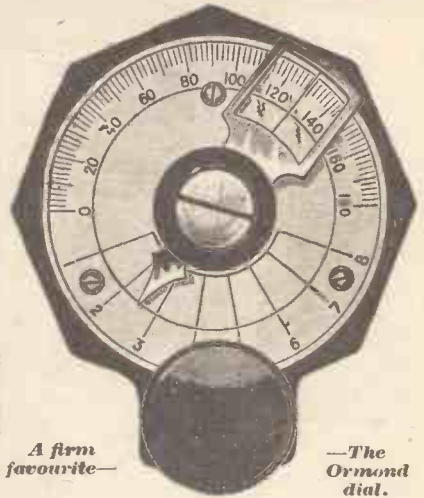
A close-up of the Formo condenser.

A. H. HUNT, LTD., Tunstall Road, Croydon.
Stand No. 133.

A very popular line of batteries is marketed by A. H. Hunt, Ltd., designed to fulfil the very exacting conditions required by all sorts of receiving sets. Although the firm is chiefly known to a great many readers in this connection, it also has a number of other lines, including electrical measuring instruments of different types, and various condensers, as well as a very useful range of other components, particulars of which are obtainable at this stand.

IGRANIC ELECTRIC CO., LTD., 147, Queen Victoria Street, E.C.
Stand No. 240.

The name of this firm, familiar from the earliest days of radio, is inevitably associated with coils and with a number of useful components and accessories, the utility of which has been proved for years past by the constructor and set builder. The firm has specialised also in condensers of different types, scoring particular success with



A firm favourite—

—The Ormond dial.

the little Pre-Set condenser and with various gadgets such as the Indigraph dial.

Always in the fore with new developments, a wide variety will be shown, ranging from metal rectifiers to gramophone pick-ups, and working through switches of all kinds, resistances, etc., to short-wave and other receivers.

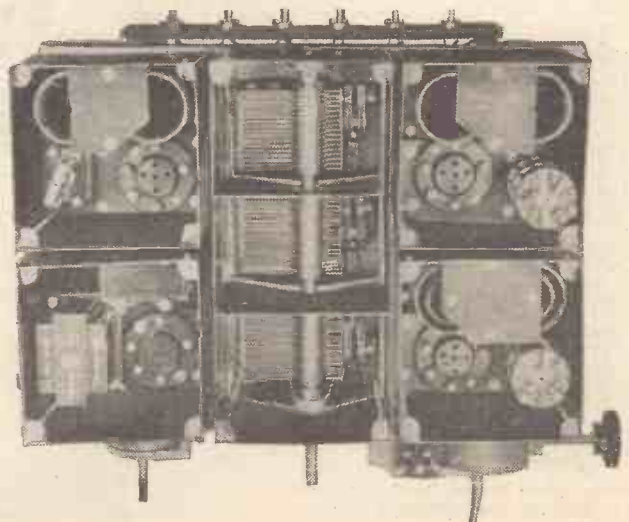


A well-known L.S. unit—the Bullphone.

ITONIA GRAMOPHONES, LTD., 58, City Road E.C.1.
Stand No. 21.

Last year this well-known firm were displaying their own portable receivers, and various other makes of receivers for which they undertake the sale. Particulars of this year's display have not been received, but it is understood that the show will be on the same lines as last year, with certain additions and improvements.

The illustration to the right shows the interior of the famous Radio Instruments' receiver, the "Madrigal," which operates entirely from the electric light mains.



The Radio Exhibition—continued



If you "wind your own" you will be interested in the "Becol" former (left). Below, a capital choke!

JACKSON BROS., 72, St. Thomas' Street, S.E.1.
Stand No. 63.

Jackson Bros. are Condenser experts of many years standing, and well known to WIRELESS CONSTRUCTOR readers, so this stand is sure to be the meeting-place of many old hands as well as of new customers attracted by the workmanlike appearance of the J.B. products.

It is impossible to describe the display, as it is a singularly comprehensive one, but the various features of the different lines will willingly be demonstrated, and an inspection of the goods themselves will reveal—even to the uninitiated—that every detail has been thought out with particular care.

The epicyclic friction drive embodied in the new type of slow-motion S.L.F. condenser makes tuning an exceedingly smooth and pleasing business, and it is this precision and finish, combined with robust construction and simple methods of adjustment, that have rendered this firm's products so successful in the past.

This particular condenser, by the way, has a knob and dial which together project only 1 1/2 in. from the panel (which is no more than the ordinary single dial), although slow-motion mechanism is incorporated which gives a ratio of 40 to 1. Another ingenious exhibit is a new J.B. condenser which is little bigger than a matchbox. Its extreme smallness and lightness make it very useful for portables. In one condenser the slow-motion mechanism is housed in the bottom bearing. With ball bearings, pigtail connection, and complete with knob, pointer and scale, fitted with slow-motion dial, this tiny instrument is an advertisement of what can be done in the way of exactly meeting constructors' requirements at a reasonable figure.

JEWEL PEN CO., LTD., 221-222, Gt. Sutton Street, E.C.1.
Stand No. 138.

At this stand will be found the famous Red Diamond radio components, notable for their handiness and the low prices at which they retail.



One of the "Camco" cabinets (Carrington Manufacturing Co.).

They are of the just-what-you-want variety, and include such invaluable little aids to good listening as the Red Diamond crystal detector, which is of the permanent type, once set and always ready. This particular detector is not affected by vibration, and can be mounted on brackets which are fixed to the panel.

Another good line on the Red Diamond list is the wall plug for loud speakers, etc., which is made in solid ebonite, and has two sockets arranged so that it is impossible to insert the plugs in reverse.

This firm is also well-known for its push-pull switches of robust construction, definite on-and-off positions ensuring good contact whenever they are employed. As most of the specialities on this stand are retailed at very attractive prices, constructors without too much to spend will certainly do well to pay it a visit.

JUNIT MFG. CO., LTD., 2, Ravenscourt Square, W.6.

Stand No. 65.

Many a trouble-free constructor will roll up to this stall with appreciative memories of the Junit soldering iron, of which enormous numbers have been sold and a very high opinion gained among set builders. The firm also handles a number of other interesting and useful lines, including the Junit wire, and handy devices such as valve holders, switches, terminal strips, and so forth.

KOLSTER-BRANDES, LTD., Cray Works, Sidcup, Kent.

Stand No. 55.

A big range of complete receivers, radio-gramophones, etc., is the chief feature of this display, and in addition there are loud speakers, high-tension batteries, low-tension batteries, variable condensers, headphones, and L.F. transformers, with which the name of this firm is associated.



A typical metal rectifier (Westinghouse Brake & Saxby Signal Co., Ltd.).

S. A. LAMPLUGHE, LTD., King's Road, Tyseley, Birmingham.

Stand No. 124.

This well-known firm has been engaged in radio manufacture since 1912, and here will be found all the familiar lines as well as an effective display of eliminators, L.T. batteries, H.T. batteries, and a range of loud speakers at popular prices.

Of special interest are the new "Silver Ghost" receivers, and the "Silver Ghost" Inductor loud speaker. Full particulars of these are obtainable at the stand, and particular attention is drawn to the wide variety of sets available in portable models, radio-gramophones and the "Silver Ghost" chassis.

LECTRO-LINX, LTD., 254, Vauxhall Bridge Road, S.W.1.

Stand No. 131.

Lectro-Linx are the proprietors of the Clix specialities, and everyone knows how handy are these little devices! Not everyone knows, however, that a number of new lines are introduced for the new season and promise to have a popularity every whit as great as their predecessors.

There is a whole line of resilient sockets in which the spring is contained in the socket instead of having it in the plug, enabling a good contact to be made with a solid plug. Both long and short resilient sockets are made for different purposes, as well as those of insulated types, these having many advantages.

Of special interest is the new valve holder, the construction being an entire breakaway from usual practice. It incorporates the new Clix resilient socket, completely air-insulated, contacts being self-aligning, and thus ensuring easy insertion of the valve as well as sound electrical connection.

Other new lines are: an all-insulated panel terminal, a twin plug and socket, and some improved resilient plugs. Valve pins, wander plugs of different types, coil pins with improved



The S.G. Brown S.G. Three, which is easily made at home from a kit of parts.

resilience, and various types of power plugs will be displayed to tempt visitors to linger over this stand.

LEVER (TRIX), LTD., 8-9, Clerkenwell Green, E.C.1.

Stand No. 249.

The Trix Portable Five will be on view here, the set being suitable for mains or batteries at will. Gramophone reproduction is provided for, and battery charging can be carried out without removing the accumulator from the set.

Visitors interested in the Trix H.T. eliminators should see these and a number of components with which the name "Trix" is associated, such as H.F. chokes, and both insulated and ordinary terminals.

LISSEN, LTD., Worples Road, Isleworth, Middlesex.

Stand No. 40.

Here will be found a selection of all the famous Lissen lines, and merely to chronicle them would be to do more than fill the space at our disposal, for this firm has branched out into almost every conceivable line of radio activity.

Of very special interest is the new volume-control potentiometer, which has been introduced specially for those who build their own radio-gramophone amplifiers. Also of outstanding interest is the output transformer, obtainable in ratios to suit all varieties of loud speakers and valves.

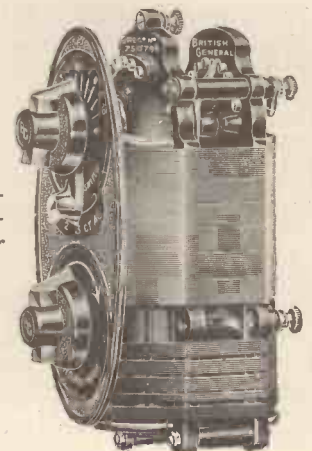
The Lissen pick-up, too, will immediately claim the attention of the gramophone enthusiast, whilst the adjustable balanced-armature loud-speaker unit, which can be fitted to any horn or gramophone tone-arm, is sure to cause considerable excitement.

Here, too, will be seen the new two-valve radio gramophone that has already become very popular. It is made in oak and walnut finish, and suitable either for battery operation or running off D.C. or A.C. mains.

Of similar versatility is the two-valve trans-portable, and another addition, showing for the

(Continued on page 352.)

An example of compact tuner design.



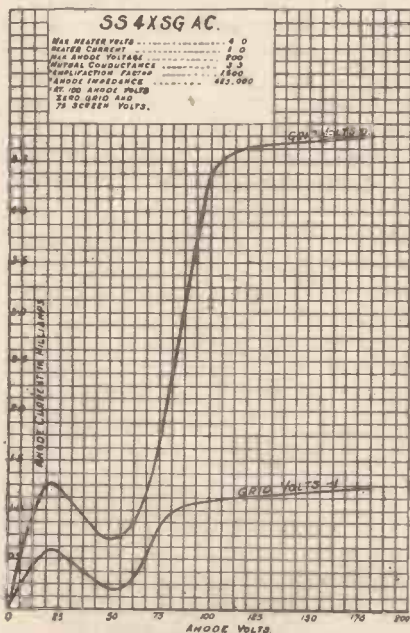
PICKING YOUR VALVES



THE Radio Exhibition usually provides some surprises in the way of set or component design, but this year the things that are to be seen there are not so much of a revolutionary character as the result of steady research and definite development.

The coming of the screened-grid valve was more or less of an event; the same can be said of the pentode and the indirectly-heated A.C. valves.

A MAGNIFICENT VALVE



This is the anode current-anode volts curve of the latest Six-Sixty S.G. valve. It is of the indirectly-heated cathode type and has the enormous magnification factor of 1,600.

But this year's Show, while providing us with no particularly outstanding advance, yet gives us the benefit of a year's hard work in the development of all the leading types of valves, including the three mentioned above.

By K. D. ROGERS

In the past few months valve manufacturers have done a great deal towards the standardisation of valves, especially in the mains and 4-volt classes. It is becoming increasingly easy to choose a valve for a particular purpose, and the modern valve can always be relied on to do its job properly.

Thus we find that all classes of set users have benefited by the intensive research that has been going on, for sets have perforce become better and better.

Time was when valve makers, in common with component and set manufacturers, kept their new developments up their sleeves "for the Show." Nowadays the fight for supremacy is so intense that we are given the benefit of any improvement almost as soon as it takes place.

A new valve is put on the market as soon as it can be placed in production—as soon as its characteristics have passed the stringent tests modern valve manufacturers set their products.

Mazda's Latest

A case in point is the Mazda P.220A. This appeared in August—a bare month before the Show. So there are no valve surprises at Olympia, but we do find a concentrated collection of all the latest valve advances.

The Mazda valve I have just mentioned is a big brother of the famous P.220, and has, roughly, half the impedance of that valve. Its filament consumption is the same (0.2 amp.), and its mutual conductance (or slope) is 3.5. A remarkable figure.

This is only one of the many

valves from which constructors of sets this autumn will be able to choose. There is, of course, the famous P.X.4 in the Marconi and Osram ranges. This, as my readers probably remember, is a 4-volt valve having an impedance of about 1,050 ohms and an amplification of 3.8.

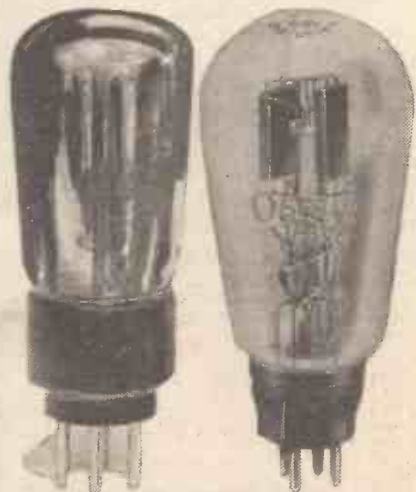
It is capable of dealing with a large input and providing a considerable output. The filament consumption is 0.6 amp., but the valve, being a 4-volter, is specially suitable as a directly-heated valve in A.C. sets.

Screened A.C. Valves

And talking about A.C. sets, we must not forget the new A.C. screened-grid and pentode valves that have been placed on the market recently. We have the M.S.4, the Mullard S.4V. and S.4V.A., and the Six-Sixty S.S. 4 S.G.A.C. and S.S. 4X S.G.A.C.

Finally, the Cosmor M 41 S.G. and the Mazda A.C.S.G. complete an interesting list. Some of these valves have

FOR YOUR H.T. UNIT



Two typical modern rectifiers. A Lissert and an Osram type U.10. This latter valve is for use with 4-volt I.H.C. valves.

Picking Your Valves—continued

magnification factors of 1,500 or so—colossal figures when you consider where we were in H.F. amplification a few years ago.

The Mazda A.C. Pen. is the first indirectly-heated cathode pentode to be placed on the British market, and marks a further step in the direction of progress.

Here, then, are some remarkable valves from which we can pick those we will use in our sets. Others worthy of special consideration include the P.2, one of the latest Marconi and Osram products, the Cossor P. series, and the Mullard P.M.24B. This latter, and also the P.M.24A, are super-power pentodes capable of giving very large outputs.

A Recent "Two"

They are specially useful for loud-speaker sets which are to operate moving-coil loud speakers, and they take large anode pressures.

The P.2 is a recent 2-volt valve with an impedance of 2,300 ohms and an amplification factor of 6.5. The price was recently reduced from 15s. to 13s. 6d.

Among the very large valves the L.S.6A, deserves a prominent position,

These are only a few of the outstanding valves. I may have missed some almost equally interesting, but the foregoing serve to indicate the advance that has been made during the last twelve months.

DON'T FORGET TO VISIT
US ON STAND 5 AT
OLYMPIA.

Besides the new valves that have been placed on the market we find that the old ones—nearly all—have been improved in some way or another, so that the results obtainable (with better components as well) with the present-day set are far and away better than those we could get with a receiver having the same number of valves eighteen months ago.

Especially are the increased results due to the advances made in the design of screened-grid valves and pentodes, and visitors to the WIRELESS CONSTRUCTOR stand (No. 5) will have an opportunity of seeing the latest thing in household receivers, using a screened-grid H.F. stage on all wave-lengths.

below 60 or 80 metres, but here is a set using a screened-grid valve, with its high magnifying powers, down on the 20-metre range with the utmost success.

Such progress in valves has

One of the Osram indirectly-heated cathode valves. Note the meshed anode which is employed. This valve is of the ordinary L.F. variety and is called the M.H.L.A.



one important result—it creates the need for better components. And the need has been satisfied by the leading component manufacturers.

And it is in the respect of components that a number of my readers have troublesome times ahead, or have been through the mill lately.

The requirements of new valves is something that comes to all sets. Valves are not indestructible, they last a long time, but not for ever; therefore new ones are necessary now and then.

And this is where the snag lies. If you have a set about two or three years of age and decide to fix it up with new valves you may have a disappointing time.

Change the Components

The reason is that your set is constructed of components not really good enough for the new valves, and so troubles such as L.F. instability, H.F. oscillation, and so on, occur.

It is a pity in one way that the valves will not give better results in every set, no matter how old the components; but it is a fact, and if you decide on a change of valves it is advisable to change the components, too, to suit the valves.

By this means you can be sure of getting the maximum advantage out of the new valves and you will be really amazed at the results.

A PLEASANT INTERLUDE



The 3rd Mitcham Troop of Scouts listening to a three-valve set during a recent rally in Surrey.

as it is one of the best "heavy" output valves I have tried. It will dissipate about 25 watts and takes an average grid bias of 93 volts at 400 volts H.T.

The impedance is something of the order of 1,300 ohms and the magnification factor is 3.

This means, of course, that the H.F. valve is still in operation on the ultra-short waves—for the set, the "Explorer" Four, is designed to cover all waves.

A short time ago it would have been impossible to get an H.F. valve to operate even moderately satisfactorily



Savoy Hill Settles Down—Musicians, Professional and Amateur—The Battle of the Talks—Imperialism Established—Mr. and Mrs. Harold Nicholson—The Three Choirs' Festival—B.B.C. Dance Music—The Bolivar Centenary—The B.B.C. Symphony Season.

By OUR SPECIAL COMMISSIONERS

Savoy Hill Settles Down

THE appointment of the Rt. Hon. J. H. Whitley to be the Chairman of the B.B.C. has certainly composed the troubles which had been disturbing the inner counsels at Savoy Hill.

I do not know by what magic this result has been achieved in so short a time, but there is the fact now being discussed among all ranks of the staff that never before in its history has the high command of broadcasting been so happy and peaceful.

It is obviously better to avoid internecine strife, but it remains to be seen whether the new peace will lead to better programmes. Among the proposals shortly to be made to the new Chairman is the reinstatement of Captain P. P. Eckersley as a programme builder. This would be not only popular, but also very sound, especially since Mr. Roger Eckersley has withdrawn from the turmoil of administration.

Musicians, Professional and Amateur

The Incorporated Society of Musicians is very cross with the B.B.C. The cause of complaint is the alleged employment by the B.B.C. of a lot of amateur and semi-professional artistes at a time when many competent professions are out of work and actually in distress.

Strong representations have been made to Savoy Hill, where the matter is being keenly discussed. One school holds that the duty of the B.B.C. is purely to its listeners, and that there should be no limitation of the field of talent.

The opposing view is that ultimately

the B.B.C. is dependent on professional talent for its programme standards, and that there should be a conscious policy of encouragement. No decision has yet been taken in this difficult matter; but we imagine that Dr. Boulton will devise a middle course, which, while encouraging professionals, will not exclude amateurs.

The Battle of the Talks

The battle of the talks, suspended during the summer truce, is about to be rejoined with unusual vigour even for that heated struggle. The repeated incursion of talks and education into both the alternative pro-

grammes has filled the entertainment side with a good deal of alarm, and an effort is to be made to cut a big slice out of the time allotted to talks and education.

The wishes of suffering millions will go with the gallant sponsors of this policy; but I am not too hopeful of the result. The advocates of talks have the advantage of fanaticism. It seems to me that a slump in licences is about the only means of enthroning entertainment at Savoy Hill.

Imperialism Established

I believe the most remarkable change that has happened recently at

RUSSIA'S RADIO GIRLS



Russian Girl Guides operating a field set during the International Jamboree recently held at Moscow.

Savoy Hill News—continued

Savoy Hill has been the change in the attitude towards the Empire. It began with Sir John Reith's address to the Colonial Conference, when he went a great deal farther towards helping Empire broadcasting than ever before.

Then there crept into the programmes a welcome note of pride in the British Empire. Talks have been arranged not only to inform but to stimulate patriotism and the sense of Empire citizenship.

Thus passes the phase of "Europeanism" which has been a characteristic of the B.B.C. during the past three or four years.

There is considerable rejoicing among those who believe that now the B.B.C. has shed its unnatural robe of milky internationalism it can do much to raise British prestige and help British trade.

Mr. and Mrs. Harold Nicholson

Mr. and Mrs. Harold Nicholson, the latter better known as Miss Sackville West, are a very gifted pair who have taken to broadcasting with much enthusiasm.

No sensible person who knows about broadcasting will deny the talent and ability of the Nicholsons, who are in their way quite remarkable people. But they are definitely of the highbrow exclusive minority, with modernist tendencies in art, literature, and thought.

There are not lacking those who would be happier if this influence were confined to specialised contributions and kept out of the region of policy. And we are by no means sure that it would be a bad plan to let Gerald Barry and Harold Nicholson alternate in six-monthly or yearly stretches with the weekly survey.

The Three Choirs Festival

Having promised to pay £150 for the right to relay a concert and a service from the Three Choirs' Festival at Hereford, it is being alleged at Hereford that the B.B.C. is trying to get out of the arrangement.

The B.B.C. now declares that it does not want the service, and that it can take the concert only on 5 G B. This being so, the offer of £150 has been reduced to £75, and

time has come for him to turn his reputation to financial account outside, as Jack Hylton has been doing.

This would mean his leaving the B.B.C., which many listeners would regard as a catastrophe. On the other hand, there are officials at Savoy Hill who believe that it would be good for both parties to make a change.

These people hold that the B.B.C. dance band should be changed every three or four years, whoever is in charge and whatever success he may have attained. It will be interesting to see what happens.

The Bolivar Centenary

The centenary of the death of Simon Bolivar, the great South American patriot, will be celebrated on December 17th. The B.B.C. is already busy on plans to signalise the event fittingly.

There will be co-operation with the representatives of no less than six South American republics who regard Bolivar as their saviour. There will be an historical feature programme on the National waves.

The B.B.C. Symphony Season

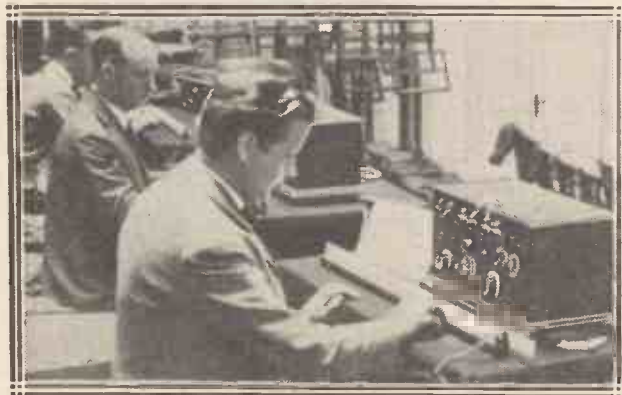
The B.B.C. Symphony Season begins on October 22nd, and runs through twenty-three concerts, ending on May 6th. This is the most ambitious series yet attempted by the B.B.C. and it marks the beginning of the new orchestra fully formed.

We see Savoy Hill has not yet learnt that it is unwise to spread B.B.C. over the bills and announcements of public performances at which the public is expected to pay. We would have thought that the financial reverse of last season would have made this clear; but apparently not.

The list of conductors is not quite as distinguished and varied as on some previous years, but it has the undoubted advantage of giving due priority to British nationality. There will be disappointment at the absence of Toscanini and Sir Thomas Beecham.

However much the latter may belabour the B.B.C. and broadcasting, he remains a wonderful conductor, very much in the affection and esteem not only of the music-lovers, but also of the general public, who, after all, form the bulk of potential supporters of B.B.C. concerts. As for the new orchestra, there is no doubt of its superb quality, a foretaste of which is being provided by the Proms.

ANOTHER RADIO VALVE ORGAN



This is the new radio organ invented by Dr. Trautwen of Berlin. Audio-frequencies are produced and in various combinations are said to give wonderful imitations of the human voice or practically any instrument of the orchestra.

Between them they have the most say in what colour the B.B.C. gives to its accounts of passing events, and also what critical opinion is given on novels and some other books.

It is believed at Savoy Hill that the Nicholsons have formed a sort of triumvirate with Miss Hilda Matheson to run the talks department as a preliminary to taking over larger responsibilities. It is an open secret that friends of Mr. Nicholson were busy canvassing his claims to succeed Sir John Reith during the time when there were rumours of the Director-General going to a big job in the City.

there is a good deal of resentment in Hereford.

The moral of this difficulty is for the B.B.C. to steer clear of composite benevolence and business. If they want to help the Festival without broadcasting it, it would be better to subscribe to its funds.

B.B.C. Dance Music

There are rumours of changes in the arrangements for the provision of B.B.C. dance music. Mr. Jack Payne, who has done such wonderful work at the microphone, is known to be considering whether or not the

A PRACTICAL MAN'S CORNER

A special section for the set-builder in which he will find many valuable hints.

By R. W. HALLOWS, M.A.

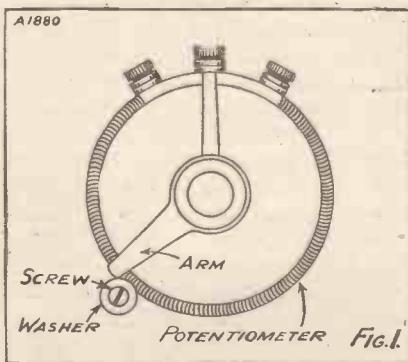


A Potentiometer Stop

Not so very long ago there were those who stated that the potentiometer was as dead as Queen Anne, or mutton, or anything else that you care to name in the defunct line. It is certainly no longer in use as a means of supplying positive potential to the grids of unruly triodes used as high-frequency amplifiers, in order to hold them.

But the man who wants to get the very best out of his set still regards the potentiometer as a friend in need for many purposes. If, for example, you want to adjust the negative bias of an anode-bend detector to a nicety, don't connect the positive of the grid battery to low-tension negative; take it instead to the slider of a potentiometer wired across the low-tension.

A SAFETY DEVICE



This simple stop will prevent your valves being damaged by the application of too large a positive bias.

