

# ALL ABOUT THE PARALLEL-FEED IN PRACTICE

# Popular Wireless

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No. 543. Vol. XXII.

INCORPORATING "WIRELESS"

October 29th, 1932.

*The "P.W."*  
**RADIOGRAM**  
FOR BATTERY USERS

**SHORT WAVES**  
on the **"APEX"**

ALSO THIS WEEK:  
LOUDSPEAKER TONE-COLOUR  
EDINBURGH'S EXHIBITION  
BEHIND THE GRAMOPHONE RECORD  
etc., etc., etc.

**SUPER  
SCREENED  
GRID  
SELECTIVITY**

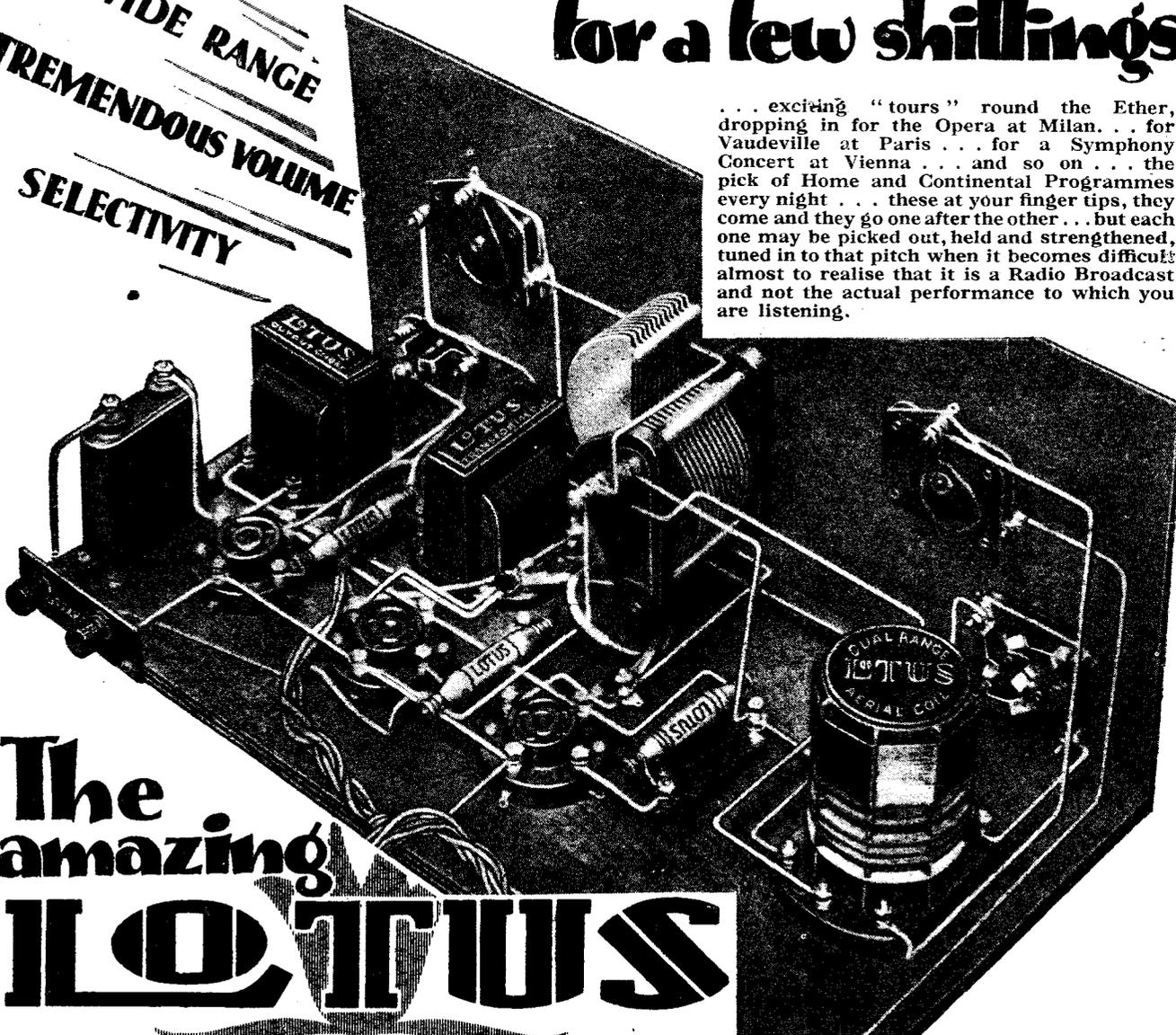
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**ALL-WORLD  
ALL-WAVE  
RADIO. See  
pages 402,  
403, 426, 427**

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# 39/6

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Please send full details of the LOTUS "LANDMARK 3" KIT SET and GUARANTEED COMPONENTS. Send also full-size Wiring Chart, for which I enclose 6d. (Strike out if not required.)