Or, again, if you are using the leaky-grid condenser detector and find reaction rather troublesome, take the grid-leak return not to the low-tension positive, but to the slider of a potentiometer wired in the same way. With the help of this instrument you can obtain the precise positive bias

THIS MONTH.

Fitting a Stop to Your Potentiometer—Making a Simple Circuit Tester—Some Terminal Tips—A Soldering Iron for Fine Work.

necessary for a combination of good rectification with smooth reaction.

And the potentiometer is still useful on the high-frequency side even where screen-grid valves are employed. Many of these valves will work pretty well with $1\frac{1}{2}$ volts negative grid bias provided that you make the H.T. on the screen high enough.

Current Economy

But if you want to economise in H.T. current, you will probably prefer to reduce the screen volts. Now, if you reduce the screen volts to the neighbourhood of, say, 60, you will most likely find with $1\frac{1}{2}$ volts negative grid bias that there is a falling off in the performances of the valve.

Something rather less than $1\frac{1}{2}$ volts is needed, but unfortunately the dry cells generally used for grid-biasing purposes have an E.M.F. of this figure. Once again take the positive of the grid-biasing battery to the slider of a potentiometer, and it is a simple business to obtain the correct negative bias to a fraction of a volt.

Bad for the Battery

So long as you are using two volts only for filament heating there is nothing very risky about doing this, for if you happen to turn the slider right over to the positive end of its travel the net grid bias resulting will be only half a volt positive, which will not lead to any serious current overload. But with 4 volts and 6 volts matters are very different.

Should you in a moment of madness

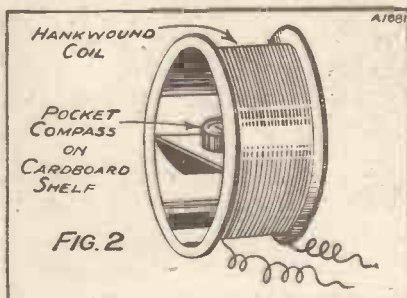
move the slider right over to the positive end, the grid will receive a positive bias of $2\frac{1}{2}$ volts in the one case and $4\frac{1}{2}$ in the other. This will lead to a "rush of juice to the plate," which will certainly do neither the valve nor the battery any good at all.

A Simple Scheme

Since all of us are prone to instants of temporary insanity, it is as well to make the potentiometer foolproof in such cases. Fig. 1 shows a very simple way in which this may be done with a screw and a washer.

Suppose that you have a 4-volt filament accumulator and a $1\frac{1}{2}$ -volt grid-biasing battery. When the slider is moved a quarter of the distance from negative to positive the net bias is $-1\frac{1}{2} + 1$, or $-\frac{1}{2}$ volt. With the slider in the midway position it is $-1\frac{1}{2} + 2$, or $+\frac{1}{2}$ volt.

HOME-MADE GALVO



By combining a solenoid coil and a pocket-compass in the above manner an extremely useful testing instrument can be provided.

Since the grid of an S.G. valve should never be raised above zero potential, we must fix our stop in such a way that the slider is brought up short when it is tapping $1\frac{1}{2}$ volts positive from the positive of the battery. This means that we should never be able to move away from the

A Practical Man's Corner—continued

negative terminal more than three-eighths of the whole possible travel.

With a pencil it is quite easy to make on the body of the potentiometer first of all a mark half-way round the travel, then two more representing the quarters. Dividing each of these into two gives the eighths.

With 6 volts the slider must not be able to move more than a quarter of the distance between negative and positive, for in this position we have $+1\frac{1}{2} - 1\frac{1}{2}$, or zero grid volts. Whichever filament battery voltage we use, set the slider at the maximum permissible point of its travel. Then if the potentiometer is a baseboard-mounting component, take a round-headed wood screw of suitable length, put a largish washer under its head and drive it into the baseboard so that the washer rests on the windings and forms a stop.

A Trouble Detector

With a panel-mounting potentiometer a hole must be drilled and a countersunk screw inserted from the front of the panel. The screw is locked in position by means of a nut; then a second nut holds the washer down on top of the windings. It does not matter in the least if you make a

A CHARGING TIP



When connecting up an accumulator for charging from D.C. mains you can find which lead is positive and which negative by putting them in a glass of water. It will be noted that more bubbles collect on one wire than the other, and the wire with most bubbles is the negative wire and has to be joined to the negative terminal on the accumulator.

slight mistake in the position of the hole when you are drilling, for the modern one-hole-fixing potentiometer can be rotated bodily by slackening off the holding nut.

The usefulness of the milliammeter as a trouble detector has been emphasised in many articles in the WIRELESS CONSTRUCTOR. But milliammeters are expensive and not everyone cares to spend the pound or more needed to acquire a really good instrument.

Making a Meter

A milliammeter is, after all, only a calibrated galvanometer, and a great deal of the trouble-hunting that comes the way of users of wireless sets can be carried out perfectly well with an uncalibrated galvanometer. Such an instrument indicates if current is flowing or not, but does not measure precisely the amount of current if a flow is occurring.

As often as not when we are searching for the cause of a breakdown all that we require to know is whether current is passing in places where there should be a flow, and is not passing in places where no flow should take place. A rough-and-ready instrument may, therefore, often do all that is necessary.

Fig. 2 shows how a very useful instrument can be made in the home workshop at a cost which runs only into pence. The first essential is a coil containing at least 250, and preferably twice as many, turns. The more turns there are the more sensitive will the instrument be.

This may be wound hank-fashion on a former of 3-in. cardboard tubing, about 1 in. in length, and provided with cheek pieces of cardboard. Once in place the turns may be bound with insulating tape to keep them secure.

How it Works

Inside the former is fixed by means of Seccotine or shellac varnish a little shelf of cardboard arranged diametrically. This serves as a resting place for a small pocket compass. The coil may conveniently be mounted upon a small board provided with two terminals to which the ends of its windings are connected.

When a current passes through the windings the coil becomes an electromagnet with north and south poles. The north-seeking pole of the compass is repelled by the north magnetic pole, and vice versa. If, therefore, the instrument is turned so that the shelf on which the compass rests points to

magnetic north, a deflection will be observed when current of sufficient strength is flowing.

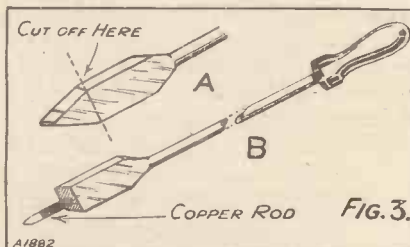
With a moderately sensitive compass a current of 1 milliampere or a little more will serve to deflect the needle when the coil contains 200 turns or rather more. With a 400- or 500-turn coil this amount of current will produce a big deflection.

The instrument may even be roughly calibrated if a milliammeter can be borrowed from a friend. With this the current required to produce a certain amount of deflection can be measured, and a pencil mark is then made on the shelf indicating the position of the needle pointer when this current is flowing.

Those Loose Terminals

It is most surprising to find how, even when untouched and apparently

USEFUL ALTERATIONS



A scheme for providing a fine bit for small work which will keep hot because of the large bulk of copper behind it.

not subjected to any shock or vibration, nuts and terminals of components in a wireless set will work loose. Only the other day I went over the connections of a home-made set made by a friend, which has been in use for only a couple of months, and during the whole of that time had not been moved from the table upon which it lives.

Every terminal had been screwed down as tight as he could get them with his fingers, but more than half were quite loose when I came to try them out. Hexagon nuts tightened down with a box spanner have a much better chance of remaining firmly fixed, though they may work loose in course of time.

How it happens I don't pretend to know, but the fact remains that it does. Personally, I always make a practice of substituting hexagon nuts for milled on any components that I am using, and wherever tightness of

(Continued on page 352.)

DO YOU APPRECIATE LIGHT & SHADE IN YOUR RADIO MUSIC?



60 volt **7/11**
100 volt **12/11**
9 volt Grid Bias **1/6**

150 volt 15/11
88 volt 4/6
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Every note is vivid. The purity of the current flowing from a Lissen battery preserves true tone-colour in the music. The full expression the artist puts into his playing is retained in your radio rendering if you use a Lissen Battery.

There is no ripple, no hum in the current—pure power is stored in big cells, created by the Secret Process and chemical combination which you get in no other battery.

Ask firmly for Lissen New Process Battery—10,000 Radio dealers sell it.

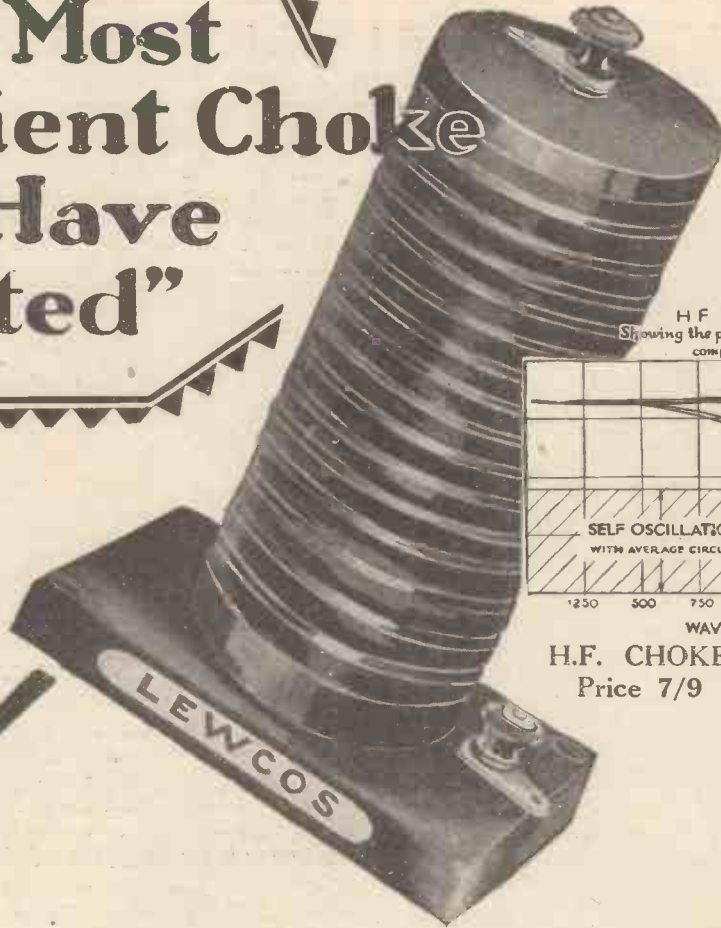
LISSEN

H. T. BATTERIES

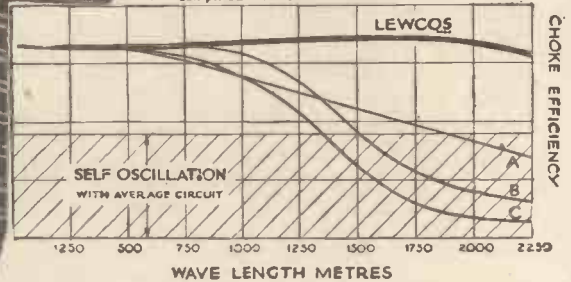
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H.F. CHOKE
Price 7/9

"We are pleased to report that the Lewcos H.F. Choke is, in our opinion, the most efficient Choke we have tested, there being no sign of instability even when using 150 volts H.T. on the Anode of the S.C. Valve. The construction is massive and well-finished, and its design places it in the front rank of high-class components."

An appreciation from Industrial Progress (International), Ltd., Bristol.

The above letter is a further appreciation of the unique qualities of the Lewcos H.F. Choke. The fine materials and the high-class workmanship used in its manufacture make it supreme. The terminals are arranged one at the top and the other at the base of the Coil, to eliminate the risk of additional self-capacity in the wiring of the receiver.

The H.F. Choke curves illustrated above show the astonishing performance and advantages of the Lewcos Choke over other makes.

A fully descriptive leaflet (R33) will be sent on request.

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EXHIBITION
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THE LONDON ELECTRIC
WIRE COMPANY AND
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CHURCH ROAD, LEYTON,
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THE LEWCOS H.F. CHOKE IS SPECIFIED
FOR THE "EXPLORER" FOUR DESCRIBED
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LEWCOS

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WE ARE EXHIBITING AT



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OLYMPIA (2000)
SEPT. 1916-27th 1930

RADIO PRODUCTS FOR BETTER RECEPTION

AS WE FIND THEM



A New Loud Speaker

It is generally recognised that in order to reach a high standard of reproduction a moving-coil loud speaker is necessary. A speaker of this type, if a reasonable degree of sensitivity is to be obtained, usually



The Ferranti "Magno-Dynamic" moving-coil speaker. It is very sensitive and does not require any energising current for its operation.

requires a separate battery, or the assistance of the mains, in order to energise the field.

It is the man with the moderate-sized receiver, such as a three- or four-valver, who requires a sensitive unit most, and it is also this type of listener who can least afford the cost of an additional battery or other apparatus for supplying the field current.

We were, therefore, both interested and pleased when we learned that such a famous firm as Ferranti, Limited, had placed on the market a moving-

coil instrument requiring no batteries or other source of energising current for its operation.

The Ferranti Magno - Dynamic speaker will handle equivalent volume to that of the electro-dynamic type, and the makers claim that it is as sensitive, the strong field having been obtained by means of a special magnet. Since it consumes no current, its running costs are nil.

The method of centring the cone is a very good one, and there is little or no possibility of any inaccuracy occurring.

The cone moves very freely, and a soft kid leather is employed as a suspension at the front edge. In practice this is much more satisfactory than thin rubber, which, of course, perishes in time.

We tried the speaker in conjunction with a straightforward det. and 2 L.F. (transformer-coupled with a super-power valve and 150 volts H.T.), and found it to be very sensitive, while the definition was fully up to moving-coil standard. Speech was clear and crisp, and there was no trace of the "boominess" so often encountered with some moving-coil loud speakers.

The unit is thoroughly well finished, and should command a ready sale. The chassis retails at £9 10s. and the table model, complete in oak cabinet, is £15 5s., or £16 14s., with a walnut or mahogany cabinet.

The Polar Universal Condenser

The latest addition to the Polar range (Messrs. Wingrove & Rogers, 188-189, Strand, W.C.2) is the Universal condenser. We examined

one of these components very recently.

The condenser is made with locked rotor vanes, but the spindle is loose, that is to say, its position can be varied at will by releasing a small grub-screw located at the pigtail end of the rotor assembly.

This enables the condensers to be ganged into two or more units if required. The length of the standard spindle is $4\frac{1}{4}$ in., but spindles of any length can be supplied.

A single-hole fixing is provided at each end of the condenser so that screens may easily be attached, and four feet are provided for fixing to the baseboard. The whole assembly is wonderfully rigid, and we could not detect the slightest end- or side-play in the case of the particular specimen submitted. The fixed and moving vanes, the end plates and supporting rods are all of solid brass, and a



The Polar "Universal" condenser has a loose spindle and is constructed so as to enable two or more units to be "ganged" together without difficulty. This component is very sturdily made.

As We Find Them—continued

ball-bearing movement is employed. This condenser is a first-class job, and can be recommended. The price of a single .0005-mfd. condenser is 7s. 6d., and the .0003-mfd. model is 7s.



The Bulgin de-coupling resistance is a useful aid towards ensuring perfect stability. These resistances are connected on the H.F. side in screened - grid circuits and are of great value in the case of two H.F. stages.

Bulgin Components

Messrs. A. F. Bulgin are marketing a number of excellently finished and useful components which should be of considerable interest to constructors.

Among them may be mentioned the double-pole fuse holder, which is designed for baseboard fixing, and enables a fuse to be incorporated in both negative and positive leads of a mains receiver or similar apparatus. This fuse holder is substantially made, the moulding employed being of green mottled bakelite, and it is a simple matter to remove either of the fuses if at any time it is necessary to replace them.

The price of this component is 2s. 6d., complete with two fuses, and spare fuses can be obtained at 6d. each.

Another useful component is a de-coupling resistance, which may be



This is the special Ferranti tool which is designed to overcome the difficulty of cutting the large holes for mounting their flush-type meters. It retails at 3s. and is supplied direct to the user.

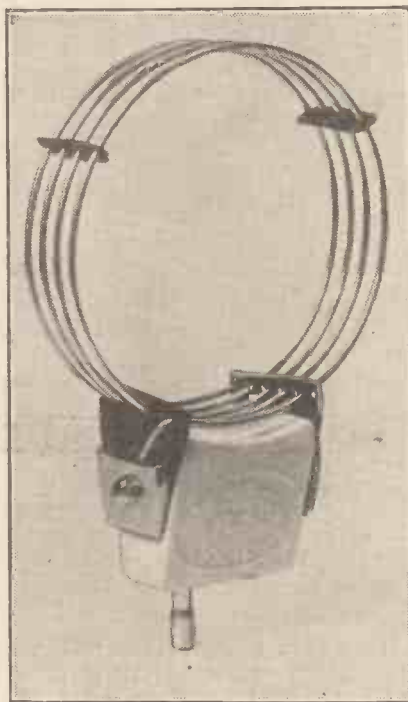
obtained in three values, namely, 600, 1,000 and 2,000 ohms. These de-coupling resistances are valuable as aids to stability in receivers which incorporate S.G. valves.

The Bulgin de-coupling resistances are non-inductively wound, and are designed to carry up to 30 milliamps.

They are small in size, and take up very little space on the baseboard. The 600- and 1,000-ohm models retail at 1s. 6d., and the 2,000-ohm resistance is 1s. 9d.

Atlas Coils

Short-wave reception is becoming increasingly popular, and readers who possess straightforward detector and L.F. receivers of the plug-in coil type can very easily adapt them for use on the ultra-short waves by purchasing a set of special short-wave inductances.

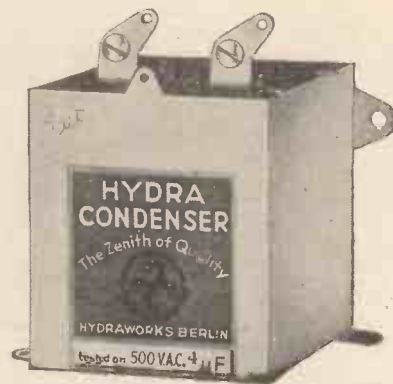


"Atlas" short-wave coils are supplied in sets of four and are arranged to cover a wave-length band of 15-100 metres.

Messrs. H. Clarke & Co., Ltd., of Atlas Works, Old Trafford, Manchester have recently sent us a set of their latest type of short-wave coils. There are four of them in the set, and they are designed to cover a wave-length range of 15 to 100 metres.

Each coil consists of a winding of bare wire of substantial cross section, the turns being suitably spaced by

means of special ebonite spacers, and the winding is mounted upon a porcelain plug, designed to plug into the ordinary standard baseboard coil holder.



The makers of "Hydra" condensers are now marketing two new models. One is designed for a working voltage of 300 volts A.C. and the other for 450 volts A.C.

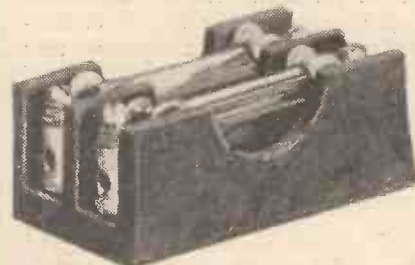
We have tested these coils in various receivers, and have found them to be very satisfactory. The price of the complete set of four coils is 10s., but if desired the various sizes may be obtained separately.

Hydra Condensers

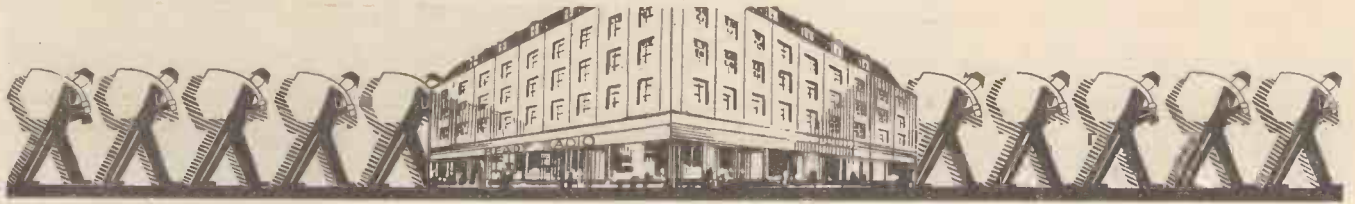
Messrs. Louis Holzman, of 37, Newman Street, London, W.1, have just introduced two new models of their well-known "Hydra" condensers.

The first is a 4-mfd. condenser, which is tested on 1,000 volts D.C., and is suitable for a working voltage of 300 volts A.C. This model retails at 7s. 6d. The second has a capacity of 2 mfd., is tested on 1,000 volts A.C. for a working voltage of 450 volts A.C. or 700 volts D.C., and retails at 5s. 9d.

The makers inform us that the insulation resistance of these condensers is remarkably high, and averages approximately 200 megohms for the 4-mfd. model and 500 megohms for the 2-mfd.



A neat twin fuse holder made by Messrs. A. F. Bulgin.



“EXPLORER” FOUR

by

VICTOR KING

| | £ | s. | d. |
|-------------------------------------------------------------------------------------------------|------------|----------|----------|
| 1 Drilled Ebonite panel, 21 in. x 7 in. | | 7 | 0 |
| 1 Hand-polished oak cabinet with 10 in. baseboard | 1 | 12 | 6 |
| 2 ReadRad -0005 variable condensers | | 9 | 0 |
| 1 ReadRad 3-point wave-change switch | | 3 | 0 |
| 1 ReadRad differential reaction condenser | | 5 | 0 |
| 1 ReadRad Brookmans condenser, -0005 | | 3 | 6 |
| 1 ReadRad on-off switch | | | 10 |
| 2 Igranic Indigraph slow-motion dials | 12 | | 0 |
| 1 Igranic 5-meg. megostat volume control | | 6 | 0 |
| 1 Wearite 3-pole change-over switch with baseboard-mounting bracket and extension arm | | 4 | 6 |
| 1 W.B. horizontal-type valve holders | | 1 | 3 |
| 3 W.B. standard valve holders | | 3 | 9 |
| 2 Lewcos 6-pin coil holders | | 4 | 6 |
| 2 Dubilier -0003 fixed condensers | | 3 | 4 |
| 1 Lissen -001 fixed condenser | | 1 | 0 |
| 1 T.C.C. -001 fixed condenser | | 1 | 10 |
| 1 T.C.C. -0005 fixed condenser | | 1 | 6 |
| 2 ReadRad 600-ohm resistances and holder | | 5 | 0 |
| 1 ReadRad 25,000-ohm resistances and holders | | 2 | 6 |
| 1 Graham Farish -0003 fixed condenser | | 1 | 0 |
| 2 Dubilier Mansbridge 2-mfd. condensers | | 7 | 0 |
| 1 Lewcos H.F. choke | | 7 | 9 |
| 1 ReadRad H.F. choke | | 4 | 0 |
| 1 Dubilier 2-meg. grid leak and holder | | 3 | 6 |
| 1 Lissen 5-meg. grid leak with terminals | | 1 | 3 |
| 1 Igranic 400-ohm baseboard-mounting potentiometer | | 1 | 8 |
| 1 Varley Nicore I L.F. transformer | 1 | 0 | 0 |
| 1 Telsen Radiogrand transformer | | 12 | 6 |
| 1 Varley L.F. choke 20 henries | | 1 | 0 |
| 1 Bulgin G.B. battery clip | | | 6 |
| 1 Drilled ebonite strip, 21 in. x 2 in. | | 2 | 0 |
| 11 Belling-Lee engraved terminals (insulated type) | | 5 | 6 |
| 2 “Explorer” dual-wave coils | 1 | 1 | 0 |
| 2 “Explorer” short-wave coils | | 14 | 0 |
| 4 Valves as specified | 2 | 7 | 6 |
| 2 Sets ReadRad Jiffilinx | | 5 | 0 |
| Screws, flex, plugs, etc. | | 1 | 4 |
| TOTAL (including valves and cabinet) | £14 | 3 | 6 |

KIT A less valves and cabinet **£10:3:6**
or 12 equal monthly payments of 18/9

KIT B with valves less cabinet **£12:11:0**
or 12 equal monthly payments of 23/-

KIT C with valves and cabinet **£14:3:6**
or 12 equal monthly payments of 26/-

RECOMMENDED ACCESSORIES

| | £ | s. | d. |
|--------------------------------------------------------|---|----|----|
| 1 Amplion cone loud speaker, A.C.21 | 1 | 19 | 6 |
| 1 Fuller 2 v. 30 accumulator | | 11 | 0 |
| 2 Fuller 60 v. super capacity H.T. batteries | 1 | 7 | 0 |
| Atlas A.C. eliminator, A.C.50X. | 8 | 15 | 0 |

PARATUNE COIL

Exactly as specified by “Wireless Constructor,” completely assembled and ready for use **8/6**

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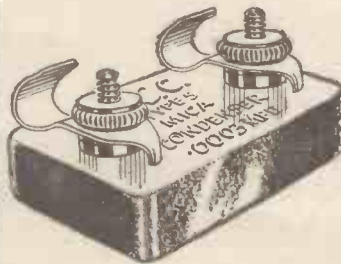
Cash or Easy Payments



TESTS OF TIME

Standing for ..

... over 200 years, this fine old building, on which Sir Christopher Wren worked for thirty-five years, has truly stood the test of time. The Telegraph Condenser Co. have spent 25 years entirely on making "The condenser in the green case"—and this, too, has stood the test of time. The name T.C.C. on a condenser is the undisputed hallmark of accuracy and dependability. For this reason it will pay you to use T.C.C. Condensers in your next Set.



The condenser illustrated is the .0003 mfd. T.C.C. flat mica type 1/3d.

ST. PAUL'S

ADVERT. OF THE TELEGRAPH CONDENSER CO. LTD., N. ACTON, W.3

5494



A NEW RECTIFIER for All-Electric Radio

Harnessing the power of the electric mains for the finest radio reproduction, giving a full supply of high tension current at the maximum voltage for A.C. Mains valves and Power valves, Marconi U.10 is the new Rectifier for modern All Electric Receivers and A.C. High Tension Eliminators. ★ It will deliver 60 milliamperes at 200 volts, with full-wave rectification. Filament consumption is 1 ampere at 4 volts—a standard rating rendering Marconi U.10 suitable for most A.C. sets and H.T. units. Impedance is only 220 ohms — giving excellent voltage regulation. ★ The price is 17/6 AND IT IS ALL BRITISH.

THE MARCONI U.10



Remember! Marconi Valves are used by The B.B.C., Imperial Airways, Croydon Control Tower, Metropolitan Police, Trinity House Beacon Stations and Lightships, Empire Wireless Communications, Large Passenger Liners, etc., etc.



IN LIGHTER VEIN The "GOOP" CHARGER



"VERY few people," said the professor, "really understand what an accumulator is."

I hastened to explain to him that I was not one of these since only that very afternoon I had got home on the two-thirty and then lost the lot on the three o'clock.

The professor said that he wasn't talking about backing horses; he was referring to secondary batteries.

"The great majority of those used for high-tension supply purposes," he said, "come to an untimely end through improper handling. I have just purchased a new set of such batteries myself and I propose to give you an object lesson in the correct way of treating them. They

WHAT NOT TO DO



"Hi! Stop it!" he yelled.

are at this moment reposing upon the top shelf of my cupboard. I will get them down to show you how to begin."

A Minor Set-back

Opening the cupboard door and placing a chair upon the polished floor the professor reached upwards. The shelf was a little high for him and the chair was, perhaps, rather far away. As he leaned forward into the recesses of the cupboard the chair began to slide.

"Hi! Stop it!" he yelled.

I performed a lightning dash from the far end of the room, but arrived just too late, for ere I could stay it the chair swept across the floor like a liner launched down the slipway. The professor hung for a moment suspended like Mahomet's coffin, betwixt heaven and earth; then the battery to which he was holding came out by the roots. He and the unit hit the floor almost simultane-

ously. When he had rubbed his bumps and expressed his feelings a little he swept up the pieces in silence.

"I take it," I said, "that that was a demonstration of—er—the way in which batteries come to an untimely end through rough handling? It was nice of you to go to all the expense of showing me, and I am really more than obliged."

We Remove the Polish

The professor then did some more expressing.

"These little accidents," he said, "will happen in the best regulated households. Personally, I have never been able to understand why people should want to polish floors.

"Perhaps before we go any further we had better produce a non-skid surface." He led the way out into the garden and within a few minutes we returned each laden with a bucket of ashes which we strewed carefully over the floor.

"That makes things a lot more comfortable and a great deal safer," said the professor. "I will now continue my demonstration."

This time he made use of the step ladder for getting down the remaining sets of units, handing them with great care to me.

"The first thing," he said, "is to mix the electrolyte properly. Always remember never to add the water to the acid."

"One moment," I cried, "you have got that wrong. It's acid that you mustn't add to water."

Which Is It?

"My dear ass," cooed the professor, "don't try to confuse me. The great thing, as I have said, is to pour the water into the acid."

"That's what I said."

"No, you didn't."

"Yes, I did."

"Anyhow," said the professor, "I have really forgotten now with all the talking that you have done which is the right thing to do. For heaven's sake turn it up in a text book."

We couldn't find it in any text book for none of ours seemed to deal with batteries. We were, therefore, reduced to tossing for it. The coin came down tails, which meant pour the water on to the acid.

"You do the pouring," the professor urged, "and I will show you how to do it."

I declined very gently but very firmly, pointing out that the professor and not I was conducting the demonstration. Pouring a good dollop of acid into a china bowl the professor seized a beaker of water.

"Up She Goes!"

"Up she goes!" I cried, giving his elbow a tilt.

And up the whole lot did go. I found, later, in a text book the statement that if water is added to acid a considerable amount of heat is liable to be developed. I can assure you that this is the case. The professor and I fled from the room, leaving this hellbroth to do its worst.

When we got back we found that most of it had boiled over on to the floor and it had mingled with the non-skid ashes. To neutralise the effects of the acid we added about a stone of washing soda, which produced the most satisfactory bubbling and frothing.

A NON-SKID SURFACE



Each laden with a bucket of ashes, which we strewed carefully over the floor.

As, however, the professor remarked, one good thing had been done, for it seemed, to say the least of it, unlikely that anyone would ever attempt to polish that floor again.

I was all for trying another brew, but the professor pointed out that mixing was mere menial work

In Lighter Vein—continued

unworthy of such brains and hands as ours.

"After all," he said, "what are chemists for? Let us send out and obtain a supply ready-made."

Filling up the cells is the most awful fun, especially when you haven't got a funnel. After about a teaspoonful has gone in a bubble thing forms at the bottom of the hole.

A sort of spluttering then occurs, and if you add any more it goes on to the table, the floor, and your clothes. And those bubbles seem to be made of unbreakable material. You can poke them as hard as you like with pipe cleaners and matchsticks and things, and they just laugh at you.

Further Troubles

The professor, however, was not long in inventing a way of dealing with the stoutest bubble. He produced a pipette, placing the wide end in his mouth and the small one in the hole. A little gentle suction, he explained, would remove the obstruction. I think he must have got into the wrong cell by mistake, for when he gave his suck about a pint of the stuff flew up the tube.

So far as I could gather from his remarks, electrolyte does not taste nice, even if neutralised, as his was, by the handful of soda I pushed into his mouth. He simply wouldn't listen to my idea that the quickest way of filling the cells would be to take a drink of the acid and blow it into them through the pipette.

Somehow or other we got those cells filled at last.

MIXING THE ACID



"Up she goes!" I cried, giving his elbow a tilt.

At just about this time I pointed out to the professor that several holes were appearing in his nether garments. In fact, those garments seemed to be positively disintegrating before my eyes under the effects of the splashing that they had received.

In a matter of minutes they had disintegrated, and the professor was forced to conduct the rest of the demonstration in a dressing-gown.

We couldn't find any dusters anywhere to dry down the tops of the filled cells, but the professor luckily came across a whole dozen of Mrs. Goop's handkerchiefs. These served admirably for the purpose so long as they lasted.

The First Charge

The first charge, the professor explained, must be a long, slow one. Luckily, charging would be easy, since our juice supply is direct current and the making of a charging board in such circumstances is, of course, simplicity itself.

As the professor remarked, all that we had to do was to find a lamp or lamps passing a quarter of an ampere of current, to wire this or these in series with the terminals leading to the accumulator; to place the units of the accumulator in parallel, to switch on and then to sit down and twiddle our thumbs for a few hours.

First of all, of course, a charging board had to be made. This the professor left to me whilst he applied soda and ammonia and things to the red patches which were appearing on his hands and arms and legs.

A Neat Board

And a jolly neat little board I made, complete with ammeter switch and everything. I handed it over to the professor, who, by this time, was looking rather like a half-boiled lobster.

It is, of course, perfectly simple to find exactly what lamp you want in a D.C. charging board. You see the volts and the watts carefully inscribed on the caps. All that you have to do is to divide the watts by the volts and that gives you the amperes.

As a matter of fact, such sums invariably give me not the amps. but the pip, for mathematics is not my strong point. I, therefore, always leave their working out to the professor. Since our voltage is 200, what we obviously needed for a quarter-ampere charging rate, at any rate, so the professor said, was a 50-watt bulb. One of these was soon forthcoming, and I proceeded to instal it in a suitable holder upon my charging board.

Things Happen

We then arranged all the units in rows and connected them up in parallel. Having run wires from the

board to the mains switch, the professor announced that all was ready and that charging on the proper lines could now begin.

He turned over the switch. A curious kind of bubbling came from the assembled cells, and as I watched I saw their plates twist into queer shapes. By the time that the professor managed to get the switch off again most of the acid that we had so laboriously pushed into the cells had been ejected once more.

PIPETTE DRILL



I gathered that electrolyte did not taste nice.

The things, I mean, kind of boiled over. What was rather amusing, too, was the behaviour of the ammeter, which luckily belonged to the professor and not to me.

The needle at the moment of switching on hit the stop with such a whack that it broke it right off and proceeded to travel unimpeded right off the scale round the dial. As this particular instrument reads up to 50 amperes, it seemed that a short, quick charge rather than a long, slow one was taking place.

End of the Demonstration

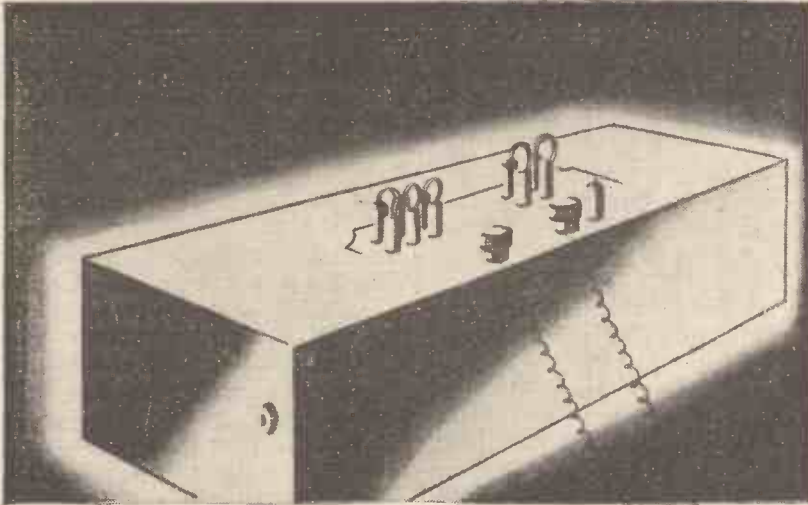
The professor gazed ruefully at the wreckage. Then his glance fell on the charging board. "By the way," he asked, "did you connect up that lamp-holder?"

"No, of course not. I thought you were going to do that."

"Then what did you do?"

"Well," I explained, "I just ran a wire between the input and output terminals because they looked sort of lonely without one."

I made a bee-line for the front door with the professor hot on my heels. Luckily, just as he turned out of the gate of the "Microfarads" the latest acid splashes began to take effect. His dressing-gown fell from him in shreds, and seeing Police-Constable Bottlesworth approaching in the distance he hastily hid himself in the bushes, whilst I sauntered quietly home.

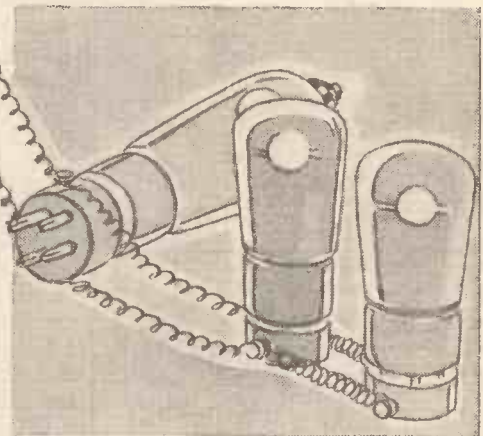


Make your Battery set All-Electric

The Six-Sixty A.C. mains conversion equipment is suitable for any Battery receiver

*No internal wiring alterations.
Specially selected Six-Sixty A.C.
Valves and Six-Sixty 4/5 pin
valve holder adaptor.*

The new Six-Sixty A.C. mains equipment enables you to turn your present battery receiver into an all-mains A.C. operated set. No need to scrap a satisfactory set—just adapt it. *The dimensions of the complete Six-Sixty conversion equipment do not exceed those of the previous batteries*, while the unit is specially designed to co-operate with specially selected Six-Sixty A.C. valves. Nowhere else can you obtain this advantage—valves and mains-conversion unit built by the same manufacturer to suit each other and work together.



The Unit can be obtained correctly built for any A.C. house supply. It is fitted with L.T. terminals giving 4 volts and up to 5 amps. H.T.appings of 60, 75, 100, 120, 150 and 200 volts and Grid Bias tapping of —1.5 to —20 volts are provided—any three H.T. or two G.B. values being available for use simultaneously. Automatic Grid Bias is provided—the most modern and expensive arrangement. A further advantage is that the H.T. leads from the set are not removed when once inserted.

Dimensions, 13" x 5½" x 4". Price complete, from £8 5s.
Mains Unit alone £6 6s.

Made by the makers of the famous Six-Sixty Valves.

Write for leaflet giving particulars of complete range, including new Six-Sixty Valves, Six-Sixty Cone Speaker Assembly and Cone Speaker Paper, Six-Sixty Turntable, Six-Sixty Valve and Set Tester, Six-Sixty Valve Adaptors, Six-Sixty Gramophone Pick-up Attachments, Six-Sixty Grid Leaks and Holders.



SAY SIX-SIXTY

Six-Sixty Radio Co., Ltd., Six-Sixty House, 17/18, Rathbone Place, Oxford Street, W.1. Telephone: Museum 6116/7.

HINTS FOR CONSTRUCTORS

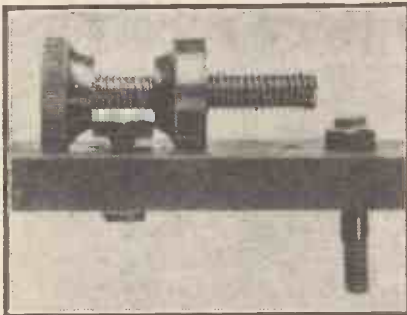
A Spanner for Small Nuts—For H.T. Accumulators—A Test-Tube Choke—Two Panel Tips.

A Spanner for Small Nuts

How often have you wanted at one time or another a small and conveniently-adjustable spanner for the purpose of tightening up or loosening small nuts? Such spanners are not often come across, and unless ordinary pliers are very carefully used for the purpose they generally result in a burring of the sides of the nut.

A large terminal of the usual "screw-down" variety can provide

FINELY ADJUSTABLE



Quite a good grip can be secured by this improvised spanner.

a very handy implement when used as an improvised spanner—the accompanying photograph showing how it is used for this purpose.

Very Finely Adjustable

A great advantage of a terminal when used in this manner is that it is very finely adjustable. Thus it may be screwed up until it just tightly grips the sides of the nut, after which sufficient leverage will be forthcoming to loosen or tighten up any small nut.

It may be found, however, that the sides of the terminal will not permit of the nut being screwed right down with it. Should such be the case, the terminal sides should be filed down until they enable the nut to be gripped when it is flush with the panel or instrument board.

For H.T. Accumulators

HIGH-tension batteries made up of secondary or accumulator cells are very much used nowadays, one of the great advantages being the constancy of their voltage. Most of them are provided with tappings at

every cell, but it is not always easy to get at the actual sockets on the battery when one wishes to put in a wander plug or take it out. I have found it rather a good tip to provide the battery with a small distributor panel.

Any Number of Taps

Supposing that you have three 60-volt units in use, the panel can conveniently be fixed to the middle one if they stand side by side, or to the top one if they are one on top of the other. It consists of a strip of ebonite fitted with as many terminals as are likely to be needed, one for H.T. negative and one for each suitable positive tapping.

My own battery terminals are arranged for 0, 60, 75, 100, 120, 150, and 180 volts, and these, I think, provide all the H.T. voltages that one is likely to need in the ordinary way. To the shank of each terminal where it protrudes beyond the back of the distributor panel is attached a lead fitted with a wander plug.

When the battery comes back from the charging station the units are connected up and the leads from the terminals of the distributor are attached to their proper tapping sockets.

One then has no difficulty in making any desired connection with the battery leads. It will be found very handy, by the way, to use one of the excellent patterns of universal terminals that are now available.

Takes Any Tags

These are arranged to take any kind of plain or tagged wire. You can thus connect to them the bared ends of flex or of stiff wire, spades, hooks, pins, wander plugs, and so on. It does not matter what kind of set you want to try out, the H.T. connections are made in the shortest possible time.

A Test-Tube Choke

THOSE who are experimentally inclined will probably find the construction and use of this home-made choke of much interest.

It is made by winding about a hundred turns of fine insulated wire around an ordinary test-tube. A

dab of Chatterton's compound or of sealing wax applied at each end of the winding will serve quite effectively in keeping the winding in position.

A cork inserted in the open end of the test-tube will act as a stand for the improvised choke.

For Short Waves

If, of course, the choke is intended to be used for more than a few experiments, stouter leads should be soldered to the ends of the winding in order to facilitate the making of connections.

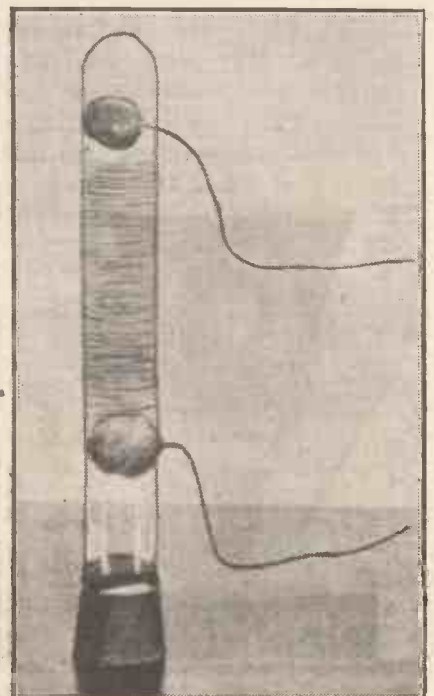
A choke made as above is most suitable for short-wave work. The precise number of turns of wire to be included in the winding depends, of course, upon the circumstances under which the device is used. However, a hundred turns of wire is a fair average, and this number can be increased or decreased as occasion demands.

Two Panel Tips

BEFORE using a centre-punch on your ebonite panels make sure that they are quite flat on the bench and no small screws or shavings or other tiny obstacles are underneath. Otherwise it is quite possible that you will split the panel in half.

When doing the actual drilling it is a good plan to have several thicknesses of tissue paper immediately below the panel to protect its surface.

READY FOR USE



Note how the ends of the windings are secured by Chatterton's compound.

HOW MANY VALVES?



IT is curious how the paths of progress of American and British radio have tended somewhat to diverge. On the one hand you have the apparent British principle of "get the most out of a valve and have as few valves as possible," while America goes all out for multi-valve low-gain-per-stage sets.

The results are that the most popular British arrangement is probably three valves arranged either as a very efficient detector—2 L.F., or as an H.F.—det.—L.F., using a screened-grid H.F. valve and perhaps a pentode.

And surprising though it may seem to many British readers, the most popular number of valves in America to-day is seven!

American Conditions

Generally three of these will be mains-driven S.G. valves! But there you have a clue to the whole business. Mains-driven sets are all but universal in the States, and battery sets are almost as scarce as are crystal sets.

Electrification is far more advanced, and the supplies over the whole country are almost universal in their rating.

Everyone has the power laid on, just as everyone has water laid on in this country, and the power is, of course, moderately inexpensive.

That is why mains sets are so overwhelmingly popular. Also, of course, it is a richer country, especially in its manufacturing resources. A seven-valver "over-there" can perhaps be compared to a three-valver over here, having regard to all the circumstances.

But there are other considerations, and these are to be seen in the following comments of members of the WIRELESS CONSTRUCTOR Ideas Committee at a recent session, which, as usual, was presided over by Mr. Victor King.

Here is a précis of Mr. Kelsey's views:

"In my opinion, the answer to this age-old question is to be found in the general trend of things as far as the reader is concerned. I would say, without hesitation, that our old friend the 'det. and 2 L.F. three-valver' is more commonly used in

this country than any other combination of valves, a fact due, in my opinion, to two important points.

"The first reason to account for the universal popularity of the 'three' is,

In America the tendency is to use a long string of valves all working with moderately low efficiency as amplifiers, while in this country we generally endeavour to use the smallest possible number of valves and to make each of them contribute their full power. The result is that in this country the three-valver is the most popular size of set, against the seven-valver of America. But are we developing on the right lines? And, in any case, is three the best number of valves for a general-purpose set? These and other important questions bearing on the vital subject of "How Many Valves?" are what the "Wireless Constructor" Ideas Committee recently discussed, and upon which we should be grateful for the further opinions of readers, as such have proved very helpful on similar occasions in the past.

I believe, to do with the comparative simplicity of controls.

"I have always been of the opinion that an amateur thoroughly acquainted with the manipulation of a single tuning control is likely to do far more with a 'three' of this type than an uninitiated listener with, say, a five-valver and two or three tuning controls.

Using H.F. Stages

"Secondly, quite apart from the question of upkeep cost, which is, and rightly so, a matter of considerable importance to most of us—I believe that the popularity of the 'det and 2 L.F.' combination has a lot to do with the fact that it is almost trouble-free.

"Naturally, when considering the more advanced reader, I am wholeheartedly in favour of the occasional publication of more ambitious designs.

"I certainly believe that there are definite advantages to be gained from the use of H.F. stages, but *only* when in the hands of someone who knows how to handle them.

"I cannot help thinking that as a result of the latest great advance by Mr. Victor King and the WIRELESS CONSTRUCTOR Research Dept., the

A FAMOUS BRITISH DESIGNER



"Constructor" readers familiar with Victor King's designs will know that he believes in getting the last ounce out of every valve in a set, and that he does this in practice is proved by the "Explorer" series, the latest example of which is to be found in this issue of the "Wireless Constructor."

How Many Valves?—continued

three-valver will become more popular than ever, because by the introduction of the new 'Paratune' principle the one great drawback to the present-day use of a 'det. and 2 L.F.' will have been overcome.

Mixed Mains

"In other words, complete separation of the Regional and the National stations (with, in many cases, a silent band for searching between the two) now becomes possible with the most popular combination of all.

"Finally, I do not think that we should emulate the American habit of using multi-valve sets with low-magnification stages, because over there the mains are practically universal and in consequence nearly all sets are mains-driven.

attempt to get the utmost out of each stage of a receiver, any more than we can make a rule of never endeavouring to obtain maximum efficiency.

"This is a matter which, like the question of how many valves to use, must be decided by the type of receiver, the conditions under which it is to be used and the purpose for which it is intended.

"I think you will find, on carefully considering the matter, that practically all small sets (namely one-, two-, and often three-valvers) are designed to be economical both in upkeep and initial outlay. The man who builds them is firstly concerned with expense, but he naturally wants as much as he can get for his money.

"Therefore, where such receivers are concerned, I think everything

in real stability under all conditions and few controls (chiefly because ganging becomes intensely practicable) and thus an ideal 'home' receiver can be produced.

"With sets employing many valves the initial outlay is not a vital point as a rule, and one or two valves more will not matter. For this reason I think that with this type of receiver a low mag. per stage can be utilised.

The Last Ounce

"The idea should be to decide on the wanted results and then to get these results in as easy a manner and with as much consistency as possible, the number of valves being one of the last matters to be decided.

"There is, of course, a lot of interest from the enthusiast's point of view in getting the last ounce out of each valve and stage, and it is very necessary from the point of progress, but as I have already indicated, each design must be considered separately, and the degree of efficiency desirable per stage must be decided with due regard to the purpose for which the particular receiver is intended."

Mr. Johnson-Randall stated that his views were as follow :

"The ideal is maximum amplification with the smallest number of valves, thus ensuring low first-cost and reasonable 'running' costs. Everybody desires to keep down capital expenditure, and also to reduce usual maintenance charges for H.T., L.T. and valves.

Regarding Selectivity

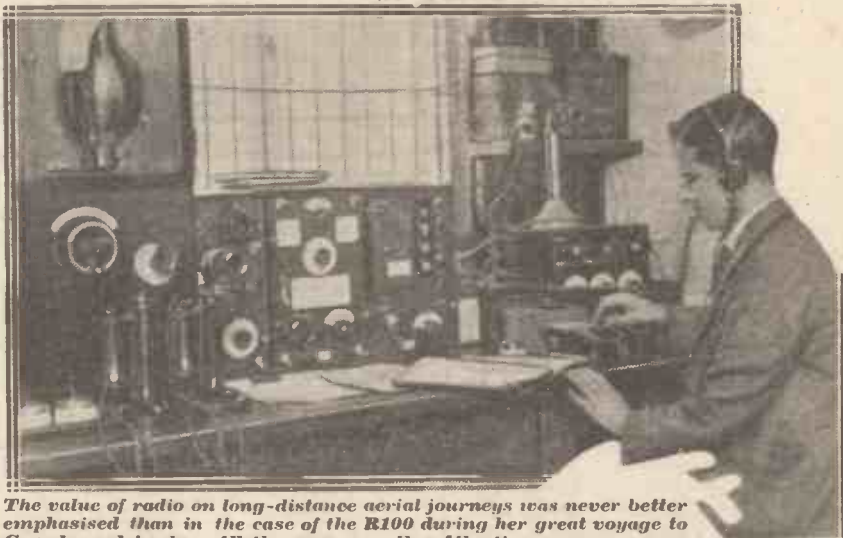
"On the other hand, it must be remembered that high amplification per stage is liable to produce instability unless great care is taken. Moreover, on the high-frequency side, one stage having very high magnification while giving great volume would also give poor selectivity.

"Speaking broadly, the selectivity of a receiver is directly proportional to the number of tuned circuits, hence the logical procedure is to cut down the amplification per stage, thus using an extra valve in order to gain an additional tuned circuit, together with adequate selectivity.

"If a receiver is to be of any value as a 'DX' proposition it must possess reasonable selectivity, and it has been

(Continued on page 351.)

COMMUNICATING WITH CARDINGTON



The value of radio on long-distance aerial journeys was never better emphasised than in the case of the R100 during her great voyage to Canada and back. All the way over the Atlantic messages were flashed out to, and received from, the R100 on the apparatus you see in the photo. The Cardington radio staff was on duty night and day, and R100 was kept au fait with every weather report likely to be of interest to her.

"Here we have to put up with all sorts of mains, and a design that may be ideal for one may be of no use at all for another, and a multi-valve set that is not mains-driven is certainly not an attractive proposition. I believe that we should concentrate more and more upon getting the utmost reasonably possible from each valve stage, thus keeping the total number of valves down to a minimum. It does not then matter very much whether the set is battery- or mains-driven."

Mr. Clark suggested that :

"It cannot be laid down as a definite rule that we should always

should be done with a view to getting the utmost from each valve, but with one qualification. The degree of efficiency must stop increasing as soon as it results in instability and difficult operation.

The "Home" Receiver

"By this I do not mean there must not be quite a number of controls, or that the set must be such that an uninitiated person can work it.

"Where these two points are of importance we must go out for a low magnification per stage, getting the desired results by using more valves. This method of designing a set results

The Latest development in Dynamic Speakers!



—and as usual the latest development comes from Ferranti. The new magno-dynamic speaker embodies years of experience and research work. It is likely that the full possibilities of permanent-magnet speakers have now been exploited and incorporated in the Ferranti model.