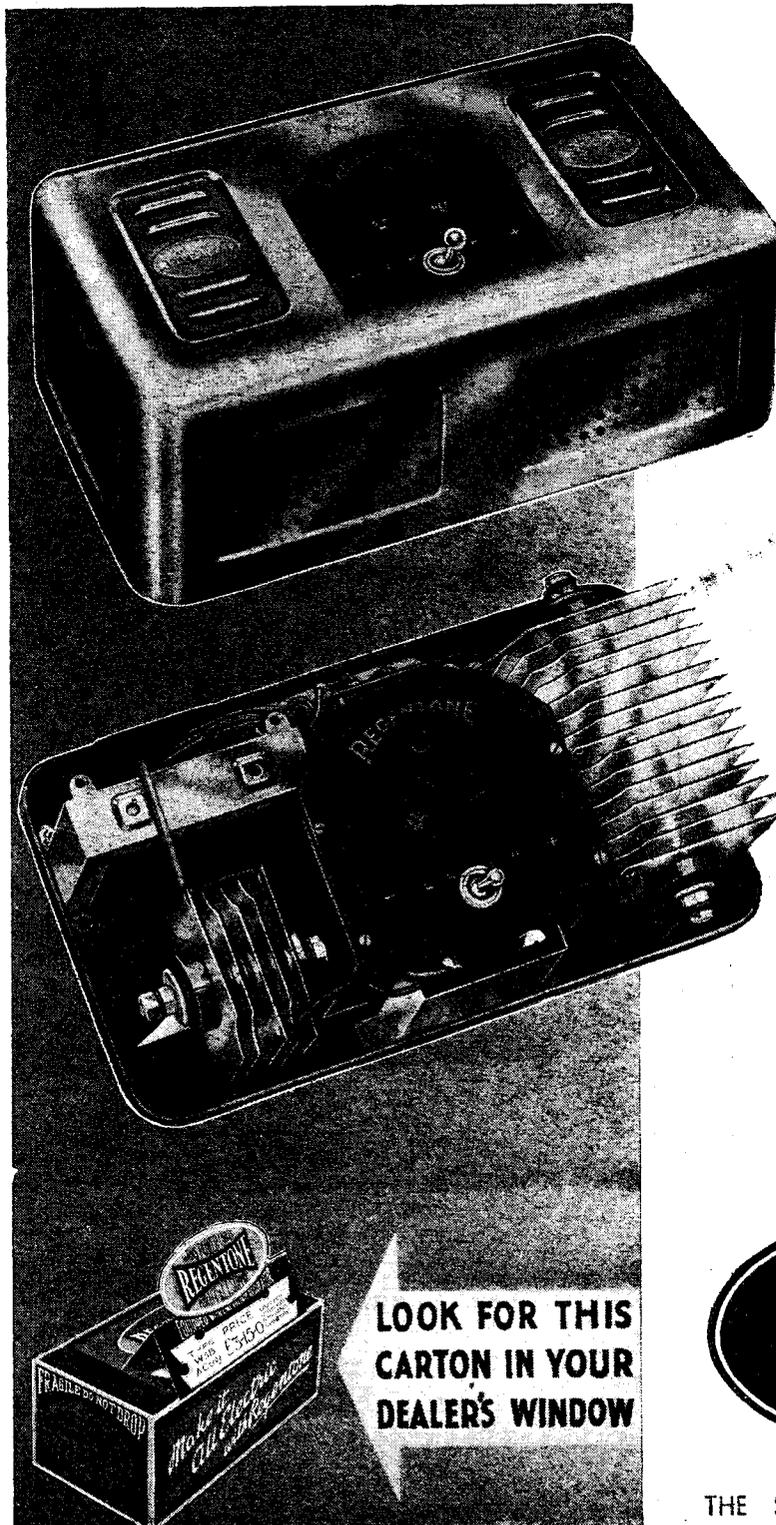
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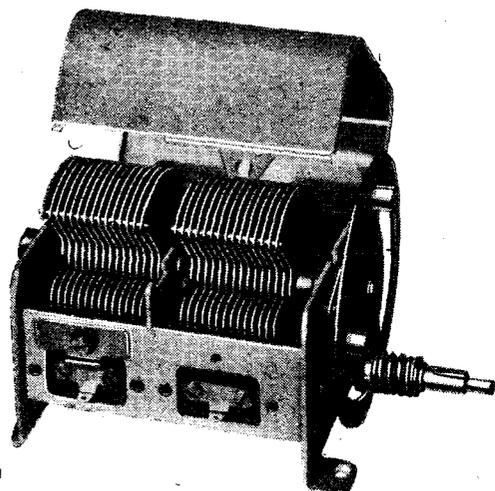
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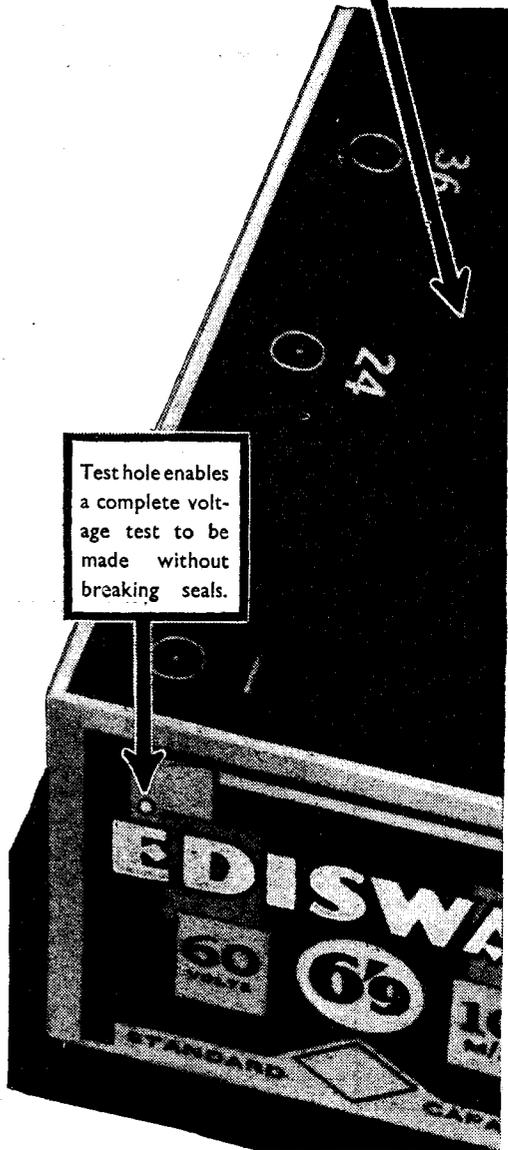
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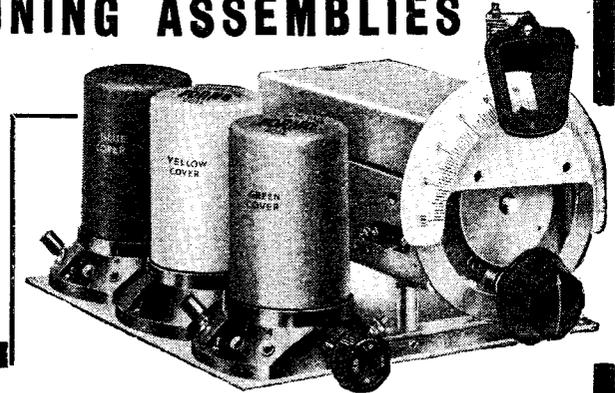
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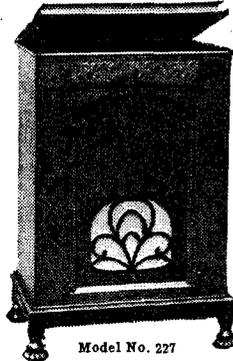
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- "THE TRUMPET OF THE EMPEROR" By DRACOT M. DELL
- "TERROR ISLAND" By BARTON FURSE
- "GALLEONS O' DEATH" By Rear-Admiral E. R. G. R. EVANS, C.B., D.S.O., R.N.