It combines super-sensitivity with an amazing faithfulness of reproduction and requires no energising current from batteries or electric mains. The Ferranti Magno-Dynamic Speaker may be operated by any good receiver, and is built for a lifetime of undiminished satisfaction in service.

PRICES: Chassis Models, £9.10s.
 TABLECABINET MODELS—Oak, £15.5s. Walnut or Mahogany, £16.14s.
 Metal, covered in Leatherette in Brown, Blue or Grey £12.10s.
 PEDESTAL " " Oak, £18.15s. Walnut or Mahogany, £20.0s.

Gradual payment terms if desired.

Ask for List W408.

FERRANTI

POINTS FOR PURCHASERS

Some interesting items from the manufacturers about their latest lines.

All the Facts

As a good instance of how radio is progressing I notice with interest that more and more information is now being given by firms about their products. If we look back a couple of years or so the change in the leading firms' attitude in this respect is astounding.

Ferranti's, for instance, recently brought out a leaflet in connection with their anode resistances, describing the product quite definitely. They further detailed the price, resistance value, current capacity in milliamps, exact dimensions and fixing centres, permissible dissipation in watts, and instructions for calculating the required resistance in any particular case!

Contrast that with old-fashioned methods of marketing an anode resistance, and you will agree that we really do progress. (Incidentally, the resistances are guaranteed to be within 5 per cent of the stated figures, and further relative particulars were given in another pamphlet!)

Brief Trade Items

Here are a few brief trade items that you may like to make a note of:

Radio Instruments, Ltd., have appointed Messrs. J. D. Morrison & Co., 10, Whitworth Street West, Manchester, to represent their products throughout the whole of the North of England, including Newcastle, Yorks, Lancs, and North Wales areas.

Stocks are carried and a showroom open at the above address.

* * *

"Tannoy Products" is the new name for the Tulsemere Manufacturing Co., and communications and dealings under the new name should now be made with 1-7, Dalton Street, W. Norwood, London, S.E.27.

* * *

The Hydra Condenser people have brought out a new line of condensers, encased in bakelite and with brass terminals instead of tags.

* * *

The Basle Wireless Club has recorded (Odeon A208,053B) a gramophone

record illustrating the various types of electrical interference which can mar radio reception.

* * *

Mr. Oldfield, the famous Australian cricketer, who kept wicket for Australia in the Test matches, purchased one of the new Dunham portable sets to take back to Australia with him.

A CUP WINNER



Part of the installation at G5BY, belonging to a Croydon amateur, and awarded a silver cup in a recent competition.

A Go-Ahead Station

One of the Philips Public Address engineers, Mr. H. L. O'Hefferman, was the first English amateur transmitter to gain the coveted W.A.C. (Worked All Continents) Certificate, awarded by the International Amateur Radio Union.

Mr. O'Hefferman owns and operates G5BY, which is situated at Croydon, Surrey. This station won a silver cup for the best amateur station in the world to be described in "QST."

New Valve Holder

Lectro-Linx, Ltd., have sprung something of a surprise on constructors this year in the form of a "different" valve holder. This

appears to have arisen naturally out of their new resilient sockets.

As everybody knows, in the past the usual plan was to have a fixed socket and a springy plug to fit in it, but these new Lectro-Linx sockets are themselves springy, so that the "plug" need not necessarily be so. When this practice is followed any conductor of suitable size can be used as a "plug," and so we have a valve holder in which four of these new sockets are employed.

Many advantages in use are claimed for the device, which certainly looks promising from several points of view. The added air-spacing that is available, for instance, should effect a distinct improvement when ultra-short-wave or other special work is being carried out.

Det.-Pentode Popularity

For the reception of local and high-power stations at excellent volume with a high standard of reproduction there is much to be said in favour of the detector-and-pentode circuit. This type of two-valver seems to be coming into vogue, and I understand the new Gambrell all-electric receiver is of this class.

Completely screened in a crackle-lacquer-finished wooden cabinet, it embodies a wave-change switch to cover long and ordinary wavelengths.

The price of the direct-current model is £13 10s., and an A.C. model is available for an extra £3.

More Mains Apparatus

Advance details of the Regentone products for the 1930-31 season show that this firm is now to manufacture only one type of mains receiver, namely, a 4-valver. This employs two H.F. stages, power detector, and choke-coupled output, with one-knob control.

And the complete specification certainly shows it to be an attractive set. (Price £31 10s., inclusive of royalties.)

Details of the Regentone mains units disclose some interesting points, and show that full-wave rectification is employed in all the A.C. units. All the models of high output will incorporate a high-low power switch.

Totally wire-wound variable resistances—which will be available to the public, also as separate components—are to be standardised in all the Regentone mains units.

EVERY WIRELESS USER SHOULD GET THIS CATALOGUE



** The Lotus Stand at
Olympia is No. 30*

LOTUS

SETS & COMPONENTS

WHETHER you are buying a new set this year, or adapting your present set, or if you are needing components to construct your own receiver, you should not fail to get the Lotus Catalogue. In this attractive booklet are described all the new Lotus Models; a wide range of Electric and Battery Sets to suit every taste and purse. The Catalogue also gives particulars of the Lotus Components, famous amongst constructors for accuracy, finish and workmanship.

One minute spent filling in the coupon below will assure you of perfect wireless reproduction for the season.

To GARNETT, WHITELEY & Co., Ltd.,
Lotus Works,
Mill Lane, LIVERPOOL.

*Please send me free of cost the
new Lotus Catalogue.*

Name.....

Address.....

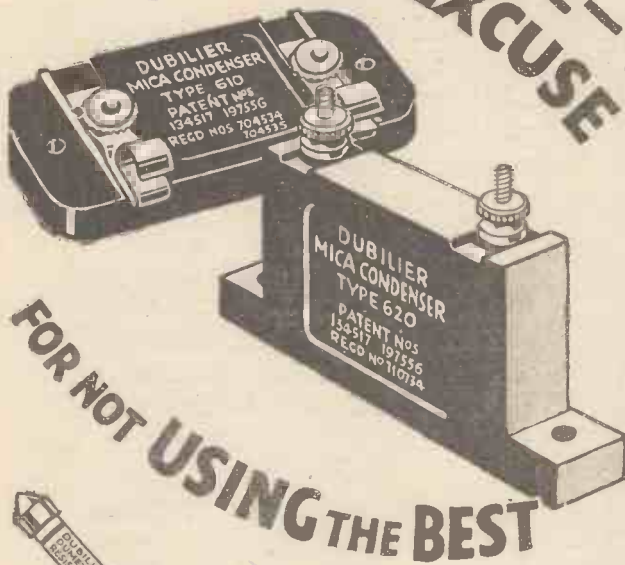
W.C./X

GARNETT, WHITELEY & CO., LTD.,
Lotus Works, Mill Lane, Liverpool

Branches: LONDON, BIRMINGHAM, LEEDS & GLASGOW

Causton

NOW
 THAT **DUBILIER**
CONDENSERS HAVE BEEN
REDUCED IN PRICE—
THERE'S NO EXCUSE



FOR NOT USING THE BEST

USE ALSO
 DUMETOHMS
 —THEY'VE
 BEEN RE-
 DUCED, TOO!
 FROM
 2/6 to 1/9

Increased demand has made it possible to reduce the cost of producing the world-famed Dubilier Condensers and Grid Leaks, an advantage which we are handing on to you.

The extreme accuracy and constancy of Dubilier Condensers are well-known and users are assured that the Standard will be maintained.

There is now no excuse for using inferior Condensers in your set.

PRICES

| | | | |
|--------------------------|-------|------------------|-------|
| TYPES 610 and 620 | | | |
| ·00005 to ·0009 | - 1/8 | ·003, ·004, ·005 | - 2/3 |
| ·001 and ·002 | - 2/- | ·006 | - 2/6 |
| ·01 | - - - | 3/- | |

DUBILIER
MICA CONDENSERS

We are exhibiting at Stand 50
 THE NATIONAL RADIO EXHIBITION
 Olympia (New Hall)
 September 19—27, 1930.

Dubilier Condenser Co. (1925) Ltd.
 Ducon Works, Victoria Road, North Acton, London, W.3

THIS
IS WHAT YOU'VE
WAITED FOR!



RADIO
EXHIBITION
OLYMPIA,
STAND NO.
67

PRICE
£6-15-0
Speech Trans-
former 15/- extra.

A new R.K. with permanent magnet designed to work—and work well—without the application of extra power. This new model, which is so easy to install (just connect it to your set, whether mains or battery driven), still upholds the reputation for tone and quality which the other R.K. models have held for four years.

The price is exceptionally reasonable when the remarkably fine reproduction is compared with that of other speakers and therefore offers excellent value for money. There are three other R.K. Reproducers—the Senior with built-in rectifier for use with A.C. mains, price £11 10s., and the Standard Senior, price £7 7s., and Junior Model, price £6 6s., all of which are obtainable through your radio dealer.

Ask your dealer for particulars of hire purchase terms.

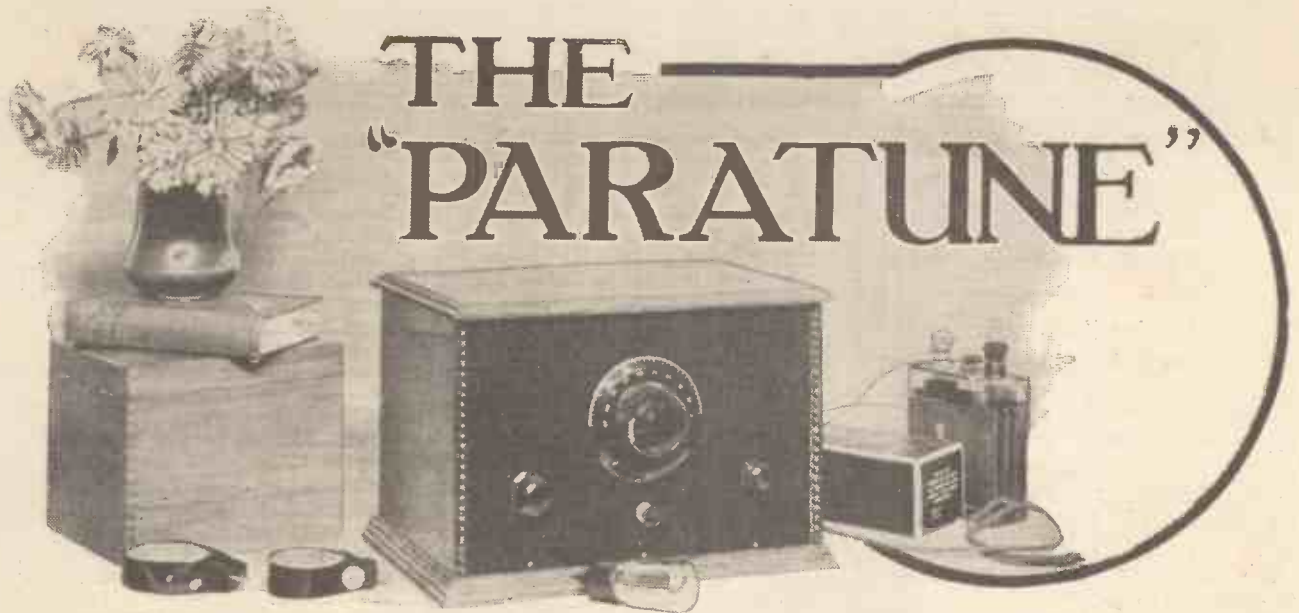
THE **RK** NEW
 PERMANENT **MAGNET**
REPRODUCERS



THE EDISON SWAN ELECTRIC CO., LTD.
 Incorporating the Wiring Supplies, Lighting Engineering, Refrigeration and Radio Business of The British Thomson-Houston Co., Ltd.
 Radio Division.

1a Newman Street, Oxford Street, W.1
 Showrooms in all the Principal Towns

EDISWAN W.89



Here are the first details of a wonderful new system which completely solves one of the most difficult problems ever met in modern radio reception—the obtaining of really selective tuning with maximum efficiency and true simplicity.

By the "Wireless Constructor" Research Dept.

IN receiving a radio programme over a given distance there are two important things which count. The first is the power of the broadcasting station, and the second the sensitivity of the receiver.

This, of course, refers to the two "broadcast" bands, namely, medium and long waves. With short waves, the question of reflection by the Heaviside layer plays an important part, and the station's power and the distance its transmission covers by no means go hand in hand.

Full constructional information about the first set to use the "Paratune" system. It is just the simple, selective and sensitive set that everyone has been looking for.

Generally speaking, for a given distance, the greater the power of the transmitter the less sensitive the receiver needs to be, and the fewer the number of valves that are necessary. Conversely, the less powerful the broadcast station the more valves we require in the receiver.

Consistent Results

To get consistent and clear results from a station it is necessary to develop a certain minimum voltage variation in the plate circuit of the detector valve, and to do this we must put a definite voltage variation on to that valve's grid. If our receiver is not sufficiently near to the transmitting station for the aerial to give

this voltage variation the only thing to do is to increase the received power somehow.

As already remarked, this may be done either by increasing the power at the broadcast station, or by adding an H.F. amplifying valve, so that the voltage variations are magnified before they reach the detector.

Question of Volume

The latter is what we had to do in the early days of broadcasting, when stations used comparatively small outputs. In those days good reception of distant programmes was practi-

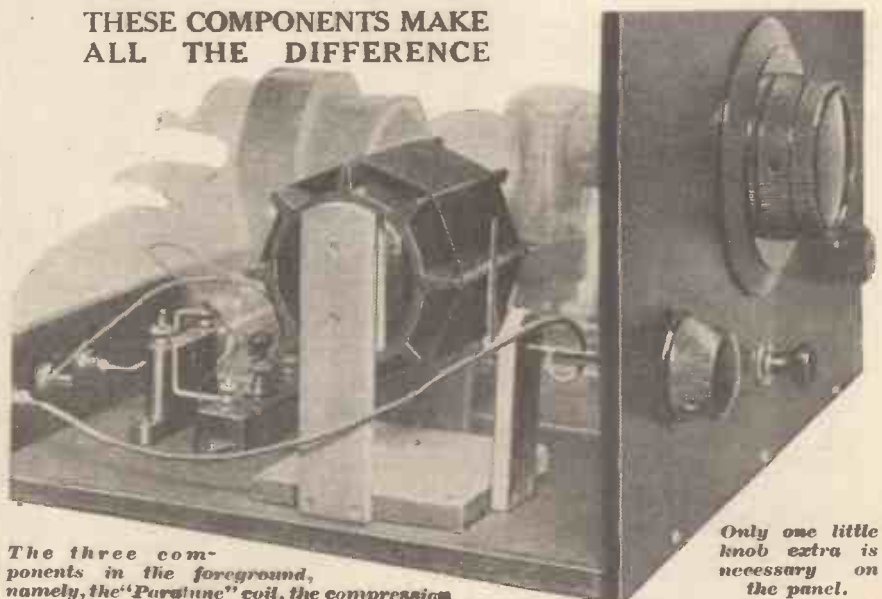
cally impossible without some H.F. amplification.

Present-day conditions, however, are vastly different, for from at least the point of view of volume it is possible to do without the H.F. amplification on many stations. This is because there are very many broadcasters working with colossal power.

Improving Selectivity

The statement made above has to be qualified with "from the point of view of volume," because an ordinary single-valve set is not

THESE COMPONENTS MAKE ALL THE DIFFERENCE



The three components in the foreground, namely, the "Paratune" coil, the compression condenser, and the fixed condenser, carry the whole secret of the system.

Only one little knob extra is necessary on the panel.

The "Paratune"—continued

sufficiently selective for modern conditions. Many schemes for improving one-valver selectivity unfortunately decrease the sensitivity, and H.F. amplification again becomes necessary.

Intensive Research

Other schemes introduce such complications that the set becomes more difficult to handle than one with H.F. amplification. Obviously, with "simple selectivity" the one-valver and the det. and one or two L.F. set can come well and truly into their own.

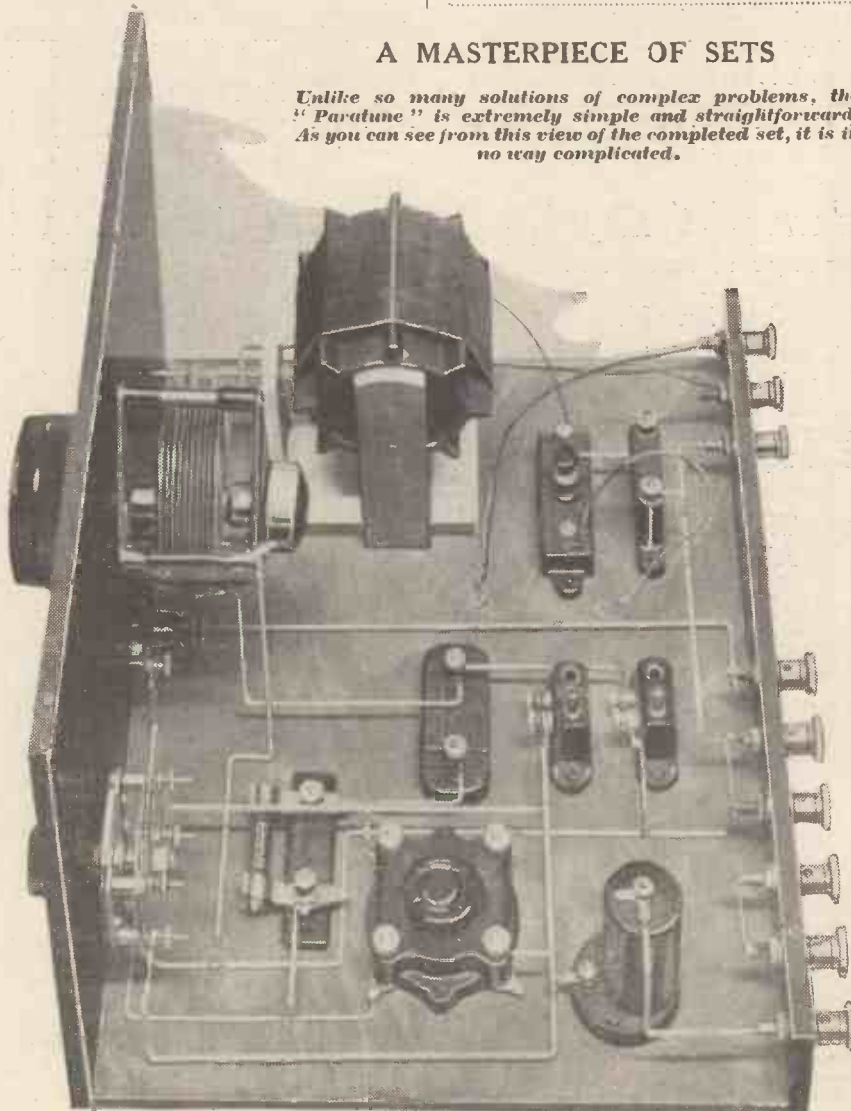
The WIRELESS CONSTRUCTOR Research Department, working in very close co-operation with Mr. Victor King, and also with the WIRELESS CONSTRUCTOR Ideas Committee, have

HERE IS YOUR SHOPPING LIST

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 Panel, 12 in. × 8 in. (Trolite, or Lissen, Paxolin, etc.).</p> <p>1 Cabinet for above, with baseboard 9 in. deep (Pickett, or Camco, etc.).</p> <p>1 Terminal strip, 12 in. × 2 in.</p> <p>9 Terminals with markings as on diagrams (Eelex, or Igranic, Belling Lee, etc.).</p> <p>1 "Paratune" coil (or materials for coil if it is to be home-made).</p> <p>1 .0005-mfd. variable condenser with vernier dial (J.B., or Lissen, Lotus, Dubilier, Polar, Ormond, Formo, Ready Radio, etc.).</p> <p>1 .0001, .00013, or .00015 differential reaction condenser (Lotus, or Lissen, Ready Radio, Polar, Dubilier, Wearite, Formo, Magnum, Ormond, etc.).</p> <p>1 L.T. switch (Lissen, or Igranic, Lotus, Benjamin, Bulgin, Magnum, Junit, Wearite, Red Diamond, etc.).</p> <p>1 Anti-shock valve holder (Igranic, or W.B., Benjamin, Lotus, Lissen,</p> | <p>Wearite, Magnum, Bulgin, Junit, etc.).</p> <p>1 .0001 max. compression condenser (Formo, or Lissen, R.I., Lewcos, Polar, etc.).</p> <p>2 Single-coil mounts (Lissen, or Red Diamond, Lotus, Ready Radio, Wearite, Magnum, Igranic, Bulgin, etc.).</p> <p>1 .001 fixed condenser (T.C.C., or Lissen, Igranic, Ediswan, Ferranti, Dubilier, Mullard, etc.).</p> <p>1 .0003 fixed condenser (Dubilier, or Lissen, etc.).</p> <p>1 H.F. choke (Wearite, or Igranic, Lissen, R.I., Dubilier, Varley, Lotus, Ready Radio, Magnum, Wearite, Lewcos, etc.).</p> <p>12-meg. grid leak and holder (Ediswan, or Lissen, Igranic, Dubilier, Mullard, Ferranti, etc.).</p> <p>Flex, ordinary wire screws, etc.</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

A MASTERPIECE OF SETS

Unlike so many solutions of complex problems, the "Paratune" is extremely simple and straightforward. As you can see from this view of the completed set, it is in no way complicated.



achieved this greatly desired "simple selectivity."

We have been carrying out intensive research work during the last month or two to solve the great problem which all radio designers have come up against. We have not gone round the subject, or arrived at a compromise, we have gone straight through it and emerged with a complete solution in the form of the "Paratune" system.

Nothing Like It

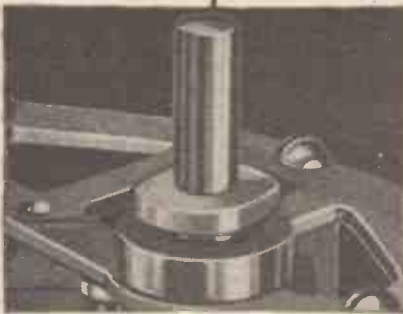
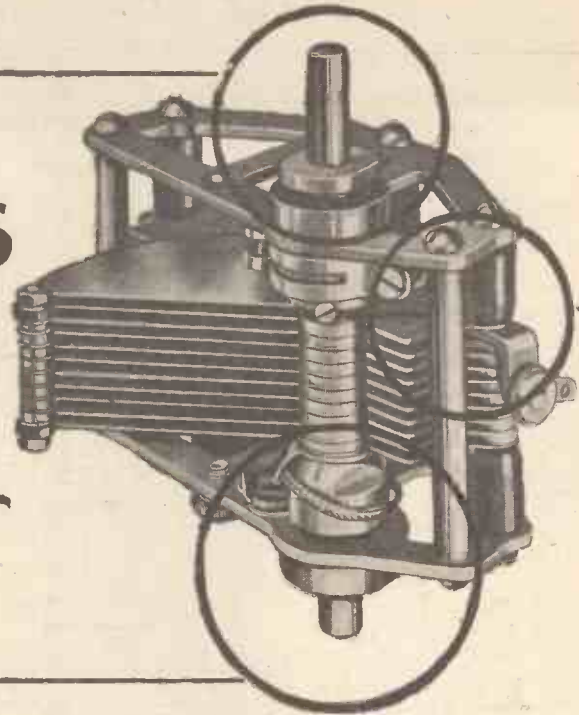
It is altogether a new system to which we are introducing you this month with the "Paratune" One. Nothing anything like it, or approaching it in results, has ever been done before, and next month Mr. Victor King will be describing a more ambitious set employing the same principle.

Nevertheless, the whole secret is revealed in this one-valver, which will enable you to bring in foreigners at wonderful strength without any interference, even if you live quite near a powerful twin broadcaster.

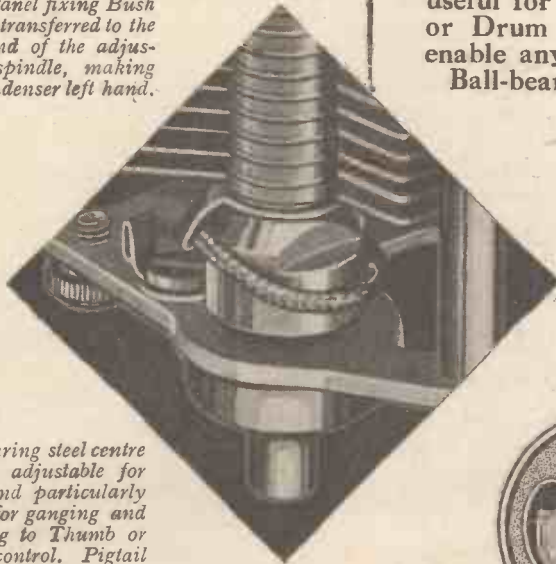
We will mention here, just to show how great is the importance of the new scheme, that we have found it most promising in overcoming another great problem which has been puzzling experts for a long time now. However, you will read more about this aspect of the "Paratune" in subsequent issues of the WIRELESS CONSTRUCTOR.

If you look at the circuit diagram of the "Paratune" One we can soon show you how really simple it is.

Features that matter



This Panel fixing Bush can be transferred to the other end of the adjustable spindle, making the Condenser left hand.



Ball-bearing steel centre spindle adjustable for length and particularly useful for ganging and attaching to Thumb or Drum control. Pigtail connection to rotor.

Here are some features of last year's outstanding success—The J.B. Universal Log Condenser.

It is exceptionally rigid, with frame and vanes of extra hard brass. Its insulation is highly efficient, and stray capacitites and eddy-current losses are minimised by cutting away all surplus material.

A special feature lies in the steel Centre Spindle, which is adjustable for length. This is particularly useful for ganging and for attaching to J.B. Thumb or Drum Dials. The bush is specially designed to enable any panel from $\frac{1}{16}$ " to $\frac{1}{4}$ " to be used.

Ball-bearing centre spindle. Pigtail connection to rotor

PRICES:

| | | | |
|-------|-----|--------|-----|
| •0005 | 9/6 | •00025 | 8/9 |
| •0003 | 9/- | •00015 | 8/9 |

4" J.B. Bakelite Dials. Black 1/6 extra,
Mahogany 2/- extra.

OLYMPIA—STAND NO. 63



Showing the well-known J.B. adjustable tension to centre spindle.



PRECISION INSTRUMENTS

The "Paratune"—continued

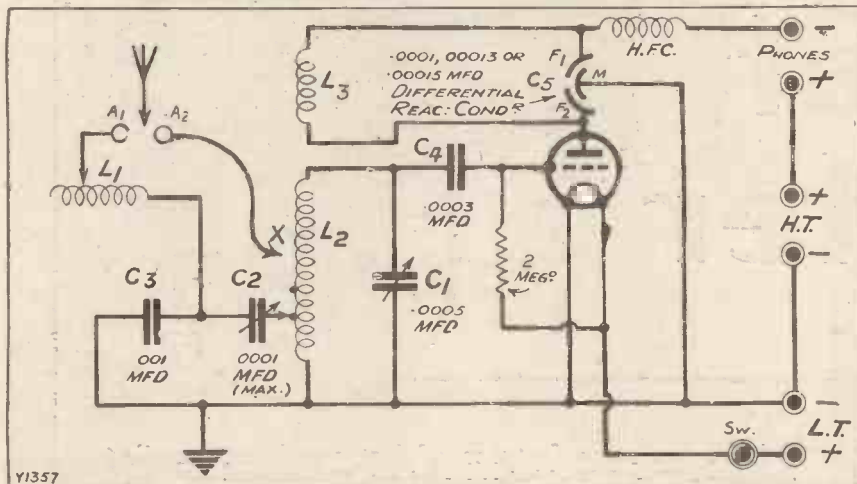
With regard to its selectiveness, you must make the circuit up to appreciate how marvellous it is, for it is beyond us to bring it home to you completely without a demonstration, so unbelievable is it!

The result is the great selectivity which we have mentioned, together with a remarkable signal strength, owing to the adjustment of the aerial circuit to suit each wave-length to which the set is tuned.

The "Paratune" components are in this way completely and conveniently cut out of circuit. The only component in the set which is not quite conventional is the "Paratune" coil L_1 .

This coil may be made at home, or a commercial form of it can be purchased, and several makes are already on the market. It is just a plain solenoid winding, and as there are no taps whatever on it, it is vastly more simple to make than the majority of home-wound inductances. A complete diagram of the coil is given, and should be extremely easy to follow. You may use a plain former instead of the ribbed one shown.

NO STATIONS JAM WITH THIS CIRCUIT



The circuit of the epoch-making "Paratune." The condenser C_1 is of the compression type, and is for the purpose of adjusting the degree of selectivity. Once it is set for a particular aerial system it does not have to be touched.

The coil L_2 is an ordinary "X" type of coil, and from this coil onwards—namely, up to the telephone terminals—the set is similar to any modern and efficient single-valve set. The condenser C_1 is for tuning, and reaction is controlled by means of the differential reaction condenser C_5 .

Variable Inductance

The condenser C_2 is of the compression type, and once you have set it for your particular aerial system it does not have to be touched. Its purpose in being semi-variable is so that the degree of selectivity can be altered to suit any conditions.

The only extra knob on the panel is for the slider on the coil L_1 . This is moved so that the value of the inductance L_1 suits the particular station which is being tuned in.

The aerial circuit consists of the series arrangement of L_1 and C_3 . The coils L_1 and L_2 are not coupled magnetically in any way, all the coupling between the two circuits being obtained via the condenser C_2 .

Highly Selective

This condenser is not only joined to a tap low down on L_2 , but also is connected to a point electrically "low down" on the aerial circuit.

Since the same degree of high selectivity is not necessary when working on the long waves, a separate aerial terminal is provided for this band. This terminal provides direct connection to one of the taps on the "X" coil, which is changed to a suitable size, as is also the reaction coil.

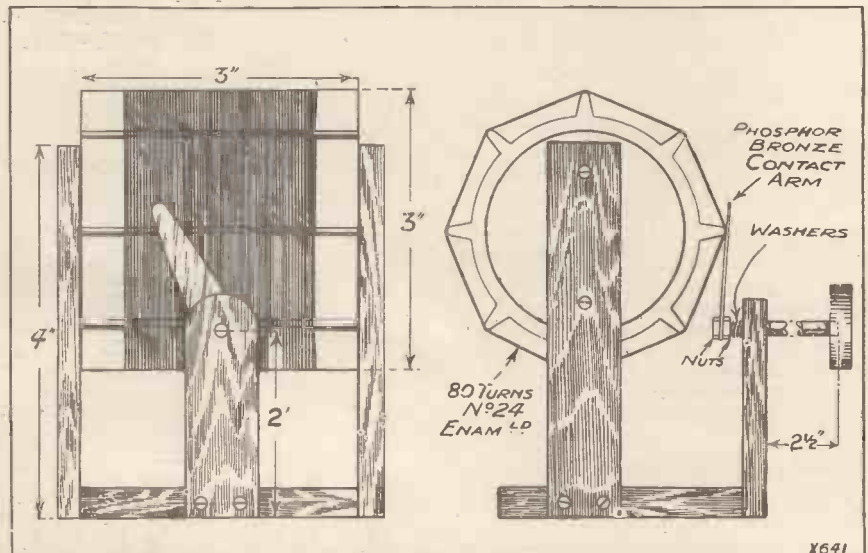
An Important Point

If you do, however, it will be necessary to bend the tip of the switch arm at right-angles, instead of having it flat. The tip of the part which is bent at right-angles should be rounded off.

In connection with this arm, it must be mentioned that it is imperative that phosphor-bronze be employed, and this should be fairly stiff. Failure to note this point may lead to a poor contact, and therefore probably a noisy action.

First wind on the 80 turns of No. 24 gauge enamelled wire, keeping the turns tight and close together. The ends of the wire may be secured

THE COIL THAT GIVES "SIMPLE SELECTIVITY"



From this diagram, which gives full details for making the "Paratune" coil, you will see that it is a very simple component. Commercial makes of this coil are available for those who are not keen on making their own.

Varley

FAMOUS SINCE BROADCASTING BEGAN



IMPEDANCE MATCHING
OUTPUT TRANSFORMER

£1 : 2 : 6

6 ratios: 9-1, 10-1, 12-1, 15-1, 20-1 25-1

Long before Broadcasting became what it is to-day, Varley had won fame for their coil winding.

On this experience is founded Varley's latest achievement in radio. Varley Impedance Matching Output Transformer—a new component of advance design—gives six different ratios. Accurately and without difficulty you can match loudspeaker and output valves.

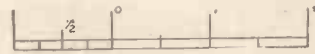
Remember that Varley Components are descendants of a long line. Since radio came Varley ideal has been quality. The Varley Impedance Transformer is the only adequate answer to a modern radio problem.



STAND No.
105

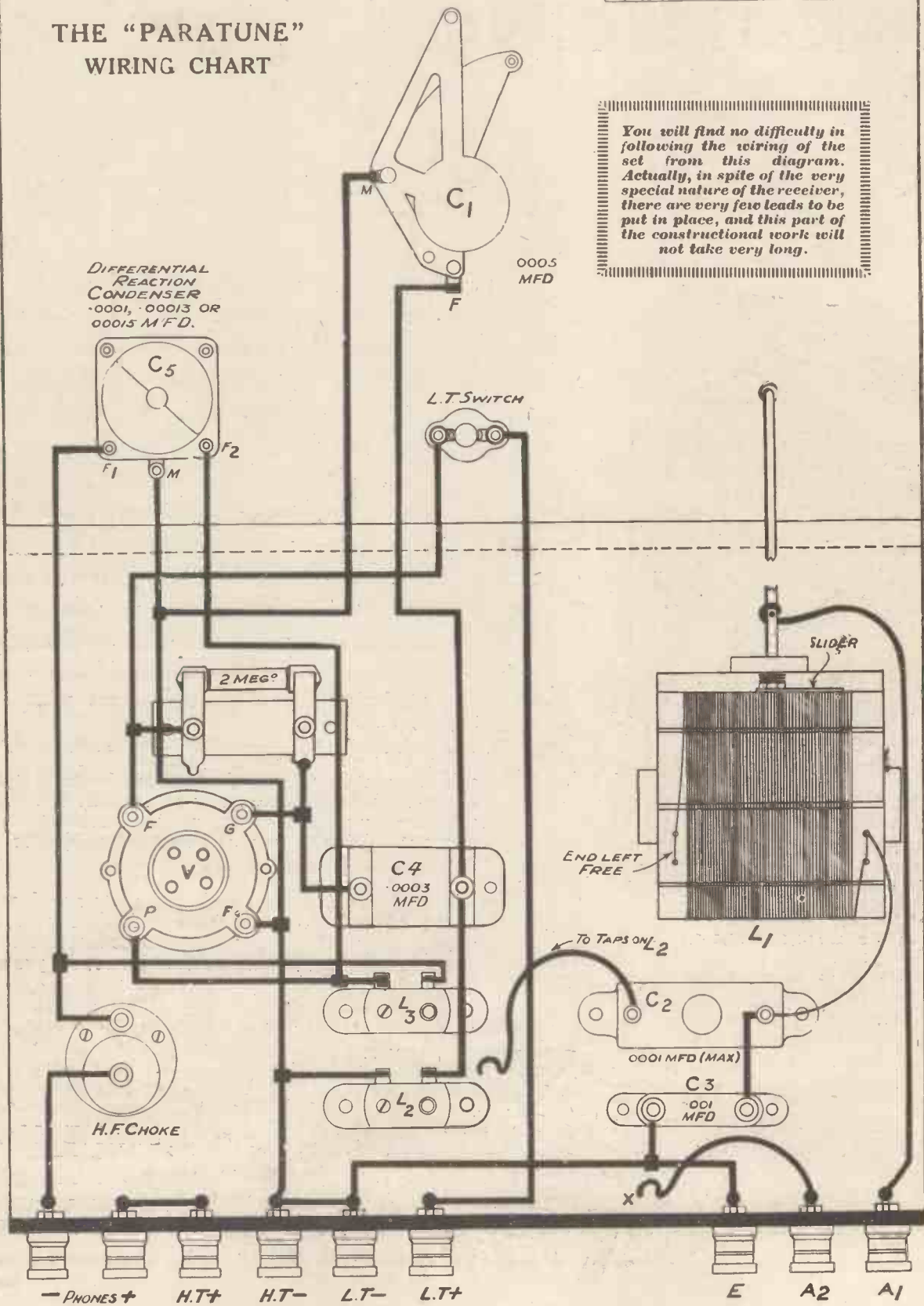
NATIONAL RADIO
EXHIBITION, OLYMPIA.

THE "PARATUNE" WIRING CHART

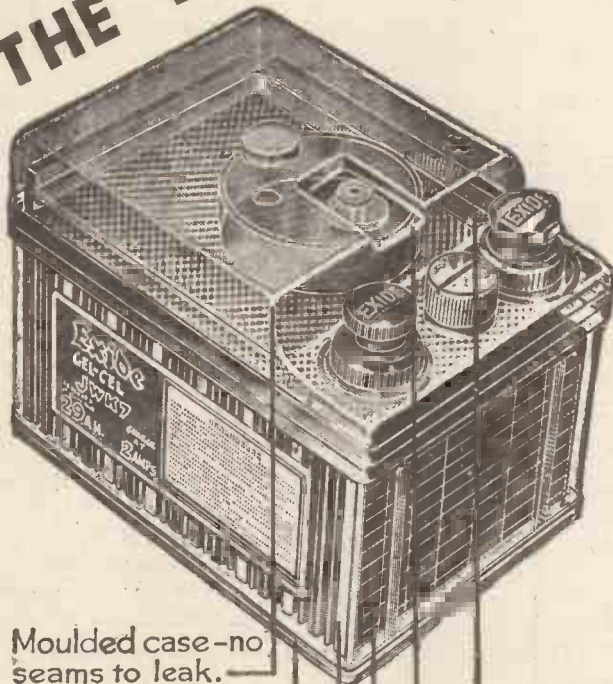


DIFFERENTIAL
REACTION
CONDENSER
.0001, .00013 OR
.00015 M.F.D.

You will find no difficulty in following the wiring of the set from this diagram. Actually, in spite of the very special nature of the receiver, there are very few leads to be put in place, and this part of the constructional work will not take very long.



★
ANNOUNCING
THE PERFECT JELLY ACID BATTERY



- Moulded case—no seams to leak.
- Double bottom for extra strength.
- Exide Long-Life Plates.
- Exide Jelly Acid.
- Improved Acid Trap.
- Non-interchangeable terminals, differently shaped and coloured.

THE makers of the Exide Battery have never before offered a jelly acid battery. A remedy had first to be found for certain well-known defects of this type of battery. This has now been done. And here is the result—the Exide Gel-cel.

The Exide Gel-cel is the first jelly acid battery to compare in efficiency with the best free acid batteries. And yet it has all the freedom from spilling which jelly acid provides. As an additional safeguard, should there be any residual acid, Exide have even provided an improved acid trap and a case with a double bottom, moulded and seamless, that cannot leak. It is the strongest, most efficient jelly acid battery for portables ever produced. Before you replace your present battery—see the Exide-Gel-cel.

Exide

GEL-CEL

REGISTERED

There is a size to suit every set. Prices range from 13/-

From Exide Service Stations or any reputable dealer. Exide Service Stations give service on every make of battery

Exide Batteries, Clifton Junction, near Manchester. Branches at London, Manchester, Birmingham, Bristol and Glasgow

L24

The "Paratune"—continued

by twisting in and out of two small holes placed close together at the ends of the formers.

Having wound the coil, the next step is to make the wooden cradle for it. The construction of this can be followed easily from the diagram.

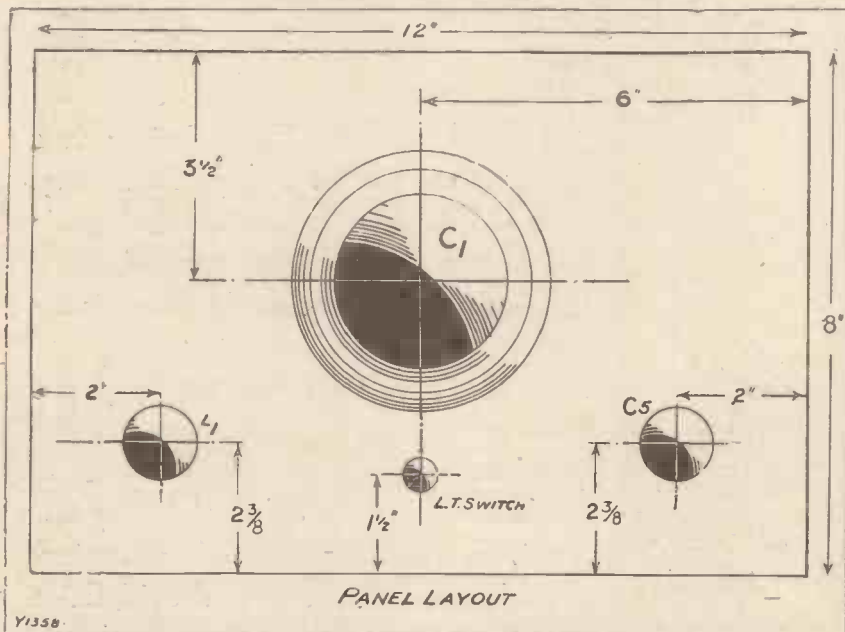
screw it to the baseboard. The next step is to drill the terminal strip, mount the terminals on it, and then screw this to the baseboard.

Now mount all the components. The positions of those on the panel are fixed by the drilled holes, and

the end of the flex lead to the slider arm is twisted once round the 2 B.A. rod. This will prevent the wire breaking away at the soldered joint when the arm is moved backwards and forwards.

In the operating chart full details of the accessories required are given, so that no reference need be made to them here. Details of the various voltages required are also given.

AN ACHIEVEMENT OF REAL MERIT



To obtain such selectivity with so few and simple controls is no mean feat, as you will realise immediately you tune in your first station on the "Paratune."

The coil is secured to the end-pieces by wood screws which pass into cross-pieces fixed in the ends of the former. Before fixing the coil finally in place the arm assembly should be completed.

For this use a piece of 2 B.A. threaded rod. See that the hole through which it passes in the wooden upright is not too large, and, if you have one, use a metal bush at this point.

Adjusting Tension

The tension on the arm can be adjusted by the number of washers behind the nuts holding the arm in place. No nuts need be placed in front of the wooden upright.

When you have made the coil—unless, of course, you purchase a ready-made one—you can carry on with the remaining constructional work. This is very simple, and once you have collected the listed parts together will not take long.

First drill the panel in accordance with the drilling diagram, and then

those on the baseboard should be arranged in a similar manner to that shown on the wiring diagram.

So far the constructional work will have presented no difficulties whatever, and all you have left to do is to wire the receiver. This, also, will present no difficulties, so little need be said about it.

You will note that only one end of the L₁ coil is connected up, and that

Operating the Set

With regard to the operation, so far as the tuning condenser and reaction are concerned it is just like any ordinary set. To start off with, join the flex lead from C₂ to one of the taps on the "X" coil, and leave the flex lead marked x unconnected.

Put the short-wave plug-in coils in place and set C₂ at its maximum. As the condenser C₁ is adjusted, alter the slider on L₁ to keep in step with it.

As the capacity of C₁ is increased, turn L₁ towards the right, and vice versa. You will not find the adjustment of L₁ critical, and after a few minutes will have the "hang" of the method of tuning.

Increasing Selectivity

If you find you want a little more selectivity, decrease the value of C₂ slightly. You should try the flex lead from C₂ on both taps on the "X" coil, to see which gives best results, adjusting C₂ to give the desired selectivity in both cases.

To go over to the long waves, disconnect the flex on the "X" coil, change over to the long-wave coils, and join up the flex lead x to the "X" coil.

THE "WIRELESS CONSTRUCTOR" "PARATUNE" ONE

A highly-selective single-valve circuit is employed.

VALVE.

General purpose, H.F., R.C. or special detector type, of 2, 4 or 6 volts rating.
H.T.: Up to 60 volts. Adjust for smoothest reaction control.
L.T.: 2-, 4- or 6-volt accumulator, according to voltage of valve used.

COILS.

Medium waves: No. 60X and No. 40 (X coil goes in socket nearest terminal strip).
Long waves: No. 250X and No. 100.

CONTROLS.

Medium waves: Tune on central large dial, adjusting knob on left to keep in step with condenser tuning. As condenser capacity is increased, turn this knob to right, and vice versa.

Reaction is controlled by knob on right. Knob in centre switches set on and off (on when pulled out).

Aerial should be attached to A₁.
Long waves: Operation is same as for short wave, but left-hand knob is not touched. Aerial should be attached to A₂.

On medium waves attach flex lead on semi-fixed condenser to tap on "X" coil which gives best results. Keep this condenser as near max. as possible consistent with sufficient selectivity. As its capacity is decreased, so selectivity increases.

On long waves attach flex lead on A₂ to tap on "X" coil which gives best results.

The BEST SHOW IN TOWN!

—AND THE BEST VIEW IS ON STAND NO 69



Telsen "Ace" Transformer, the ideal model for all Portable sets and where space is limited—gives perfect reproduction throughout the musical range. Shrouded in Genuine Bakelite, with new windings and core, fitted with earth terminal. Made in ratios 3-1 and 5-1. Price 8/6 each.



Telsen "Radiogrand" Transformer, new model shrouded in Genuine Bakelite with new windings and core, fitted with earth terminal. Made in ratios 3-1 and 5-1. Price 12/6 each.



Telsen fixed (Mica) Condensers. Shrouded in Genuine Bakelite, made in capacities up to .001 mfd. Pro. Pat. No. 20287/30, supplied complete with Patent Grid Leak Clips to facilitate series or parallel connection. Can be mounted upright or flat. Price 1/- each.



Telsen H.F. Chokes, designed to cover the whole wave-band range from 18 to 4,000 metres, extremely low self-capacity. Shrouded in Genuine Bakelite. Inductance 150,000 microhenries, resistance 400 ohms. Price 12/6 each.

Look out for the New Range of Telsen Components at Olympia—new types, new prices—better and cheaper radio!

These models embody many new features, which at their remarkably low prices now place first-class radio components within the reach of all.

The new models of Telsen Transformers have been entirely redesigned, each one having new windings and core, in addition to which they are now fitted with earth terminals, a very desirable feature in these days of high-efficiency two-transformer sets, and finally they are shrouded in Genuine Bakelite Mouldings.

The complete range of Telsen Components includes Variable Condensers, Fixed (Mica) Condensers, H.F. Chokes, Valve Holders, etc. The range is of such technical perfection and beauty of finish that no real radio enthusiast will buy other than Telsen: Radio's Choice for Better Radio Reception.

VISIT THE TELSEN STAND FIRST.

TELSEN | RADIOGRAND
TRANSFORMER SPECIALLY
SELECTED FOR THE
"EXPLORER" FOUR
DESCRIBED IN THIS ISSUE.

TELSEN

COMPONENTS

Advt. of Telsen Electric Co., Ltd., Birmingham.



On the Trail

THE Post Office pirate detector service is busy these days. The Post Office has two vans now fitted with direction-finding sets, and they spend their time buzzing round the various districts on the look-out for wireless licence pirates.

"Information Received"

"The Post Office also depends upon information received," stated an official of the Post Office recently; and this suggests that the Post Office is becoming quite a miniature Scotland Yard in receiving information from what Mr. Edgar Wallace would call "noses."

Not So Bad

At the end of July there were 3,180,000 licences issued, and during

the last twelve months the Post Office has conducted 1,029 prosecutions. The Post Office thinks this is evidence that, in the main, listeners pay their wireless licences pretty well.

Adult Education

Mr. A. Siepman gave a talk recently on "Adult Education by Wireless"—a subject very near to Mr. Siepman's heart, for he has a lot to do with it at the B.B.C. With the advent of broadcasting, he said, it would not be from a lack of opportunity that ignorance and superstition would remain. Nothing, he said, had been more striking than the rise in the tastes and interests of the listening public.

Stimulating Influence

It was inevitable that wireless education could never be more than a stimulating influence. Nothing that

broadcasting could do could supplant the work of existing organisations, but it could reach those whom the organisations could not.

A New Series

We understand that a series of talks on "The Future of Medicine" will be given in the autumn by Sir George Newman, Chief Medical Officer of the Ministry of Health. Other talks in this series will be given by Professor Sidney Russ, the radiologist, and Dr. Mellanby, the physiologist. The series will be concluded with a talk by Sir Humphrey Rolleston, the King's physician.

Science and Religion

A new series of debates on "Science and Religion" has also been arranged by the B.B.C., to begin early in the autumn, and the first few speakers will probably include Professor Julian Huxley, Professor Eddington, Dr. Barnes, Dean Inge, Sir J. A. Thomson, Professor J. S. Haldane, Professor L. P. Jaks, and Canon Streeter.

Ether Theory to Go?

Dr. Einstein recently propounded his new theory of space at the World Power Conference in Berlin, and one
(Continued on page 340.)

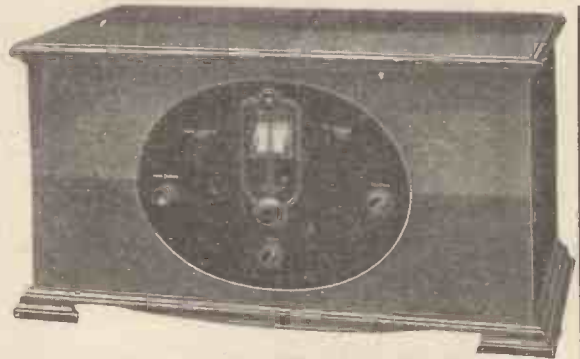
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1931
RADIO-GRAM
FOR A.C. MAINS**



An all-electric instrument embodying all that is best in modern radio and gramophone practice. Complete and ready for use, including royalties **£45**

**MAGNUM
BAND-PASS
FOUR**

An A.C. Mains-operated Receiver of the very latest design, with superb selectivity. Great range and beautiful tone. One knob control. Complete and ready for use, including royalties **£30**



We Specialise in

The "Explorer Four," "Paratune," and all "Wireless Constructor" sets, which we supply as constructional kits, ready wired and tested, or any parts separately. Full particulars, including our new 1931 lists, dealing with all that is latest and best in Mains- and Battery-operated Receivers, and a range of entirely new components, Free on request.

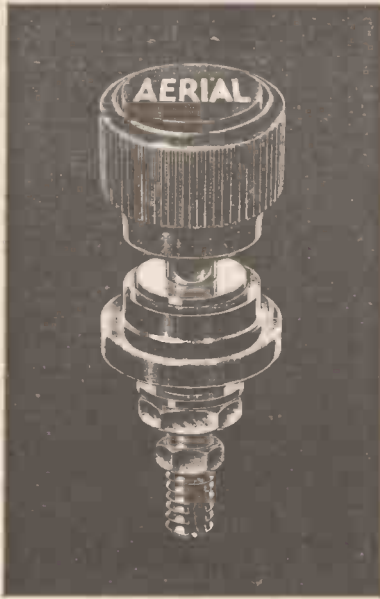
BURNE-JONES & CO., LTD.,
"MAGNUM" HOUSE,
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LONDON, S.E.1.
Telephone: Hop 6257/8.



**MAGNUM
VOLUME
CONTROL**
Specified for the
"Explorer Four,"
5 meg. **7/6**

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Belling Lee products for 1930-31



Years ago Belling-Lee were already marketing the famous Terminals which manufacturers are standardising to-day.

Belling-Lee products are ahead of their time. Last year's favourites will be this year's favourites, too—Terminals, Plugs and Sockets, Wander Plugs, Spades, Anode Connectors and Battery Cords.

TWO NEW COMPONENTS

The Belling-Lee Bakelite Terminal Mount takes any pair of Belling-Lee Terminals or Plugs and Sockets; can be mounted vertically or horizontally, on your baseboard, your window-ledge — anywhere.

Price - 8d.

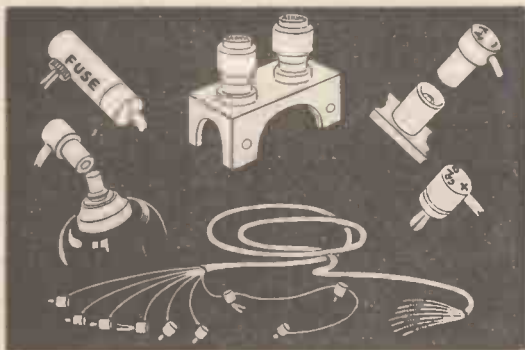
The new "Wanderfuse" takes no more headroom than a Wander Plug—though it's a fuse as well! Price - 1/6. Spare Fuses (150 m/a) - 9d.