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Author's Kit of specified components including **ready drilled panel** and terminal mounts, but less valves and cabinet. **CASH or C.O.D. Carriage Paid.** Or 12 monthly payments of 7/3. Carriage Paid. One Set of Valves **£1/12/3** One Specified Cabinet 15/-

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As Kit A but WITH VALVES, less cabinet CASH or C.O.D. Carriage Paid **£5-11-3** Or 12 monthly payments of 10/3 Carriage Paid.

## "P.W." RADIOGRAM

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Set of 3 Valves as specified	£1 12 3
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1 B.T.H. Minor Pick-up and Tone Arm	£1 5 0
1 Garrard No. 30 Double Spring Motor	£1 10 0
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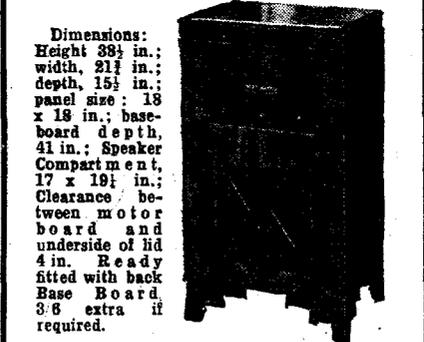
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## 1933 WALNUT ADAPTGRAM

Constructed in Walnut with inlaid Walnut Veneers. Trade Mark



Dimensions: Height 38 1/2 in.; width 21 1/2 in.; depth, 15 1/2 in.; panel size: 18 x 19 in.; base-board depth, 4 1/2 in.; Speaker Compartment, 17 x 19 1/2 in.; Clearance between motor board and underside of lid 4 in. Ready fitted with back Base Board 3/6 extra if required.

● **MODEL A** Convert your existing set to a Radiogram. Comes to you with vignetted front as illustrated and motor board, ready to take your own Set, Gramophone Motor and Pick-up. No skill or expensive tools are required to transform your Radio into a combination instrument, presenting the professionally finished appearance of the most luxurious Radio Gramophone money can buy. 12 monthly payments of 5/9. Carriage and Packing 2/6 extra, England and Wales. **63/-**

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PM22A

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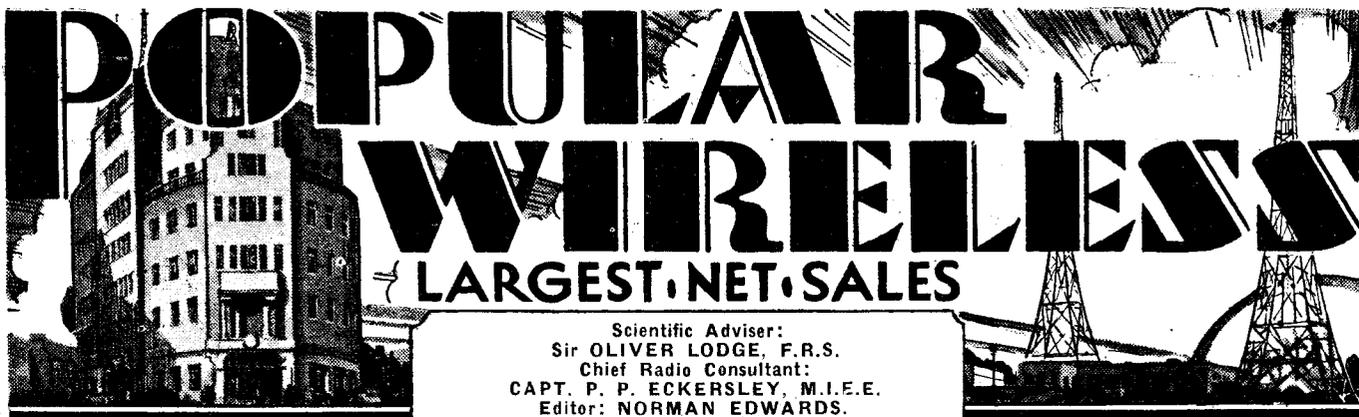
**Price 17/6**

**MADE IN ENGLAND**

*The valves specified for the "P.W." Radiogram described in this issue are:—*

*Mullard P.M.12. Mullard P.M.1HL.  
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**UP THE GARDEN  
 BANG CAME REACTION!  
 CHORUS OF HYENAS  
 "BLINKING IRISHMEN"**

## RADIO NOTES & NEWS

**MONG JEW!  
 IN PLAIN VANS  
 SLUM AND WOOLSACK  
 A MAN'S LETTER**

### Spotted Again.

WHENEVER I indulge in a jocular leg-pull I invariably get a number of letters from literal-minded folk (like the farmers who have written to say that they are neither ruined nor well-fed) who cannot recognise a jape even when they see it in "Notes and News" over my pseudonym. But I notice that there is a determined attempt, not a concerted one, to "lead me up the garden," and I take it in good part.

If the letter from W. D. (Wallsend), who tells of his troubles with his "Nevada Foursome," which his ma bought from a grocer for 33 shillings, is not a leg-pull—it looks darned like one. Your luck's out, W. D. I'm not an old bird, but I'm a noticing child for my age.

### Wireless Resting on Its Oars?

PROF. A. M. LOW, whose vigorous mentality none admires more than "Ariel," has committed himself to the following statement: "Wireless has reached a period when sensational inventions and striking improvements cannot be expected immediately."

I have the temerity to suggest that such a dictum is very rash and not in accord with experience. We thought that the diode was a fine substitute for the crystal detector, and then—bang came the third electrode and revolutionised reception. Bang came reaction! Then bang came superhet. Bang came pentodes, and so on.

My view is that there is plenty of room—and the time is ripe—for a "bang" in loud-speaker development and in microphones.

### News of an Old Friend.

AN engineer from 7 L O (Nairobi) looked in on me to-day and told me lots of interesting things about 7 L O, that station which is so popular amongst long-distance fans. He had a few bad words to say about locusts, too!

Well, consider the difficulties of colonial radio. Nairobi has one studio, and it accommodates four people—standing. It has two chairs, one being purely ornamental

and liable to be removed if the studio is crowded—with four people, as aforesaid.

### Groans from the Packing Case.

WHEN 7 L O is able to collect a troupe of performers the "mike" is placed at the window of the studio and the troupe performs outside. A lorry with tarpaulin cover is provided for wet weather!

For murders, etc., in cellars, a packing-case is inverted, resting on the edges of two tables. The actors have to sit on the floor,

### ROBINSON CRUSOE'S SET!



This 72-year-old hermit lives on Duck Island, Co. Antrim, and exists by fishing and shooting birds. His only entertainment is his wireless set.

with their heads and shoulders in the packing-case, and by talking to opposite corners give the desired subterranean effects.