BELLING-LEE TERMINALS

- Type "B" 6d.
- Type "M" 4½d.
- Type "R" 3d.
- Wander Plug 3d.
- Twin Plug and Socket 1/6 (Panel portion 6d., Flex portion 1/-)
- Indicating Spade Terminal 4½d.
- S.G. Anode Connector 6d.
- Battery Cords, 9-way .. 5/9 (also made in 5-, 6-, 7-, 8-, and 10-way)

STAND No. 134

NATIONAL RADIO EXHIBITION—OLYMPIA



BELLING-LEE
FOR EVERY RADIO CONNECTION

Advt. of Belling & Lee, Ltd., Queensway Works, Ponders End, Mdx.

Olympia for better Radio —



If you want to keep your set up-to-date come straight to **Radiolympia**. See the latest marvels of the Radio world.

The most modern sets, the most efficient components. And everywhere you will sense an ever-increasing simplicity of control. Radio has become a necessity like tap water and electric light — and now Radio is just as simple to operate.

At the touch of a switch you have the voice of the world — all the news, the entertainment and the wisdom of all countries. To know how best to enjoy these marvels

Come to the

RADIO
Exhibition
and marvel

NEW HALL OLYMPIA

SEPT 19-27

11 a.m. to 10 p.m.
DANCING

PROMOTED BY THE RADIO MANUFACTURERS' ASSOCIATION

OUR NEWS BULLETIN

—continued from page 338

of his remarks was that we must abandon the present hypothesis of the ether.

Dr. Einstein seems to have reached the same conclusion as the late Dr. Steinmetz, who contended that the ether-wave theory was merely a form of words designed to enable scientists to find their way out of a difficulty.

A New Idea

Dr. Steinmetz preferred to regard the so-called ether waves as merely the manifestations of the alternating electro-magnetic field of force, which extends through all space.

It appears that Dr. Steinmetz believed that when the electro-magnetic field is disturbed by radiations from a transmitting wire it causes vibrations which affect the receiving aerial, and the receiver translates them back to the music or speech which first produced them.

The Heaviside Layer

The Heaviside Layer has also come in for criticism, for Dr. Eve, a Director of the Department of Physics

at McGill University, Montreal, challenges the theory.

The Heaviside Layer is said to be an electrical conductor of ionised gas which surrounds the earth at a distance reputed to vary between 250 and 400 miles. Beneath it are two other layers, also electrical conductors, which form belts varying between 70 and 100 miles from the earth's surface.

Completely Enclosed

Dr. Eve's theory is that the wireless waves cannot easily penetrate a conductor, but are reflected by it as an image is reflected from a mirror. The theory that these waves must reach the 400-mile layer must be put aside in favour of the theory that they are reflected in a series of zig-zags from one layer to the earth, and back again from the earth to a second layer, and so on again and again.

If Dr. Eve's theory is correct it means that the idea of getting wireless messages through to Mars, or any other planet, is quite out of the question.

A Roman Beam

The new Italian station near Rome has been built to enable Italian transmissions to be heard in the Colonies and in other overseas countries outside

the range of normal Italian broadcasting stations.

The new station is designed on the lines of the Marconi short-wave beam transmitter, and has been entirely supplied by the Marconi Wireless Telegraph Company, Limited.

The station is now completed, and probably listeners have heard the tests, which began as far back as last March, on 25.4 metres. These tests were successfully noted in the Italian Colonies, and reports have also been received from India, Australia and South Africa stating that the station has been very successfully received.

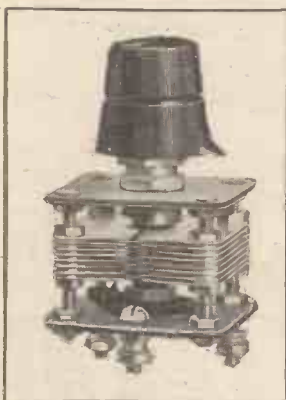
Philadelphia 'Peckers

A story comes from Philadelphia that broadcasting station WNB O had to close down for two days because of the snapping of the 100-ft. mast, 3 in. thick. The mast gave way because a family of woodpeckers drilled a hole completely through it!

Radio Religion

Wireless religion is too easy to do people much good, is the view held by the Vicar of Fulwell, Middlesex. In the course of a parish letter he writes: "It merely consists of listening-in to sermons. We can do that in an

(Continued on page 342.)



POLAR S.M. DIFFERENTIAL

For very accurate differential control, enabling small and sensitive adjustment. Very smooth and silent action; no hand-capacity. Insulated spindle and insulated between vanes. Fitted with knob and pointer.

| | | |
|------------------|----|-----|
| ·00025 each side | -- | 8/- |
| ·0001 | " | 7/6 |
| ·00015 | " | 7/6 |
| ·0003 | " | 8/6 |

... for the
"EXPLORER IV"

Mr. Victor King, in the latest of his famous "Explorer" series, specifies and uses a

POLAR SLOW MOTION DIFFERENTIAL.

It is the only slow motion differential condenser obtainable and is a great advance over all other types. Polar, by keeping pace with modern set design, backs up the designer by giving him just what he requires, enabling you to immediately gain the benefits of the latest developments in radio science.

Write for complete list C of the many New Polar Condensers

GALLERY STAND 118 GLYMPIA

WINGROVE & ROGERS LTD.,
188-189 STRAND, LONDON, W.C.2

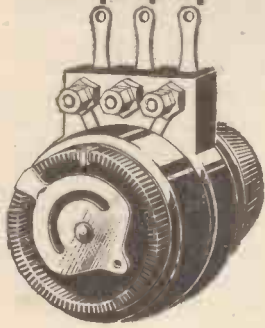
Polar Works, Mill Lane, Old Swan, Liverpool



POLAR "IDEAL"

This Tuning Condenser has both fast and slow motion control. Accurate tuning is easily obtained by reason of the design, construction and smooth yet firm control. Its wide tuning range alone gives it definite superiority over other condensers. Sturdily built and constructed throughout of chemically-cleaned hard brass.

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|--------|---|------|
| ·0005 | - | 12/6 |
| ·00035 | - | 12/3 |
| ·003 | - | 12/- |



And Now—

ELECTRAD Royalty Potentiometers

Now you can purchase the famous Electrad Royalty resistances in potentiometer style at greatly reduced prices.

Remember when you purchase wire-wound high resistances be sure to specify Electrad Royalty, the original units used by the leading manufacturers, experts, and in laboratories throughout the world. Do not accept imitations and infringements. Manufacturers should note that special models are available for production use.

| | | | | | | | |
|--------|------------------|---------|------|------|----|-----|------|
| TYPE A | 1/10th to 7 meg. | .. | 2 | m.a. | .. | 6/3 | each |
| .. B | 1,500 .. | 100,000 | ohms | 5 | .. | 6/3 | .. |
| .. C | 500 .. | 50,000 | .. | 7.5 | .. | 6/3 | .. |
| .. D | 10,000 .. | 700,000 | .. | 2 | .. | 6/3 | .. |
| .. E | 0 .. | 500,000 | .. | 2.5 | .. | 6/3 | .. |
| .. F | 0 .. | 2,000 | .. | 37.5 | .. | 6/3 | .. |
| .. G | 0 .. | 10,000 | .. | 16.5 | .. | 6/3 | .. |
| .. H | 0 .. | 25,000 | .. | 10.5 | .. | 6/3 | .. |
| .. J | 0 .. | 200,000 | .. | 4 | .. | 6/3 | .. |
| .. K | 0 .. | 5,000 | .. | 23 | .. | 6/3 | .. |

Complete with bakelite arrow knob.

If you have not received the complete Electrad catalogue of Royalty resistances, Truvolt fixed and variable resistances, Nichrome wire resistances, Super Tonafrols and Loftin White Amplifiers, write for your copy to-day. It's free and post free.

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EACH

DO YOU USE A PICK-UP?

If so, you will be interested in the "M.W." Review of Gramophone Records most suitable for pick-up reproduction in the home.

This feature, under the title of Recent Record Releases

appears every month in

"MODERN WIRELESS"

Every Month

Price 1/-



The "Waverley" Radio-Gram Cabinet

Prices: Oak, £5 10s. Mahogany, £6 15s.

This is only one of many beautiful Cabinets described in our new 24-pp. Catalogue. Send for it, or call and see the full range at our Showrooms, or Stand 140, Olympia.



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Phone: Holborn 8202.
Factory: Camco Works, South Croydon.

OUR NEWS BULLETIN

—continued from page 340

armchair, smoking a cigarette, and we can, of course, switch it off if we don't like the sermon, or if it fails to entertain us."

Well, why not? People who like listening to religious services are quite entitled to decide whether that sort of service is what they want, and a good sermon need not necessarily be boring!

The Pope's Short-Waver

The Pope's radio station in the Vatican is nearly completed, and when it is absolutely ready to transmit it will be one of the most modern stations of its kind. It has been presented to the Pope by the Marconi Company.

It will be able to work both on wireless telegraphy and wireless telephony, and will have two wavelengths, 19.84 metres and 50.26 metres. The power in the aerial will be about 12 kw.

Empire Wireless Scheme

It is probable that if the Empire Wireless Station scheme comes to

fruition, British wireless listeners overseas will be asked to pay 5s. a year to the B.B.C. as a licence fee, to help maintain the station. But even the money collected this way would not be enough to pay for the running of the station, and a scheme is now being considered as to the possibility of the deficiency being made up by the Government. Assistance from the Dominions will also be sought at the forthcoming Imperial Conference.

DON'T FORGET

that you can examine
for yourself . . .

VICTOR KING'S LATEST SET—

The "Explorer"

Four

at the Radio Exhibition.



It will be displayed on

**THE
WIRELESS CONSTRUCTOR
STAND, No. 5.**

Just inside the main entrance

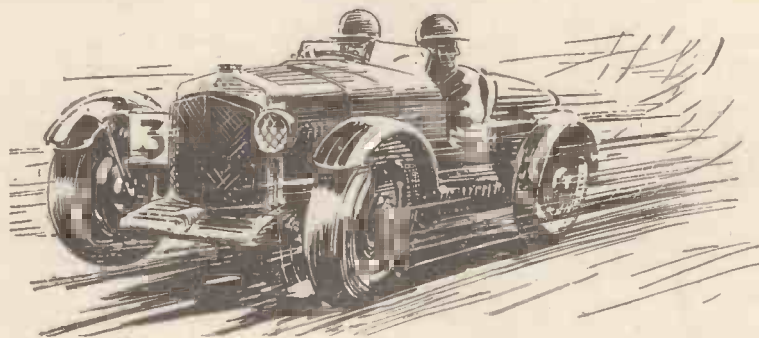
* THE "EXPLORER" *
* THREE *

Sir,—I feel it is my duty to write in praise of the "Explorer" Three, which I have recently built. Apart from substituting a Formodensor for the series aerial condenser and the omission of the volume control I have kept more or less to the published design. A small button switch takes the place of the volume control on the panel, and is used instead of the flex and plug and socket for shorting the fixed condenser across the tuning condenser when on short waves. This arrangement makes an even more symmetrical panel than that of the original "Explorer."

The complete coil cost me roughly 3s. 6d., as I made the former from a piece of ordinary 8-ribbed former, cutting the slots with the edge of a flat file, which left just sufficient space to cut a wider slot to take the medium-wave winding. A piece of ebonite was then cut to fit exactly in the end and into this the pins were fixed, a tiny hole being drilled by the side of each, through which the ends

(Continued on page 344.)

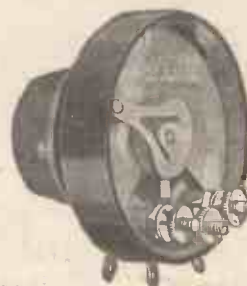
It Would be Fatal to Lose Control



A swiftly-moving mass of metal—each part fulfilling its appointed task—tremendous power unleashed to annihilate distance. The difference between control and lack of control may spell disaster to men and machine.

In your radio set, control is vital. CENTRALAB are acknowledged to be the world's leaders in volume controls—millions of radio receivers are CENTRALAB equipped. Is your radio controlled by CENTRALAB?

Write for the complete Centralab Catalogue—it's FREE.



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**SOMETHING
REALLY NEW
FOR YOUR SET—**

**WEARITE
COMPONENTS**

**—AN ENTIRELY NEW
L.F. COUPLING UNIT**

VISIT US AT
STAND
250
RADIO EXHIBITION,
OLYMPIA.

which will make a remarkable
difference to your reproduction.

Complete with switch
for tone control. Price **20/-**

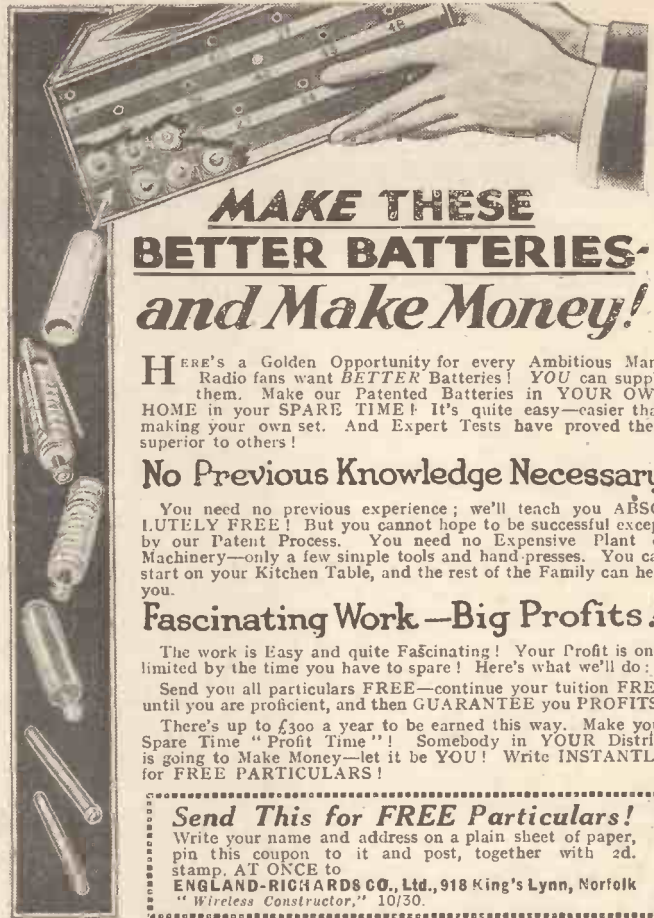
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Each **4/6**

SEND FOR A COPY OF OUR
NEW ILLUSTRATED LIST.

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740, HIGH ROAD, TOTTENHAM, LONDON, N.17.

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and Make Money!**

HERE'S a Golden Opportunity for every Ambitious Man! Radio fans want **BETTER** Batteries! YOU can supply them. Make our Patented Batteries in YOUR OWN HOME in your SPARE TIME! It's quite easy—easier than making your own set. And Expert Tests have proved them superior to others!

No Previous Knowledge Necessary

You need no previous experience; we'll teach you **ABSOLUTELY FREE!** But you cannot hope to be successful except by our Patent Process. You need no Expensive Plant or Machinery—only a few simple tools and hand-presses. You can start on your Kitchen Table, and the rest of the Family can help you.

Fascinating Work—Big Profits!

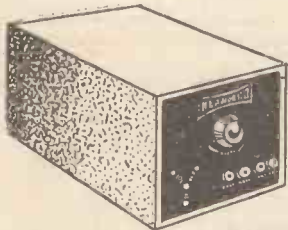
The work is Easy and quite Fascinating! Your Profit is only limited by the time you have to spare! Here's what we'll do:

Send you all particulars **FREE**—continue your tuition **FREE** until you are proficient, and then **GUARANTEE** you **PROFITS!**

There's up to £300 a year to be earned this way. Make your Spare Time "Profit Time"! Somebody in YOUR District is going to Make Money—let it be YOU! Write **INSTANTLY** for **FREE PARTICULARS!**

Send This for FREE Particulars!

Write your name and address on a plain sheet of paper, pin this coupon to it and post, together with 2d. stamp, **AT ONCE** to
ENGLAND-RICHARDS CO., Ltd., 918 King's Lynn, Norfolk
"Wireless Constructor," 10/30.



**Be your
own
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**Make an eliminator
with a HEAYBERD
kit of components.**

Batteries for high tension are a source of trouble. Every day people are realising this and turning to the mains for the steady power they supply. Build yourself an eliminator—a trouble-free, humless unit with the HEAYBERD kit. Full directions and wiring diagrams are supplied.

Write to-day for particulars.

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**RADIO EXHIBITION
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Come and see us at Olympia and examine the British General **BIG FIVE** guaranteed products. New ideas in design, new methods of production and increased sales enable us to offer the famous British General quality products at prices lower than ever.

DON'T MISS

**STAND
59**

BRITISH GENERAL

**BRITISH GENERAL MFG. CO., LTD.,
Brockley Works, London, S.E.4.**

REGIONAL COMMENTS*—continued from page 286*

such a spot is to reduce to a minimum the risk of "wipe-outs."

But a local expert has stated to the "Yorkshire Observer" that he agreed the new station would affect many listeners. It was his opinion that owners of crystal sets and of one-, two- and even three-valve sets would still be able to get distant stations, but would get Moorside Edge at the same time and be unable to eliminate the latter.

Their only remedy, he thought, would be to have a modern screened-grid high-frequency valve set, which type would not be influenced to any considerable extent.

"Wipe-Out" Fears

The B.B.C. points out in reply that there were similar "wipe-out" fears when Brookmans Park station began to operate, but after a few months' experience they had completely eradicated all complaints in that area. The district around Moorside Edge is not so densely populated as at Brookmans Park, and there is no great danger of inconvenience to listeners in the West Riding.

Any complaints after Moorside

Edge has opened will, of course, be investigated immediately.

Meanwhile the station at Moorside Edge (or Slaithwaite) progresses rapidly.

The North Regional station will comprise a rather stumpy though spacious building. It is being built almost entirely of brick. Brookmans Park station is constructed chiefly of grey stone.

1,000 Feet Up

The station occupies a site on the crest of Moorside Edge, a moorland hill some 1,000 feet above the little Yorkshire woollen town of Slaithwaite. The aerial masts to be erected will be 500 ft. high. This will mean radiation from a total height of 1,500 ft.

The station is to have the wave-lengths of 301.5 and 479.2 metres allotted to it.

The 479.2-metre wave-length is expected to give good service, for there will be a power of 50 kw. available for transmissions on this wave-length. The 301.5-metre wave-length will have the same power, if necessary, but it is not expected that transmission on this latter wave-length will cover so large an area.

With luck the station should be "on the air" early in the New Year at the latest.

THE "EXPLORER" THREE*—continued from page 342*

of the respective windings were threaded and soldered to the bases of the pins. Another circle of ebonite was then cut to fit the other end exactly and was tightly fastened in when the reaction coil had been inserted. The finished coil proves a highly satisfactory and efficient unit.

On the Speaker

As regards performance, the volume from the British stations is terrific at all times, especially from the two Daventry transmitters. London Regional is not very well received in these parts but provides fair loud-speaker strength.

I have also built an "Explorer" for my brother-in-law, who is as highly satisfied with it as I am.

I have not had much time for short-wave work, but have logged a few stations, including Zcesen at loud-speaker strength.

Once again thanking you for a great set.

Yours gratefully,
L. PITCHFORD.

Yorks.

IMPORTANT DEVELOPMENTS

IN

WESTINGHOUSE RECTIFIERS

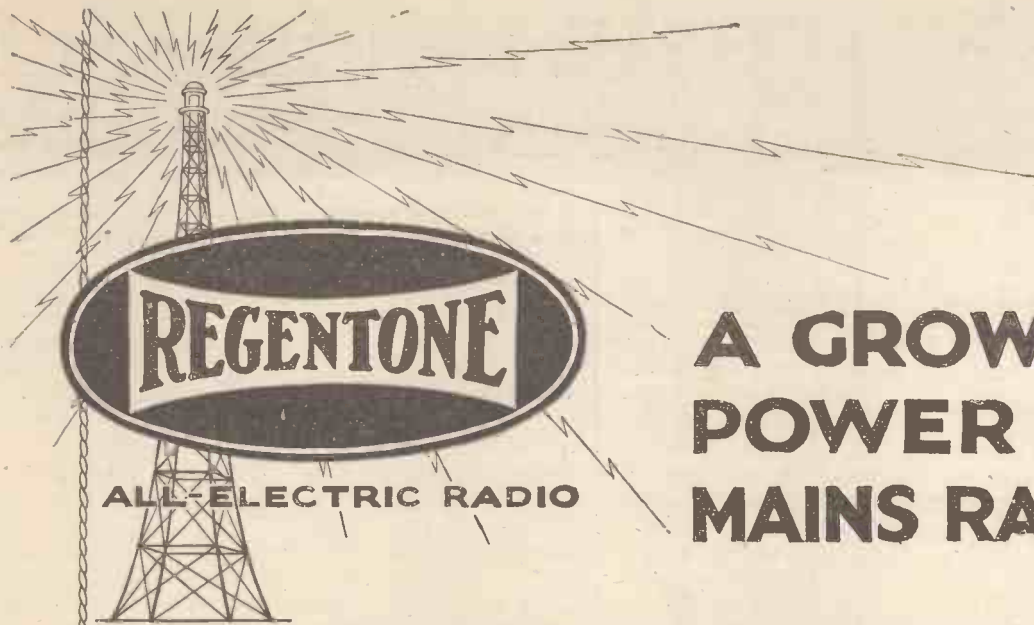
ON STAND 239 (EMPIRE HALL)

NEW

WESTINGHOUSE**METAL RECTIFIERS****FROM 15/- EACH**

Call for a copy of the 1931 edition of "The All-Metal Way," enlarged to 40 pages of valuable technical and practical data for mains users.

The Westinghouse Brake & Saxby Signal Co., Ltd., 82, YORK ROAD, LONDON, N.1.

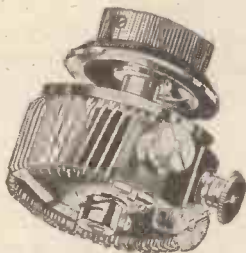


A GROWING POWER IN MAINS RADIO



COMBINED MAINS UNIT.
(H.T. with L.T. Charger).

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|------------------|----|----|---|
| A.C. Model | £5 | 17 | 6 |
| D.C. " | £3 | 19 | 6 |



THE NEW REGENTSTAT.
The only totally wire-wound Variable power resistance on the Market.
Complete range of Values.
Price 9/6 and 11/6.



4-valve ALL-ELECTRIC RECEIVER.
(For A.C. supplies).
4 Valves (2 stages Screened Grid H.F.).
Single-knob Control. Long and Short Waves.
Rectification by Westinghouse Metal Rectifiers.
Walnut Cabinet.

MAINS UNITS

Regentone Mains Units have been instrumental in showing tens of thousands of the radio public the simple way to make their sets, even their Portable sets, All-Electric. The first Combined Mains Units to fit inside a Portable were made by Regentone. Now leading British Set Manufacturers recommend Regentone Combined Mains Units for use in their sets—they have proved the reliability and satisfaction which every day make Regentone a still greater power in Mains Radio.

Mains Components

The home constructor knows the value of mains components made by a firm specialising in all-electric radio. These components are themselves the "bits" that go to make up Regentone Mains Units—there can be no greater recommendation than this.

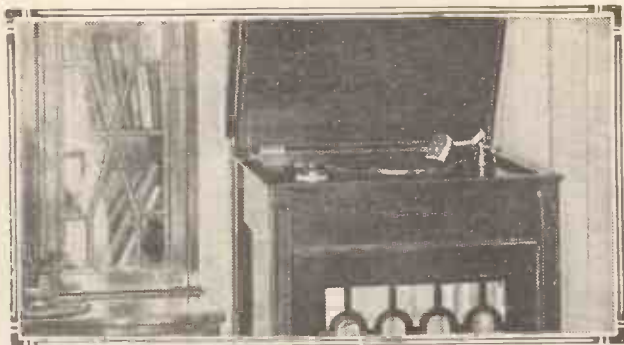
Mains Receivers

The new Regentone 4-Valve All-Electric Receiver (for A.C. supplies) has the same outstanding performance and reliability as the famous Regentone Mains Units. It is made by a firm which has specialised for years in the study of all-electric radio. It is a good receiver, a superlatively good receiver possessing to a marked degree simplicity of control (one knob tuning), selectivity, tonal quality, volume, range, and beauty of cabinet design. It is the Receiver for the discerning few who insist on the best.

Price complete 30 guineas.

Write for our new Art Booklet—"The Simple Way to All-Electric Radio"—free on application.

REGENT RADIO SUPPLY Co., 21, Bartlett's Buildings, Holborn Circus, London, E.C.4.
Telephone: Central 8745 (3 lines).



WITH PICK-UP AND SPEAKER

A Neat Tell-Tale—Modifying the "Vee-Kay" Four—Single-Pole or Jack Switching?—Using Two L.F. Stages—Connecting "Fader" Volume Controls.

Conducted by A. JOHNSON-RANDALL.

WHEN you see such firms as the H.M.V. Co. and Columbia Gramophones, etc., entering the radio-gram field with de luxe radio-gram equipments you are left with no possible shadow of doubt as to the popularity of this type of set.



This "Bulgin" tell-tale not only prevents you from accidentally leaving the amplifier "on," but it also illuminates the turntable and facilitates needle changing. It is shown on Stand No. 103.

A walk round the Show will bear this out. On the stands of makers of the larger types of receivers you will find that many of the multi-valve equipments have a pick-up and turntable incorporated.

A Useful "Gadget"

Moreover, most of the leading components manufacturers are including pick-ups in their 1931 programmes.

The pick-ups for next season will be better than ever, although the improvements which have been made are chiefly in the nature of refinements, such as slight alterations in suspension, weight, etc. In the next issue I hope to be able to describe fully the radio-gram apparatus shown at Olympia, especially the various "gadgets" and components which are likely to be of interest to constructors.

I notice that the Bulgin people have brought out a neat tell-tale which should be very useful in connection with pick-up amplifiers. The tell-tale consists of a nickel-plated vertical holder with the usual ruby glass indicator at the top.

At one side of the holder there is a rectangular slit and the idea is that the tell-tale should be mounted near

the turntable so that the light shall illuminate the pick-up and thus make needle-changing easier. This is quite a brain-wave in view of the fact that needle-changing has frequently to be made in a half-light. The tell-tale, of course, informs the listener whether the amplifier is on and acts as a guard against leaving the valve filaments burning when the equipment is not in use.