Dearie me! How Writtle-like! Such are the hardships of colonial life. My friend is much more worried, however, by hyenas who search his dust-bin at night—with full choral effects.

### "Out of the Deep."

DE PROFUNDIS! Surely one of the most fascinating broadcasts ever offered to listeners was that given by Dr. W. Beebe, who descended in a steel ball to a

depth of 2,200 ft. into the sea off the coast of Bermuda.

The sphere was fitted with portholes of quartz, through which, with the aid of a searchlight, the Doctor was able to see life-forms at that depth.

Connected to the surface by line telephone, his commentary was carried to the radio telephone station of Imperial and International Communications, Ltd., who made radio-telephonic connection with New York, from whence the commentary was broadcast over America.

Wouldn't it be fine if the B.B.C. would give us a story by a diver on the bed of the English Channel?

### Radio and the "Slops."

I DO not need to comment on the development of radio in connection with police work here, because you all read the papers.

But I may say that in the U.S.A. radio police alarms have proved so effective that 200 green lights, by which "cops" were signalled from their stations in New York, have been discontinued.

By the way, these green lights were known as "blinking Irishmen." How Irishmen in America have come to be the backbone of a service devoted to the maintenance of law and order is a puzzle which I give up without effort!

### America's Latest Lark.

AND here I may quote the words of my friendly enemy, W. Werner, of San Diego (Cal.), namely, "The latest fad here is listening to the various police radio stations. Operated by the police departments of the various cities in connection with prowl cars, the broadcasts are carried on near 175 and 125 metres."

Drunks, chicken-stealers, fights, etc.! People jump into their "oddomobiles" and dash to the location, interfering with the police on their lawful occasions. *Quelle* country! Mong jew! (As the French say.)

(Continued on next page.)

# NEWS—VIEWS—AND INTERVIEWS (continued)

## The New "Pirate" Hunt.

ONE cannot but wish the Post Office a good haul as a result of its latest "pirate" drive, "with new and improved machinery," but I think that they overdo the mystery business with their vans. The layman is not nowadays so ignorant of radio that he is easily deluded into believing that there is some difference between the re-radiation from an aerial attached to a licensed set and that from an unlicensed one.

However, if the moral effect of the P.O. plain vans sends up the B.B.C.'s receipts, it's welcome.

## A Sound Notion.

THIS is a simple tale. The Liverpool Housing Committee, in their blindness, imposed a charge of a bob per annum on people who put up poles for aerials. Said people were very sticky



with said bobs—quite rightly, sez me! The collectors of bobs couldn't function; collect as hard as they might there were precious few bobs in the net. So the Liverpool Housing Committee, being

logical, said, in effect: "We cannot collect these bobs, so there's no point in having a bob charge. Let's abolish it." I am going to recommend their decision to the consideration of the Commissioners of Income Tax!

## The Penny-Whistlers.

WHEN R. L. Stevenson meditated on music and alleged that, "The young of the penny-whistler is occult from observation," he approached a mystery which was not to be penetrated until thirty-eight years after his death. A South Wales man asks, "Why don't 'oscillators' buy a tin whistle to amuse themselves?" Here is the clue to R. L. S.'s puzzle. The oscillator is the penny-whistler in the incubation stage. I suppose that, nowadays, as an adult, he figures as the loudspeaker fiend.

## Hint to the B.B.C.

VERY humbly I suggest that the B.B.C. would score a success if it could arrange to broadcast a commentary by Dr. Piccard when he next goes up in a



balloon to visit the Heaviside Layer. Next, why does it not arrange for some clever journalist to go out on a North Sea trawler and broadcast his experiences. And ditto on a whaler.

Ditto on an aeroplane trip to, say, Berlin or Cairo. And what about a talk from inside an Egyptian pyramid? There is an excellent radio-telephone service from Cairo to London.

## Success in Russia.

THE writer of a "Radio Talk" in "Reynolds" (who having recently returned from Russia pleasantly remarks that he is sure he has returned into an asylum for criminal lunatics) states that one, Zaitzeff, now a high officer of the Moscow radio system, was an illiterate peasant seven years ago, and he asks what chance an English agricultural labourer has of becoming a big chief in the B.B.C. in seven years.

The insinuation is, of course, that Britain is bad and Russia very fine. The answer is: "Very little chance." Seven years is too short a time to serve to qualify for high office in a great Corporation, if one is a labourer to start with.

But there is no bar between a slum kid and the Woolsack—in this country, bless it!

## "SHORT WAVES"

A correspondent writes to say that his four-valve wireless set brings in America quite plainly.

I can only advise him to exchange it for a two-valve set.—"Pictorial Weekly."

"Femmes, Battez vos Marys (Traditional Songs of France) arr. Bax."—Programme in Wireless Paper.

We thought they only beat the tum-tum in Africa.—"Punch."

"Can you keep a secret?"

"I certainly can. Why, an oyster is a loudspeaker compared to me."

## DISCORD.

A detector and 2 L.F. set

Received an "advanced" string quartet.

Cried V 2: "You're distorting!"

The detector said, snorting:

"This'd wreck an eight-valve superhet!"

Tourist (pointing to very old man): "I suppose that's your oldest inhabitant?"

Village Schoolmaster: "Yes, sir. Quaint survival; quite a period-piece, in fact. The village's sole remaining exponent of a pre-B.B.C. accent."—"Punch."

"Mother wants to borrow your loudspeaker."

"Goodness! Is she going to start dancing this time of night?"

"No; she wants to go to sleep."

## The Scientist is Impressed.

TO us radio chaps it must surely be encouraging that so learned a man as Sir Alfred Ewing, President of the British Association, should refer to our toy as the "magic box." Sir Alfred said, "I don't know of any product of engineering more efficient..." And again, he said, "Is any fairy tale so strange as that reality? In all the wizardry of science surely there is nothing more wonderful than this."

Such opinions, expressed by a scientist of world-wide renown, should confirm us in our belief that radio is a thing a thousand-fold "worth while."

## Radio Ads., Grammies, S.W. Clubs and Leagues.

I COME back to Bill Werner's letter. San Diego is the postmark. He does not, apparently, connect with me unless a friend sends him a copy of "P.W." Say, Bill, that's battle by proxy. Why not

subscribe to us and go down to history as the cementer of Anglo-Californian amity?

No, I don't darned well believe that radio ads. "pay." I firmly believe that people in America advertise by radio as sheep go through a gate. Let the first one swerve away, and how readily t'others follow. I do not confuse the International Short-Wave Radio Club with the I.S.W. League. Swelp me, I could not, for they have both plagued me to the verge of making me a long-wave lover.

## Reconciliation and Lightning.

G. S. (Liverpool), who, you may recall, described my "politics" as "school-boyish,"—I thought it a compliment!—comes back with a man's letter which, if I were to meet him, would result in a hand-shake and a "What's yours?"

But he sticks to his theory that the "earthed" aerial isn't much of a protection to a house. He says: "An ordinary wire is almost an insulator when one considers the prodigious energy released by a moderately severe lightning flash."



## Across the Micrometer Gap.

WELL, G. S., I can only say this. I have, in my younger days—and for my sins!—worked radio sets in the tropics, where lightning discharges are born. Our sole protection against lightning was a tiny spark gap between aerial and earth, the lead to the receiver being taken from the aerial side of the spark gap.

Now, I have sat for weeks in a shanty, with lightning playing around like Brocks' Benefit, and with the discharge ticking across the gap as a blue spark and with the regularity of a second-hand of a clock.

Yet I have never had a "stroke." The Marconi Company designed the safety-gap, and I reckon they knew what was what. And the shack was of galvanised iron!

## A Nutty Little Receiver.

WE have not yet heard what sort of nut-shell that Italian lad built his set in, though the betting favours the coconut. But there is a young

Aberdonian who has managed to conceal his set in the shell of a walnut. I have seen a photograph of the thing. A crystal set, of course, and it will receive the "local."

It slips into the vest pocket. The 'phones can be hidden under the mattress, and the P.O. van can detect as hard as it likes, but the result will be *naething*. This young Scot must be the son of the chieftain who writes his cheques with invisible ink!



ARIEL.



# Short Waves "on the APEX"

\* Increase the "touring" properties of your "Apex" receiver by adding the one or two extra parts needed to make the set capable of working on short waves as well as medium and long. The additions are extremely easy and most lucidly explained. By G. V. DOWDING, Associate I.E.E.

ALL you need in order to make your "Apex" a tri-bander capable of tuning in the short waves, are two baseboard-mounting coilholders, a neutrodyne condenser, a simple switch, and one terminal.

We have provided this extra aerial terminal so that a series aerial condenser could be introduced for the short waves, and so make it possible to adjust for perfect reaction and no dead spots.

And by employing plug-in coils, the wave-bands you can cover are limited only by the coils you choose to purchase.

#### First-Class Material.

Be careful in your selection of coilholders. Just because these are so cheap and such ostensibly simple items, you may be tempted to "pick up" the first which come to your notice. But it is no exaggeration to say that the results can be ruined by only just one of the coilholders being of inefficient construction.

You do not necessarily want holders of special design, but it is essential that they should be made of first-class material, as otherwise they may introduce serious losses.

A small panel will be needed to accommodate the switch and the aerial terminal. This measures 2½ inches by 1½ inches, and if you have fitted the tone control it can be fixed immediately adjacent to this.

#### Placing Coilholders.

The coilholders must be placed so that their pins and sockets are the same way round and placed exactly as shown in our wiring diagram. You will note that their sockets are nearer the left-hand side of the baseboard. (We are, of course, looking at the back of the set the whole of the time during this constructional work.)