The "Vee-Kay" Four

A number of constructors have written in asking for details for fitting a pick-up jack or switch to the "Vee-Kay" Four, described in our July issue.

A HANDSOME OUTFIT



This is the Burndept de luxe radio-gram equipment. An all-A.C. mains drive five-valve receiver with push-pull output is employed in conjunction with a moving-coil loud speaker. Full details are obtainable from Stand No. 56.

Now, in the case of the "Vee-Kay" Four, we have a set with two stages of transformer-coupled L.F. and an output filter.

The L.F. side is, therefore, very suitable for pick-up work. The pick-up switch can be of the single-pole

two-way type, and the connections are as follow:

Remove the lead which goes from the grid condenser C_3 to G of V_2 (page 132, July WIRELESS CONSTRUCTOR). Join this side of C_3 to one side (not the arm) of the change-over switch. Then connect the arm of the switch to G of V_2 . Therefore, in one position of the switch the grid condenser will be joined to the grid of the detector valve, as before.

The H.F. Valve Filament

There now remains the other side of the switch. Arrange two terminals on the panel or on the terminal strip—whichever is the more convenient and gives the shorter leads—join the remaining side of the pick-up switch to one of these terminals, and take the other terminal to the 1½-volt tapping on the grid-bias battery.

The pick-up leads go to the two terminals and so you have a simple switch which will give you the radio programmes on one side and the gramophone on the other.

There is still one point to bear in mind, and that is the H.F. valve is still consuming current from the H.T. and L.T. batteries when the gramophone is in use. The only way to

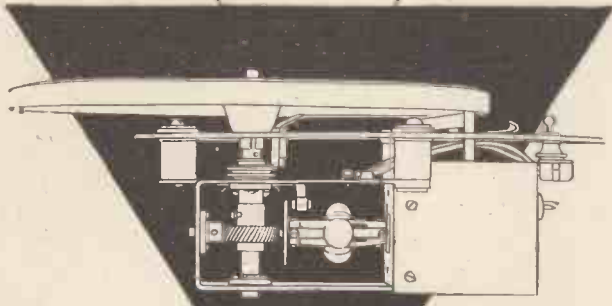
It is possible to obtain a "fade-in" and "out" effect by taking a tapping at a suitable point on the resistance element of a high-resistance potentiometer. The "dissolver" shown is a "Magnum" and may be seen on Stand No. 121.



overcome this difficulty is to place an "on-off" switch for the filament in the L.T.+ lead, and preferably on the baseboard near the H.F. valve holder, so as to make as little alteration to the wiring as possible.

Generally speaking, this scheme of using a two-way change-over switch is probably the most convenient

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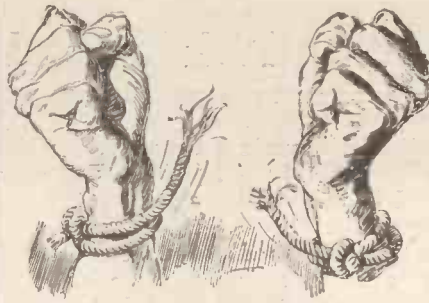
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With Pick-Up and Speaker—continued

method of incorporating a pick-up in the average receiver. There is, however, a second method in which the switch is replaced by a jack.

Some constructors like plug and jack switching best, and for their special benefit I will describe the type of jack needed. A single-circuit-closed jack will do the trick. You will find that there are three contacts.

Jack Switching

One is joined to the frame of the jack and should be connected to grid-bias negative. Then there is the bent tongue which makes contact with the end of the plug. This goes to the grid of the detector valve. The remaining contact spring is joined to the grid condenser. (The grid condenser and grid of the valve are, of course, not connected except via the jack.)

Thus when the jack is "free," i.e. when the plug is "out," the grid condenser is joined to the grid of the valve.

Upon the plug being inserted in the jack the circuit between the grid condenser and grid terminal of the valve holder is broken and the grid is joined to the pick-up via the plug, and thence to grid-bias negative (1½ volts). The pick-up is, of course, joined direct to the two connections on the plug.

This method of utilising the detector valve gives enormous amplification in the case of a two transformer-coupled amplifier, and can only be used with a sensitive pick-up if the volume control is available.

Using Two Stages

There are one or two super-sensitive pick-ups on the market which do not require three L.F. stages if ordinary room strength is required.

The procedure is to use two L.F. valves by connecting the pick-up in the grid circuit of the first L.F. valve.

There are two alternatives. One is to join the pick-up to a single-pole switch, making use of the existing volume control across the transformer secondary. To do this the connection between the volume control and G (or O.S.) of the transformer secondary is broken. This is the end remote from G.B.—

This point on the volume control is joined to the centre point or arm of the switch. One pole of the switch is connected to that side of the sec-

ondary winding which was previously joined to the volume control, and the other pole goes to the pick-up and thence to G.B.— The pick-up is thus connected between grid-bias negative for the first L.F. valve and one side of the switch. The volume control operates both for radio and pick-up. The only existing lead which is disturbed is the one from the volume control to the transformer secondary.

"Fader" Volume Controls

A better method is to employ a "dissolver," because this enables you to "fade out" the radio and to gradually bring in the gramophone somewhat on the lines of the B.B.C. broadcasts.

The "dissolver" or double potentiometer is a volume control for both radio and gramophone. You have a high resistance with a centre-tap and the usual moving arm. One half of the potentiometer is joined across the transformer secondary in the normal manner, the centre-point going to the G.B.— end of the winding, also to G.B. negative, and one pick-up terminal.

The other pick-up terminal is joined to the remaining connection on the "dissolver," the arm, of course, going to the grid of the L.F. valve. You can then change straight over from radio to gramophone, the effect being most pleasing.

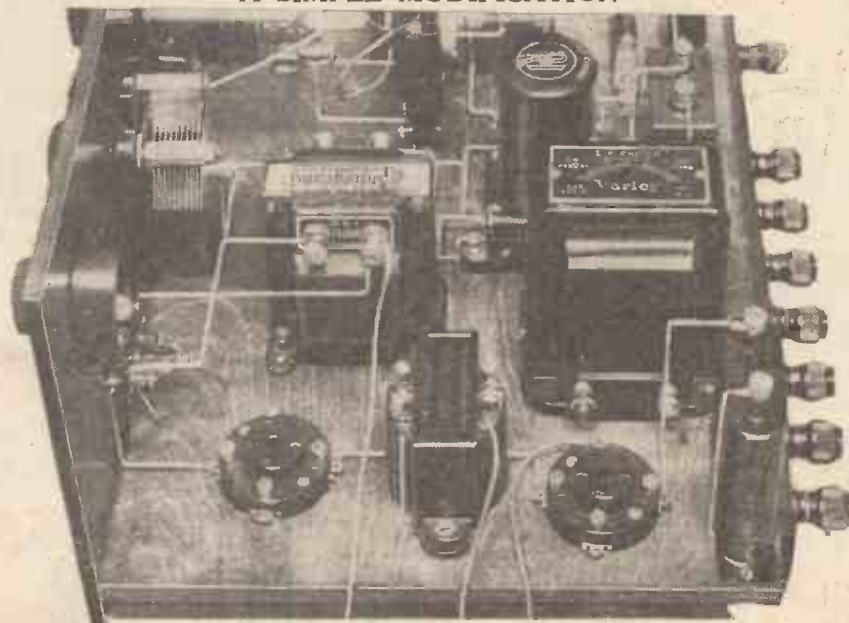
From time to time I get requests from readers asking me for a filter circuit to cut out needle scratch, and I often wonder whether these readers realise that needle scratch is inseparable from the higher musical register. You can cut out the scratch with comparative ease, but in doing so there is always the danger of reducing the amplification of the higher musical frequencies, in particular the overtones, all of which help to give us that brilliancy which is so necessary for realistic reproduction.

There is, of course, another point of view, and that is the average record cuts off at somewhere about 5,000 cycles, and in consequence it is not much use endeavouring to adjust the amplifier and pick-up so that they respond to anything above this figure.

Greater Frequency Range

In endeavouring to attain the ideal, it is quite right that we should concentrate on making our equipment as perfect as possible, especially since recording systems are improving rapidly, and the range of frequencies covered is getting wider relatively day by day. If we are going to be content with an amplifier which is only just capable of giving us what is on the record we are not likely to progress much.

A SIMPLE MODIFICATION



The L.F. side of the "Vec-Kay" Four is particularly suitable for pick-up work. The requirements are a single-pole change-over switch and two extra terminals, and the necessary alterations to the wiring are clearly explained in this article.

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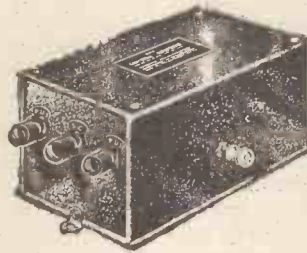
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THE "EXPLORER" FOUR

—continued from page 293

the presence of the unwanted reaction coil in the one case will not be likely to affect results adversely.

And now for the operating details. First of all, short-circuit the fixed condensers C_4 and C_5 , insert the all-wave coil units, with, if you make them yourself, the reaction one on the detector side of the screen, and adjust the wave-change switches to the position which short-circuits the contacts. Place C_3 at the maximum setting (plates in), and with C_1 set at about 30 degrees slowly rotate C_2 until the two circuits come into tune.

Tuning-In

This condenser will probably bring the second circuit into tune at roughly the same setting as C_1 ; but, in any case, you will easily be able to tell, because when the two circuits are in tune the set will noticeably sound more "lively."

Having thus brought the circuits into tune, set reaction at zero (condenser C_{12} with plates all-out) and, degree by degree, slowly rotate the

two main tuning controls, taking care to keep them in tune until you hear the local station.

Even if at 30 degrees the set is in tune with the condensers at approximately the same setting, this will not necessarily hold good over the whole of the tuning range, and you may find it necessary to increase one of the condensers slightly more rapidly than the other. Anyhow, the main thing to bear in mind is that, irrespective of the dial readings, the two circuits *must* be kept in tune.

The judicious use of reaction will help you when you are searching for distant stations, and, at first, since the set is of the "non-radiating" variety, you can, if you like, simplify the job of finding distant stations by searching until you find a carrier-wave with the set in an oscillating condition.

To use the set on long waves you simply push in the wave-change switches so that the contacts are not short-circuited, and proceed exactly as on the broadcast waves.

Adjusting for Selectivity

If you feel that you could do with a little less selectivity and more signal strength on broadcast waves you can increase the winding in the top slot of the intervalve coil unit by

10 turns, making it 30 turns in all.

Similarly, on long waves, if you desire stronger signals with less selectivity, the tapping on the long-wave coil which goes to pin 2 should be made at the cross-over between the second and third slots from the bottom, instead of, as at present, between the first and second. This should only be done to the first unit.

On Short Waves

When you think you would like to try the set on short waves you can do so merely by changing the coil units and removing the shorting strips across C_4 and C_5 .

You will find it best for these waves to advance C_1 10 degrees at a time, and to search (with the set just, but only just, in an oscillating condition) with the second condenser C_2 . When you find a station you can then adjust C_1 until the loudest results are obtained.

Finally, remember that this set, in accordance with the recommendations of the WIRELESS CONSTRUCTOR Ideas Committee, is suitable for use with either an A.C. or a D.C. mains unit.

In the latter case the only additions required are two high-voltage type 2-mfd. condensers, and they should be joined in circuit at the points marked X in the circuit diagram.

IGRANIC QUALITY COMPONENTS

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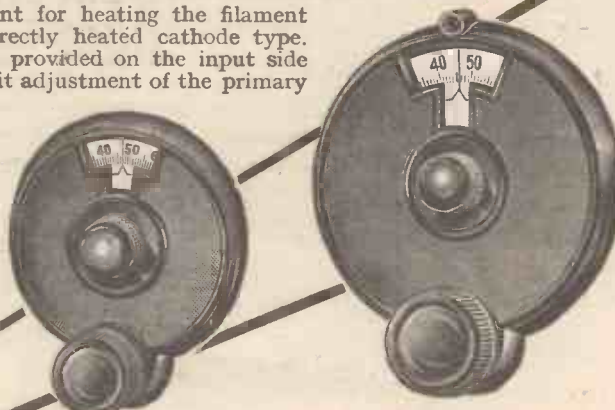
Designed to supply current for heating the filament of A.C. valves of the indirectly heated cathode type. Five terminal positions are provided on the input side of the transformer to permit adjustment of the primary to suit mains voltages of 100-250 volts. The output of the secondary, which is centre-tapped, is 4 volts across the outer two terminals.

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HOW MANY VALVES?

—continued from page 324

proved that in order to obtain distortionless reproduction, allied with selectivity, three or more tuned circuits are necessary. Thus you have two alternatives: High magnification—few valves—and poor selectivity, or moderate gain per stage and high selectivity.

“Various considerations, among which may be mentioned cost, ease of operation and stability, limit the maximum number of H.F. valves in a ‘popular’ long-distance receiver to two.

“Even with a design of this type it is necessary to cut down the stage gain to about 70 per cent or less of the maximum in order to ensure adequate selectivity.”

The “Paratune” System

“I do not think,” said Mr. Victor King, “I have much to add to the excellent appreciations of the problems that have been advanced. Almost the whole of the ground has been ably covered, and I have listened with the very greatest of interest.

“But I must have a friendly tilt at my friend Johnson-Randall, with whom I am quite unable to agree. I do not subscribe to the very general view that to achieve selectivity a multiplicity of tuned circuits is necessary.

“I think Mr. Randall has yet to test a set incorporating the new ‘Paratune’ system. When he has done so perhaps he will agree that selectivity of a high order can be obtained, without sacrificing sensitivity, and without a plurality of tuned circuits.”

A Problem Solved

Mr. Randall interposed that he regretted not having tested the “Paratune,” but he had only just returned from his holidays. He was delighted to hear that Mr. Victor King, in co-operation with the Research Department, had evolved a solution to a very great problem.

In view of this he found it necessary to revise his ideas a little.

Subsequently Mr. Randall did test a “Paratune” receiver, and was amazed at the results given by such simple apparatus.

The “How Many Valves?” discussion was, in fact, finally centred round the “Paratune” principle, and we await with interest our readers’ comments.

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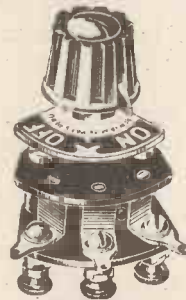
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Please be sure to mention "Wireless Constructor" when replying to advertisements.

THE PRACTICAL MAN'S CORNER

—continued from page 312

the connections is of first importance I use lock-nuts as well. Connections of this kind should certainly be employed in portable and transportable sets, for milled nuts finger-tightened are bound to loosen and to cause trouble some time or other.

One often sees in wireless sets, both home-made and professional, leads soldered to tags which are themselves fixed to components by means of nuts. It has always puzzled me not a little why such a system should be adopted when the wiring is done with stiff wire.

Terminal Tags

With flex it is understandable, for the fine strands are apt to break if connections are made direct; but with other wires I regard it as a positive disadvantage. It means, when you come to think of it, that at every connection there are two joints instead of one.

The tag is soldered to the wire and is then fixed to the terminal by having a nut turned down upon it. Every extra joint means a small addition to the high-frequency resistance of circuits.

For what it is worth, my advice to the home constructor is to remove tags from components, if these are provided, before he starts the work of wiring. Connections are better made by forming loops in the ends of wires with bottle-nosed pliers.

A Soldering Tip

In wireless constructional and repair work one often wants a soldering iron with a fine bit for doing little awkward jobs. Very small irons can be purchased, but these have one great drawback: owing to the small volume of copper in the bit they cool so rapidly that they are difficult to work with.

A very handy tool can be made from an old worn-out soldering iron in the way shown in Fig. 3. The point is cut off with a hacksaw and the end trimmed up more or less square. A piece of 1/4-in. copper rod about 1 1/2 in. in length is then obtained.

In the end of the old bit is drilled a hole through which the rod is a driving fit. It is then forced home, and, if necessary, made perfectly secure by making deep indentations with a centre-punch round its junction with the bit.

THE RADIO EXHIBITION

—continued from page 306

first time this year, is the Lissen balanced-armature speaker in oak cabinet.

A very wide range of radio-gramophones is also shown, to run from batteries, A.C. or D.C. mains, complete with frame aerial, and, if desired, for operation with an outdoor aerial. In fact, the Lissen stand is a complete exhibition in itself!

LITHANODE CO., LTD., 190, Queen's Road, Battersea, S.W.
 Stand No. 135.

A wide range of accumulators suitable for various types of sets will be in evidence here.

W. T. LOCK, LTD., St. Peter's Works, Bath.
 Stand No. 132.

Here will be on view a complete range of cabinets to meet the needs of every home constructor. All kinds will be on show, including radio-gramophone cabinets, pedestal cabinets for receivers with loud speaker, with provision for batteries, mains units, etc.

A feature of the loud-speaker cabinets this season is the provision of a substantial baffle board behind the grille. There is sure to be a big demand for the items on this stall.

LOEWE RADIO CO., LTD., 4, Fountain Road, Tottenham, N.
 Stand No. 207.

The name of this firm will always be associated with the famous Loewe valve, but in addition it should be noted that it is responsible for several sets and components which are finding a wide market and appreciation. Among these are the Loewe radio high-vacuum resistances, which are sealed in glass tubes under high vacuum, and thus protected from the atmosphere. A feature of these resistances is that the valve is practically independent of the applied voltage, and quite heavy currents can be carried without change of resistance value.

Here, too, will be shown the Loewe radio high-vacuum fixed condensers, the peculiar construction of which results, the makers claim, in a condenser in which the defects of external insulation are eliminated.

The chief attraction of this year's display will probably be the four-pole cone loud speaker, recently introduced. The front panel is of genuine walnut, and the outside appearance of the speaker is distinctly attractive, the price of the complete instrument being two guineas.

LONDON ELECTRIC WIRE CO. & SMITHS, LTD., 7, Playhouse Yard, Golden Lane, E.C.
 Stand No. 41.

The complete Lewcos range of coils for wireless will, of course, be in evidence, and constructors will note with pleasure that in many cases the prices of these have been reduced. The low-frequency transformer is now 25s., the S.P. Three six-pin base is now 2s., and there are many other reductions.

In addition to the Lewcos L.F. transformer shown last year, and now available in either metal or bakelite case, a new model having a ratio of 3 to 1 will be produced, price 20s. An entirely new development is the Lewcos L.F. choke. With an inductance of 30 henries, a low D.C. resistance, and attractive limits of current, weight and dimensions, the price is 17s. 6d.

Other features of this exhibit are the fixed potentiometers, dual-range anode resistance, and the Lewcos wave-trap, backed up by the famous coil units, "X" coils, "Lewcodensors," and a variety of six-pin coils, so this stand is certainly one to attract keen constructors.

MANUFACTURERS' ACCESSORIES, LTD., 82, Great Eastern Street, E.C.
 Stand No. 201.

A representative collection of the "Mayco" products.

MARCONI COMPANY, LTD., 210, Tottenham Court Road, W.C.
 Stands Nos. 38 and 120.

These stands will contain, for one thing, a representative collection of all the Marconi valves. These, incidentally, are a show in themselves, even on the receiving side, although, of course, the firm is responsible for a great many types that would not be recognised by average listeners!

In addition there is an enormous range of complete receivers, loud speakers, and accessories, representative of the whole range of the firm's activity. This year's display of loud speakers is particularly interesting and, of course, the quality obtainable with the moving-coil models has long been familiar to the more ambitious listener.

(Continued on page 353.)

THE RADIO EXHIBITION

—continued from page 352

There are, however, Marconi speakers suitable for much more slender purses, and as all sorts of components are included in the Marconi range, many at extremely popular prices, the interest in these stands is by no means restricted to those who are prepared to pay a large price in order to get the backing of this famous radio name.

The range of complete receivers on view this year will be particularly varied, and a feature of the stand will be the excellent literature available in which the various Marconi productions are dealt with in detail. So varied are the activities of this firm that the stands cannot be reviewed in detail, but discriminating constructors can be left to browse over the bargains offered.

The popularity of portable sets and also of the all-electric variety is well illustrated by the attention paid to this class of receiver, whilst the long-range capabilities of some of the sets will be a revelation to the fortunate purchaser.

MATCHLESS RADIO CO., LTD., 105, Great Eastern Street, E.C.

Stand No. 246.

Details of the Matchless Radio Co.'s display are not available at the time of writing, but it is understood that this includes fittings and cradles for loud speakers.

L. McMICHAEL, LTD., Wexham Road, Slough. Stand No. 57.

A complete range of the McMichael products will be shown at this stand.

M-L MAGNETO SYNDICATE, LTD., Victoria Works, Coventry. Stand No. 222.

One of the chief attractions here will be a rotary transformer with which you can run an A.C. receiver from a D.C. supply mains.

STAND No. 5

is where you will find

THE WIRELESS CONSTRUCTOR

PAY US A VISIT

MULLARD WIRELESS SERVICE CO., LTD., Mullard House, Charing Cross Road, W.C.2. Stand No. 38.

This stand occupies a large space in a prominent position on the ground floor, and on it will be displayed the whole range of Mullard products. And everybody knows that this includes receiving valves, for both battery and mains operation, rectifier valves and transmitting valves, as well as all sorts of accessories, loud speakers, mains apparatus, etc.

A great many old friends will be here, as well as some new lines which will be on show at this exhibition at Olympia for the first time. In the gallery will be another display featuring the company's popular publication "Radio for the Million."

A special Autumn edition of "Radio for the Million" will be sold on this stand, and this will contain circuits and special articles of interest to set builders. In addition receivers and the latest circuits will be obtainable upon these stands and several novelties are promised.

The Mullard Company has also reserved a large demonstration room in the gallery, and at one end of this will be a raised dais or miniature stage which will serve as a setting for the new "Radio for the Million" receivers and Mullard speakers. The latter will be demonstrated to everybody interested at any time whilst the show is open.

MURPHY RADIO, LTD., Broadwater Road, Welwyn Garden City, Herts. Stand No. 252.

Here will be found the Murphy portable sets in which are incorporated single tuning control ganged circuits, combined with a control that is calibrated in wave-lengths. Compact, in a walnut cabinet, the set has been specially made for simplicity and reliability, desirable features being the battery rack, so that the accumulator is not in contact with the cabinet, a turntable which enables the set to be rotated in any required direction, and complete screening.

NATIONAL ACCUMULATOR CO., LTD., 50, Grosvenor Gardens, S.W.1. Stand No. 39.

Accumulators for all radio purposes and also trickle chargers for use with high-tension accumulators are on show here. Known as the

"Dagenite" series of National accumulators, they are produced by the Hart Accumulator Company and Peto & Radford, Ltd., and these two well-established firms will need no introduction to readers.

Fitted with a tell-tale device which gives an accurate indication as to the state of the charge, these accumulators enable the listener to check the work of the charging station, and also to get a timely warning of the "running down" of the voltage, the advantages of the method being obvious.

The firm also specialises in accumulators made for suitcase models of receiving sets, the electrolyte being in a jelly form, so that it cannot be spilled. An interesting point of the National Accumulator Co.'s service is that every battery is guaranteed for the first six months, it being contended that any fault in a battery will certainly become evident within this period.

NEW LONDON ELECTRON WORKS, LTD., East Ham, London. Stand No. 34.

Most listeners will be familiar with the name of this firm in connection with Electron wire, and in addition they will be showing the usual associated lines, including the famous "Superial" aerial wire.

OLDHAM & SON, LTD., Denton, Manchester. Stand No. 64.

Readers of the WIRELESS CONSTRUCTOR will need no introduction to Oldham accumulators, for this firm has long been familiar to them, and this year's display is likely to still further enhance its reputation.

Always alive to the up-to-date requirements of the constructor, a number of new lines will be on view, as well as the old friends.

No matter what your battery requirements may be, whether you are situated right away in the country, far from charging facilities, or so favourably placed in town that H.T. accumulators are easy and cheap, the Oldham experts will be pleased to advise you as to which of their many lines will be most suitable for your own particular purpose.

ORMOND ENGINEERING CO., LTD., Rosebery Avenue, E.C.2. Stand No. 75.

Dozens of old favourites will be found on these stands, including such popular lines as the famous Ormond condensers and loud speakers, accessories such as jacks, plugs, etc., the Ormond radio-gramophone, and an attractive line of Ormond sets, including the "Suitcase Four" and "Cabinet Five."

In addition there is a very big selection of completely new lines, including a new four-valve set (available in either oak or mahogany), a new cabinet loud speaker, a new chassis and cone, a selectivity unit, and a wide variety of condensers, both fixed and variable.

This stand will be packed with variety and value.

OSRAM VALVES, Magnet House, Kingsway, W.C. Stand No. 46.

So famous are the various types of Osram valves that not only will the listener need no introduction to them, but he will probably make his way automatically to see the latest types at this stand.

There is, of course, the usual range of two-, four- and six-volt types for battery operation, and in addition a large number of mains-operated valves and all sorts of special types, including rectifiers which are capable of delivering heavy currents.

These are backed up by various special receiving valves, such as S.G.'s, pentodes, various super-power valves, and, of course, the latest advances in valve technique as exemplified by the different types of mains valves, both directly and indirectly heated.

All the valves are fully backed up by pamphlets describing the various technical points of excellence, so that listeners interested will be able not only to see the valves, but to obtain the necessary details for future reference.

PANDONA, LTD., 184, Aston Road, Birmingham. Stand No. 218.

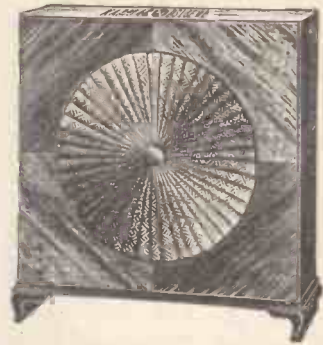
Various classes of valve receivers, portable radio-gramophone, and ordinary radio-gram sets will be featured here.

E. PAROUSSI, 10, Featherstone Buildings, W.C.1. Stand No. 227.

All keen constructors will be interested in this exhibit for the firm has an enviable reputation for making components, etc., of the right kind, and at the right price.

Metal screens and valve holders are two well-known specialities, and here also will be found in great profusion the coils, chokes, etc., bearing the "Par Ex" sign, and intended for radio reception *par excellence*.

(Continued on page 354.)