Our diagram is drawn exactly to scale, so that you should discover no difficulty in determining the positions of the coilholders.

However, in order to provide a check, it will be as well for you to place the coils in and also insert the L.F. valve. You will then insure good clearance.

Two of the original leads have to be altered, and, to avoid any confusion, I would advise you to remove these entirely and rewire the points concerned in accordance with the detailed instruction which I am about to give.

The two wires are (1) The lead which runs from the fixed vanes of the reaction condenser to the H.F. choke and (2) The lead which runs from terminal No. 6 of the

because, tabulated in this manner, it will make it easy for you to check up when the job is done.

1. New aerial terminal to one terminal of the neutrodyne condenser.
2. Other neutrodyne condenser terminal to the further terminal of the .0003-mfd. fixed condenser. (Don't forget we are looking at the back of the set.)

3. One terminal of three-point short-wave switch to left-hand terminal of the aerial coilholder.

4. Second terminal of short-wave switch to that terminal of the 30,000-ohm resistance (the resistance is shown in a holder in this diagram although it has no holder in the blue-print), which joins to the L.S. plus terminal. It is shown as the "bottom" terminal in the blueprint.

5. Third short-wave switch terminal to terminal No. 9 of the tuned anode coil.

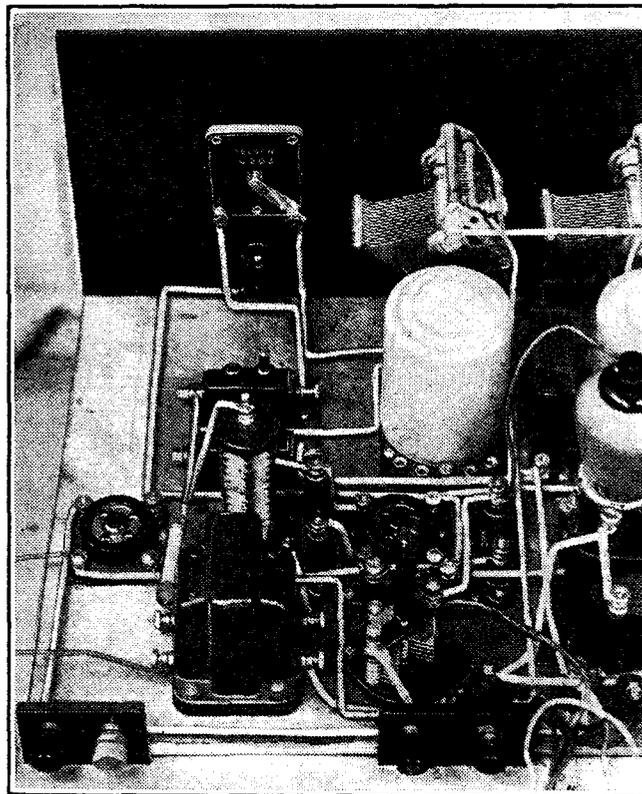
6. Left-hand terminal of the aerial coilholder is already joined to switch, but it must also be connected to terminal No. 6 on the tuned anode coil unit as well.

7. Right-hand terminal of aerial coilholder to further terminal of the .0003-mfd. fixed condenser.

8. Left-hand terminal of reaction coilholder to one terminal of the H.F. choke—you will have no difficulty in seeing which one!

9. Right-hand terminal of reaction coilholder to fixed vane terminal of the reaction condenser.

### NO COMPLICATIONS ARE INTRODUCED



The additional parts are at the L.F. end of the receiver, and plenty of space for them has been allowed for, even when you have fitted the tone-control described last week. The neutrodyne condenser is seen in the foreground next to the L.F. transformer.

Tuned Anode coil to the .0003-mfd. fixed condenser.

#### Tabulated Wiring.

Having taken these two leads away, you can then proceed with the new wiring. The order of wiring is not very important, and I will deal with it component by component

#### Short Leads.

That completes the wiring, and I need only add that as this wiring concerns the short waves, it should be carried out rather carefully and the various leads kept short and well away from other wires.

In order to switch over to short waves, it will be necessary only to change the aerial over to the new aerial terminal and operate the short-wave switch. The pair of coils you choose for the bulk of your short-wave work can remain in position. The fact that they are plug-in coils must not lead you to visualise the necessity of coil-changing almost every day.

(Continued on next page.)

# SHORT WAVES ON THE "APEX."

(Continued from previous page.)

Most listeners find after a little experience that they can do all they want to do on one particular band. Nevertheless, the

fact that the "Apex" takes plug-in coils for the short waves is a flexibility feature in its favour which we trust will be appreciated.

Also, it may be as well to point out that the neutrodyne condenser will not need constant adjustment. Its duty is largely to vary the aerial coupling so that individual aerial and earth systems can be suited.