LATEST & GREATEST IN CONE SPEAKERS!

The new LOEWE RADIO model EB 85. Radio's greatest advance in Cone Speaker manufacture. Price 42/- complete. Unit only, 12/-. Unit and Chassis, 16/6. Full details from

THE LOEWE RADIO CO., LTD., 4, FOUNTAYNE ROAD, TOTTENHAM, N.15. 'Phone: Tottenham 3911/2.



The best Eliminators

The best Mains Sets

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HYDRA CONDENSERS

LOUIS HOLZMAN, LTD.,

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Telephone - Museum 2641

"BE UP TO DATE"

—MAKE A NEW SET and get the very best from Wireless. Complete kits of parts for any of the many excellent new sets—

EASY TERMS FOR EVERYTHING WIRELESS

DEMONSTRATIONS AT OUR SHOWROOMS.

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108
GALLERY

GRAHAM FARISH

PROVED
COMPONENTS

THE RADIO EXHIBITION

—continued from page 353

PARTRIDGE & MEE, 74, New Oxford Street,
London, W.1.
Stand No. 248.

Mains apparatus of various types will be featured here.

PERFECTAVOX, LTD., Yeaton, Nr. Leeds.
Stand No. 241.

This year the firm is introducing a new and cheaper model radio-gramophone, fitted with an induction-type electric motor, and a new type B.T.H. pick-up, and moving-coil loud speaker.

PERTRIX, LTD., 233, Shaftesbury Avenue,
London, W.C.
Stand No. 243.

Here will be on view a very attractive range of batteries for all classes of radio work.

No matter whether you are principally interested in accumulators for supplying low tension, or dry batteries for high tension, you will find your requirements are catered for by the Pertrix firm, the increasing popularity of the famous "no-sal-ammoniac" H.T. and G.B. dry batteries being a good index of the regard in which the different lines are held by the public.

PETO SCOTT CO., LTD., 77, City Road, London,
E.C.
Stand No. 110.

Besides manufacturing a number of sets, etc., of its own, this firm handles and supplies a variety of lines by other manufacturers, so a really comprehensive display is assured here.

Special attention has been paid to the demand for radio-gram receivers, of which a very large selection is available. Another speciality of the firm which is much appreciated by constructors is the series of kits of parts from which famous sets can be made at home.

Yet another attractive aspect of these stands is the fact that the Peto Scott is a great believer in the pay-out-of-income idea, very convenient hire purchase terms being arranged to suit the customer.

P.R. PRODUCTS, P.R. House, Newgate Street,
E.C.
Stand No. 224.

The famous P.R. mast is one of the products in question, and, of course, there are the P.R. valves, which will need no introduction to readers, having long been famous for their many excellencies.

Another speciality on this stand will be the cone loud-speaker assembly which has already found enormous favour in the eyes of constructors, and is certainly well worth investigation by readers contemplating the task of constructing their own. This is a not-to-be-missed exhibit.

PYE RADIO, LTD., Paris House, Oxford Circus
W.1.
Stands Nos. 31 & 32.

A very wide field is covered by this firm, including both low- and high-tension batteries; battery chargers, valve holders, resistances of various types, switches, output transformers, chokes and L.F. transformers, inductances, and several types of condensers.

This attractive display is backed up by loud speaker, and the famous Pye sets, the many excellencies of which have made them almost a household word.

QUEST MFG. CO., 41, Newcomen Street, London,
S.E.1.
Stand No. 238.

More familiar to the public under the name of "Ready Radio," this firm is always ready to consider the needs of the set-builder, and to provide exactly what he wants in the way of components, kits of parts, etc. Willing to trade for either cash or on easy terms, and with an eye particularly to those who want a good set, but can't pay down for everything at once, the policy of the firm is elastic enough to meet a wide variety of conditions.

The set you fancy can be bought in kit form, with or without cabinet, or less valves if you already have them, etc., and as this practical service is backed up by a wide range of handy components and accessories, there is no doubt that this stand will again this year have a clamorous crowd surrounding it.

"RADIO FOR THE MILLION"

Stand No. 101.

"Radio for the Million" is the name of the publication which has done much in the past to popularise the various Mullard products, and a glance at this stand will convince the uninitiated

novice that radio really is for the million. Everything that possibly can be done in the way of clear explanation and circuit advice, etc., is aimed at in this ambitious scheme.

Its enormous success in the past speaks volumes for the care with which the various items have been prepared, and for the design of the sets themselves, and of the various components incorporated in them, and recommended for use in the circuits. Visitors to the last exhibition and to previous shows will also recollect that this was one of the star "give-away" stands, from which an enormous quantity of literature was distributed to visitors from all over the country.

RADIO INSTRUMENTS, LTD., Purley Way,
Croydon.

Stand No. 61.

Probably Radio Instruments, Ltd., themselves will be somewhat at a loss to say which is the main attraction at these two stands, for the firm has a number of outstanding lines this year.

The R.I. Madrigal Mains Four, for instance. This set has triple gang tuning of the H.F. stages, each condenser being fitted with a "trimmer" permanently set at the works before despatch. A compensating knob for aerial, when used, actuates a small variable condenser in parallel with the first ganged condenser; astatic coils and separately screened stages being used.

There is leaky-grid detector with reaction, arranged so that the capacity change effect on tuning is minimised by a condenser across a portion of the reaction coupling. Volume control for radio is carried out by means of adjustment of screen voltage, the same potentiometer being used for volume control on gramophone, by means of a switch-over.

External aerial and earth may be used if desired, or alternately the loud-speaker leads may be employed as aerial.

The other R.I. lines will all be displayed, prominent among them being the Hypermite and Hypermu L.F. transformers, and the Hypercore L.F. choke.

This latter is the first nickel-iron L.F. choke, and has an inductance of 30 henries, though it weighs only 18 ozs. Moreover, the high inductance value is well maintained even under heavy current conditions, so the purity output enthusiast will find the R.I. stand difficult to leave.

"The Wireless Constructor"

will be at

STAND No. 5

RADIO SOCIETY OF GREAT BRITAIN, 53,
Victoria Street, S.W.1.

Stand No. 229.

As in former years, the senior amateur organisation of affiliated radio clubs, etc., will be strongly represented, and will offer a warm welcome to all enthusiasts, particularly those of the transmitting variety and the short-wave fans.

REDFERN'S RUBBER WORKS, Dawson Street,
Hyde, Cheshire.
Stand No. 204.

Radio panels in black and mahogany, of the well-known "Ebonart" and "Bulwark" varieties, will be the star turns here, backed up by a very representative and pleasing array of the other Redfern specialities.

Here, too, will be low-loss coil formers, transformers, ebonite sheet, and also lead-in tubes, battery boxes, etc.

RED STAR RADIO, LTD., Aston Road, Bir-
mingham,
Stand No. 109.

A wide variety of batteries for different wireless needs is one feature of this display, and in addition a range of inexpensive receivers is sure to attract considerable attention.

Both two-valvers and three-valvers are represented, and visitors on the look-out for low-priced sets should certainly pay a call at stand 109.

REES-MACE MANUFACTURING CO., LTD.,
39a Welbeck Street, W.1.
Stand No. 117.

This firm specialises in all kinds of portable receivers, and it is understood that this year's display will again include a wide variety.

REGENT RADIO SUPPLY CO., 21, Bartlett's
Buildings, E.C.4.
Stand No. 51.

Amidst the many attractions here probably none will create greater interest than the "Regentone" combined mains units.

(Continued on page 355.)

THE RADIO EXHIBITION

—continued from page 354

The trouble with most small sets is that the high-tension battery runs down, and the L.T. battery requires re-charging far too often for convenience. But both these nuisances are overcome by a combined mains unit which charges the L.T. battery when the set is not in use, and supplies the H.T. for it whenever it is. Easily plugged into the electric light system, and suitable for popular 2-, 3-, and 4-valve sets, there is sure to be a big demand for this line and for the free booklet explaining it.

SELECTORS, LTD., 206, Bedford Avenue, Trading Estate, Slough, Bucks.
Stand No. 114.

A full range of portable and all-electric receivers will be on show here, and will include a new model "Attaché 22," which is entirely self-contained, provision being made for external aerial and earth connections where desired. Other attractive lines are the "Selector 32," which incorporates a jack by means of which it is possible for gramophone music to be reproduced through the cone loud speaker in the set, and the Selector-Vox. The latter operates off A.C. mains, and is a completely self-contained radio-gramophone receiver.

SELFRIDGE & CO., LTD., Oxford Street, W.1.
Stand No. 242.

The great Oxford Street store has long been keenly interested in radio products, and at this stand will be seen the various popular lines which are handled by this firm, both complete sets and loud speakers, etc., being available in wide variety.

SIEMENS BROS., Caxton House, Westminster, S.W.
Stand No. 70.

This stand is mainly devoted to batteries, and an amazing array there is. Here they are for all radio purposes, and the name and reputation of the firm is a complete guarantee for the most exacting.

Of particular interest is the Full-o-Power radio battery, which, although it has not been on the market for long, has already made a name for itself. As a matter of fact, we understand that a complete new range of batteries of this type will be seen at these stands, so that this point alone would ensure that a visit is well worth while.

SIX-SIXTY RADIO CO., LTD., 17-18, Rathbone Place, W.1.
Stand No. 58.

Every kind of receiving valve you can possibly require can be found in the Six-Sixty range, and will be displayed here. Including as it does the ordinary two-, four- and six-volt receiving valves, as well as a large number of special types, and S.G.'s, R.C.'s, Pentodes, for all sorts and conditions of long-range reception and powerful radio reproduction, this stand is sure to attract enthusiasts with a knowledge of what really goes on within the vacuum.

Apart from the valves—which are an exhibition in themselves—there are many Six-Sixty lines of great interest, one particularly useful little gadget being the new valve adaptor, which converts your set for A.C. valves.

All you have to do is to plug-in the Six-Sixty 5/4-pin valve adaptor, connect up the flex lead to the four-volt A.C. of the mains drive, and your set is converted from D.C. to A.C. Similarly the 4/5-pin adaptor will convert it from A.C. to D.C., at the modest costs of 1s. 6d. or 2s. each for these ingenious devices.

Another Six-Sixty product which is sure to create wide interest is the new cone speaker assembly, which is now being standardised by well-known set manufacturers. It comprises a unit, a cone diaphragm, and instructions for making your own loud speaker, the whole business being within the scope of the most inexpert constructor. This is a singularly attractive display.

THE STANDARD BATTERY CO., LTD., 154, Shaftesbury Avenue, W.C.
Stand No. 42.

A very strong range of components, etc., is on this stand, including the famous wet batteries, and various meters, testing instruments, loud speakers (both complete and in chassis and unit form), Wates Star pick-ups and pick-up arms, and a new mains receiver.

This is of the universal A.C. type, using indirectly-heated valves and fitted with plugs for gramophone pick-up. Suitable for almost any alternating current supply, it is sure to create great attention.

There is also a new Wates pedestal cabinet loud speaker, and other lines, both new and old, which will merit close attention.

SWIFT, LEVICK & SONS, LTD., Clarence Steel Works, Sheffield.
Stand No. 129.

Although the name of these stand holders will not be familiar to most London listeners, they are well known in Sheffield as a prominent steel firm specialising in magnets of all kinds, and with a particular interest in radio requirements, such as moving-coil loud speakers, etc. It is understood that this year particular attention is being paid to armatures and the special coils for field magnets for loud speakers.

TANNOY PRODUCTS, 1-7, Dalton Street, West Norwood, S.E.
Stand No. 111.

The slogan of this firm is: "No matter what kind of set, work it from the mains." And a glance round this stand will convince even the most sceptical that everything has been done to enable this advice to be carried out in practice, with a minimum of trouble and expense.

One of the most interesting features on the stand is the new Tannoy Portable Unit, which can be fitted into the H.T. compartment of a portable set, and which plugs into the mains and makes H.T.B. renewal a thing of the past. It incorporates a metal rectifier (Westinghouse), and has three H.T. tappings (one variable), the price being £3 15s. complete.

TELEGRAPH CONDENSER CO., LTD., Wales Farm Road, North Acton, W.3.
Stand No. 145.

The famous T.C.C. range of condensers, both mica and paper dielectric, for radio transmission and reception purposes, will be showing here. These will include high-voltage smoothing and high-capacity condensers, and, of course, the usual range at special prices for set manufacturers.

One of the most important new features in the display here will be the new non-inductive type condenser, with capacities between .005 to 2 mfd. In addition, there are several new types of electrolytic condensers in three working voltages, namely, 12, 40 and 100.

By connecting two of the latter in series it is possible to work on 200-volt D.C. mains and to obtain a capacity of, say, 500 mfd. (two 80's in series), a development which is of great importance to the trade.

TELSEN ELECTRIC CO., LTD., Miller Street, Birmingham.
Stand No. 69.

Prominent among the lines here will be the Radiogrand L.F. transformer, made in 3 to 1, 5 to 1, and 7 to 1 ratios. Here, too, will be found a Telsen L.F. transformer in 2 to 1 and in 5 to 1 ratios, and a variety of valve holders, H.F. chokes, condensers, grid leaks and fixed condensers in comprehensive ranges.

The grid leaks, for instance, are obtainable in values from 1 to 7 megohms, and the fixed condensers from .0001 to .001. A very attractive display.

TONEX CO., Walker Street, Blackpool.
Stand No. 233.

Coils of all kinds will be found here, the Tonex Co. being specialists in tuning coils, H.F. chokes, tuning units, etc.

Included in the latter is the "Tonatuna," which is a compact dual-range unit for single-hole mounting.

TRELLEBORG EBONITE CO., LTD., Union Place, Well Street, W.1.
Stand No. 228.

Radio and electrical component parts and accessories turned and machined in Trelleborg ebonite are displayed here. There is a wide variety shown, including slotted panels of all sorts, drum dials, discs, bobbins and formers, switch box and pillars, coil formers and a wide range of insulators.

TURNER & COMPANY, 54, Station Road, New Southgate, N.11.
Stand No. 9.

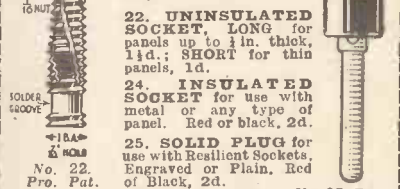
This firm will be familiar to readers in connection with the Tunewell loud-speaker units and Tunewell coils. There is a wide variety of the former and quite an array of the latter, suitable for all purposes and circuits.

In addition there is a goodly range of accessories, such as H.F. chokes, coil formers and bases,

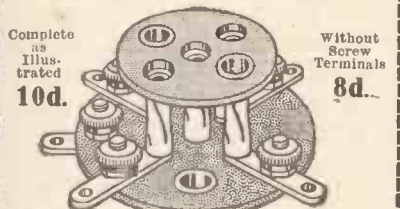
(Continued on page 356.)

CLIX
Preserver of Contact

The Clix Method of Plug and Socket contact in which the sockets are resilient and helically slotted, provides the only means of obtaining perfect contact with a Solid Plug. May also be used with Resilient Plugs.



22. UNINSULATED SOCKET, LONG for panels up to 1/4 in. thick, 1 1/4; SHORT for thin panels, 1d.
24. INSULATED SOCKET for use with metal or any type of panel. Red or Black, 2d.
25. SOLID PLUG for use with Resilient Sockets. Engraved or Plain. Red of Black, 2d.
No. 22. Pro. Pat. No. 25. Pat.



27. CLIX VALVE HOLDER. (4/5 Pin Contact). Type "B" for Baseboard mounting.
Complete as illustrated 10d. Without Screw Terminals 8d.

No. 27. Pro. Pat. Reg. Design. Gives perfect contact with SOLID or any other type of valve pin. Easy insertion and withdrawal of valve. Usual H.F. losses entirely eliminated. Resilient Sockets air-dielectrically insulated and self-aligning. Impossible to blow valves. Illustrated Leaflets Free.
STAND No. G.131 Olympia
LECTRO LINX, LTD.,
254, Vauxhall Bridge Road, S.W.1.

To House Your SET OR RADIO-GRAM BUILT LIKE A PIANO. NOTE "PATENT" BAFFLE CHAMBER.

De Luxe Radio Furniture. The outcome of seven years' experiments followed by exceptional demand—leading Experts—Famous Engineers—3,000 users. Direct from Craftsman's bench to your home. You may have ON APPROVAL FREE TEST, and return at our expense if you wish to part with it. Prices run from £5 5 0 (or £10 to £15 15 0 for Exclusive models), Cash or Easy Payments. Photographs and full particulars FREE.
PICKETT'S, Radio Furniture Makers (W. Con.), Albion Road, Boxleyneath, Kent.

IF YOU REQUIRE FIRST-CLASS BECOL

EBONITE PANELS & FORMERS. Look for this TRADE MARK. The Hall Mark of Quality. Sole Manufacturers; THE BRITISH EBONITE CO., LTD., HANWELL, LONDON, W.7.

THE PICTURE PAPER WITH THE MOST NEWS —SUNDAY GRAPHIC—

THE RADIO EXHIBITION

—continued from page 355

variable condensers, and the Tunewell transformer and cut-out. There is also a three-valve battery-operated set, to retail at £3 19s. 6d.

ULTRA ELECTRIC LTD., 661, Harrow Road, N.W.10.
Stand No. 77.

This firm is known everywhere for the Ultra Air-Chrome loud speakers, which have attained a very enviable reputation.

It will be remembered that the original "Ultras" had a great vogue with the introduction of linen-diaphragm loud speakers into this country, and since then the models have been improved with the result that the improvement in reproduction as compared with certain old-fashioned loud speakers is more apparent than ever.

A number of models will be on show, and as the later lines have already created something of a stir amongst the enthusiasts who have heard them, there is sure to be a big demand from the discriminating for further details.

C. A. VANDERVELL & CO., LTD., Warple Way, Acton, W.3.
Stand No. 7.

Specialists in radio accumulators, this firm will be showing some particularly attractive types resulting from the firm's thirty-seven years of manufacturing experience. Of special interest is the 45-amp. mass plate type, which is introduced for the first time at this exhibition.

VARLEY (OLIVER PELL CONTROL) CO., LTD., 103, Kingsway, W.C.2.
Stand No. 105.

The Varley organisation is so well known that many constructors in search of L.F. transformers, resistances, or other components, the manufacture of which is associated in their minds with this firm, will make straight for the stand to see what "Varleys" are doing this year.

They will find plenty to interest them, for the firm has a number of lines specially to tempt constructors, as well as an attractive variety of complete receivers, etc., that the non-technical will appreciate.

Of special interest is the part of the stand devoted to chokes and transformers, the latter including the Ni-cores, as well as push-pull, pentode, heavy-duty and various output types.

The literature distributed with the different lines is very informative.

WATMEL WIRELESS CO., LTD., Imperial Works, High Street, Edgware.
Stand No. 12.

This firm this year is bringing out a new three-valve battery-operated receiver, and a three-valve all-mains set, which will be on show, but particulars of which are not yet available for publication.

There is, however, plenty of interest on this stand, and constructors will be particularly interested in the new Universal two-wave tuner, for use on medium waves, 200-600 metres, and long waves, 1,000 to 2,000. It is controlled by a two-point switch.

Retailing at 6s., there is the Watmel binocular

H.F. choke, with a winding of inverted-V formation resulting in a compact component which can be fitted comfortably in any receiver. Listeners who suffer from the interference problem will be interested in the Watmel wave-trap which retails at 8s. 6d.

Finally, there is the Watmel cone chassis, which is sure to be appreciated by the seekers after realistic reproduction.

WESTINGHOUSE BRAKE AND SAXBY SIGNAL CO., LTD., 82, York Road, King's Cross, N.
Stand No. 239.

Here will be found an abundance of the Westinghouse dry rectifiers, in which no chemicals are used, giving efficient rectification without any of the mess or trouble formerly associated with this operation. For L.T. charging and for high-tension work a very wide range of these is available, and these rectifiers have won an extraordinarily good name for their efficiency in obtaining from A.C. supply mains both high- and low-tension current for radio purposes.

The famous "All-Metal Way" booklet is obtainable at this stand, and practical information about the application of the Westinghouse devices can be obtained, together with methods for incorporating them for various purposes. The long life of these metal rectifiers is already proverbial, and in addition to the established models certain new units will probably be on show.

**YOU WILL BE WELCOME
AT
STAND No. 5.
WHERE YOU WILL FIND THE
"Wireless Constructor"**

WHITELEY, BONEHAM & CO., LTD., Nottingham Road, Mansfield, Notts.
Stand No. 66.

A new permanent cobalt-steel magnet moving-coil loud speaker is one of the big attractions here. The retail price for the assembly in chassis form, fitted with 14-in. baffle, being £6 6s. In addition, there is the great variety of W.B. products to be expected from this firm, which has been unusually successful in the past with its valve holders, of which an extensive range is marketed to suit different requirements. Universal S.G. valve holders, and the four or five-pin valve holder (retailing at 1s. 3d. each) are amongst this year's attractions, and in addition there is a four-pole balanced-armature L.S. unit, and a range of attractive cone loud speakers, sure to prove very tempting to purchasers.

WILKINS AND WRIGHT, LTD., Utility Works, Holyhead Road, Birmingham.
Stand No. 60.

In addition to the wide range already associated with this famous firm, a large number of new lines will be introduced. Included in these is a new

anti-capacity switch, the contacts of which are finished in silver.

The action is lever-operated, and the switch is of the one-hole-mounting type, designed on anti-capacity lines, and retailing at a popular price. Another interesting new line is the drum dial which makes for easy tuning, and gives a very open scale with a reduction of two to one.

Left- or right-hand dials can be supplied together with panel plates, and there is also an attractive range of condensers. This includes the Mite log condensers, the Mite thumb-control condenser, and the Mite log triple balancing condenser, which is similar to last year's model, but is an improvement on it.

There is also a new flash-lamp fitting for illuminating drum dials and is sure to find a ready sale at the popular price of 9d.

WINGROVE AND ROGERS, LTD., 188, Strand, W.C.2.
Stand No. 118.

The main feature at this stand will be the Polar variable condensers, including the famous Ideal and the Ideal drum control, modifications of this, the Volcon condensers, and the differential condenser (this latter and certain others include types new this month).

In addition, a special Polar short-wave condenser and the Polar Universal are now being placed on the market, these being of special interest to WIRELESS CONSTRUCTOR readers. An entirely new line to be marketed is a Polar ganged condenser, which is particularly interesting in view of the existing popularity of single-control condensers on the other side of the Atlantic.

The Polar-drum drive and the Polar disc-drive are other attractive lines, while chokes, short-wave chokes, fixed potentiometers, and slow-motion dials, etc., will ensure that the visitor to this stand has plenty to think about.

WRIGHT AND WEAIRE, LTD., 740, High Rd., Tottenham.
Stand No. 250.

Everybody knows the Wearite components, and nearly everybody who goes to the exhibition will find time to inspect this stand, at which a great variety of well-thought-out components will be on show.

Those who make their own sets will appreciate the fact that Wright and Weaire make a speciality of coils as described in the WIRELESS CONSTRUCTOR, "P.W." and "M.W.," and full details of all sorts and conditions of special coils for special sets are available. Practically every other kind of component seems to be in evidence as well.

Differential and other condensers, potentiometers and filament resistances are in great variety, whilst the many types of switches are quite bewildering. Back up this comprehensive list with a wide range of valve holders, coil units, coil-stands, sockets, chokes (both high- and low-frequency), tuners, metal-work screens, power transformers, and so forth, and you have a good idea of the wonderfully wide range of good stuff offered by this firm.

YOUNG ACCUMULATOR COMPANY (1929), Burlington Works, Arterial Road, New Malden, Surrey.
Stand No. 225.

All types of radio batteries will be on show here, and in addition the firm is exhibiting a rectifier for charging high-tension batteries from the mains. A particularly attractive and well-prepared booklet on the Young accumulator is available.

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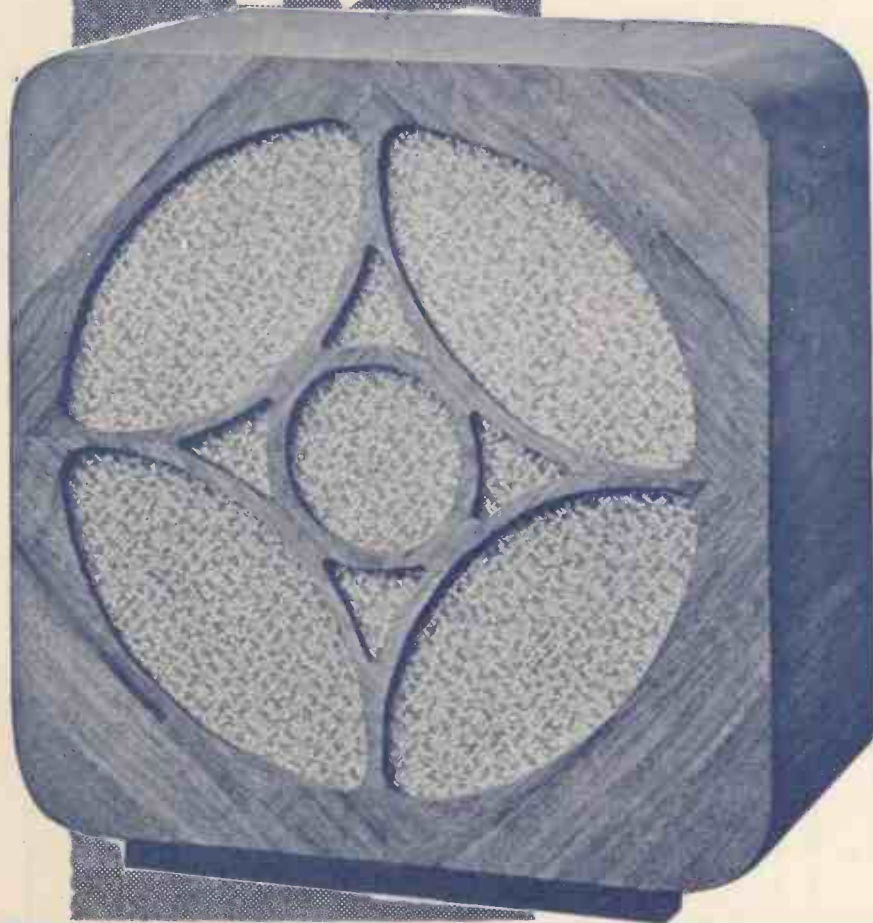
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