When you first try out your "Apex" on short waves, experiment with various

settings until you are able to obtain easy oscillation throughout the particular waveband on which you are working.

It should be noted that the 0002-mfd. fixed condenser which is connected between the anode and the filament of the detector valve influences the wave ranges covered by various sizes of short-wave coils, as I shall show in a moment.

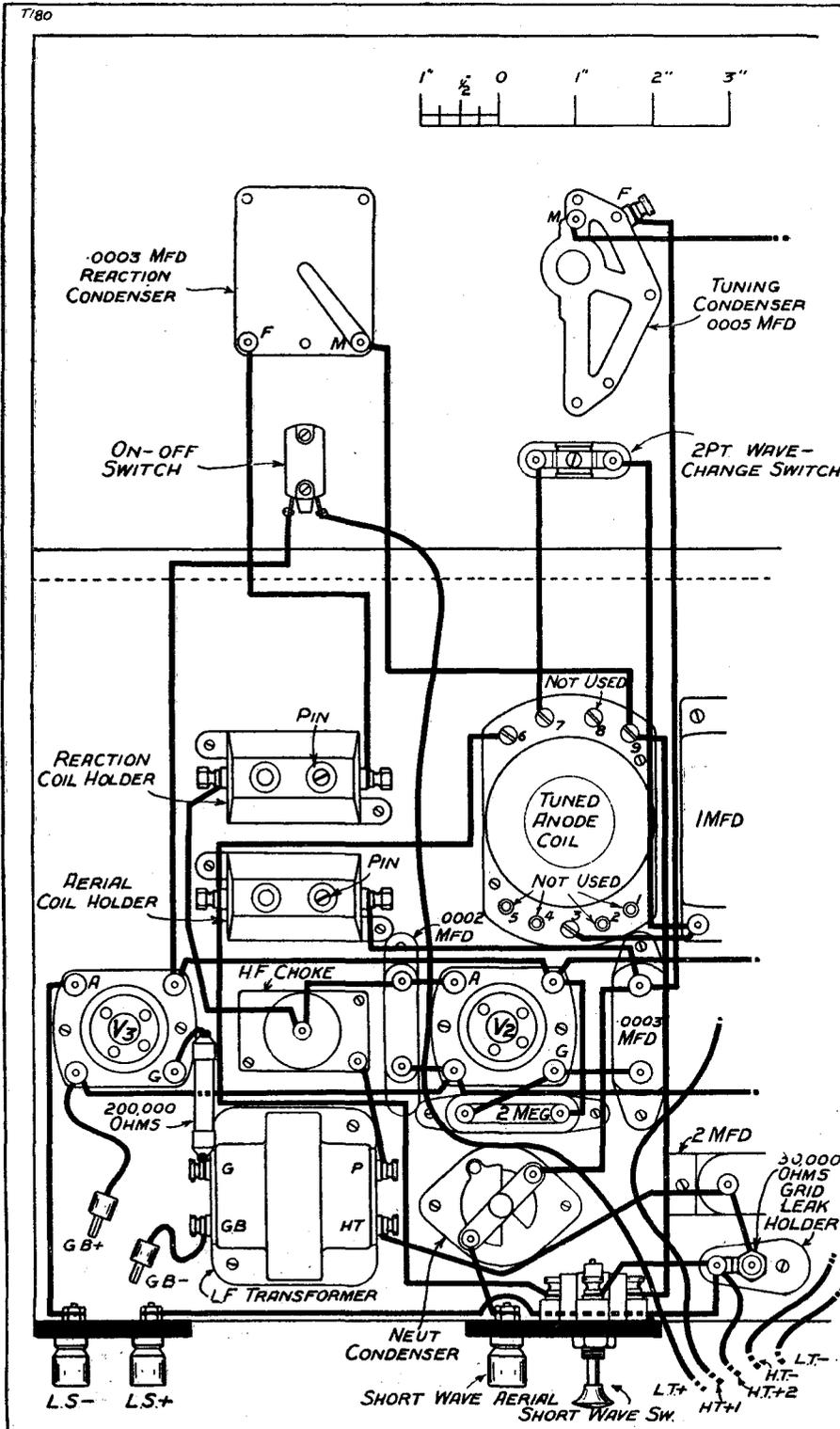
This fixed condenser improves the reception of broadcast stations, but if it is disconnected it will not affect the short-wave efficiency. Some constructors may prefer to sacrifice a little of the medium and long-wave efficiency in order to accommodate lower wave short-wave stations than they would otherwise get in with particular pairs of coils.

This is a minor compromise which can safely be left to the discretion of the individual operator.

### What Size Coils?

A very useful pair of coils is the Igranic two turn for the aerial and a four turn for reaction. With these a band of approximately 28 to 48 metres will be covered. If

## LINES THAT LEAD TO MANY STATIONS



### EXTRA COMPONENTS NEEDED.

- 2 2-pin coil-holders (Igranic, Lissen, Magnum, Lotus).
- 1 3-point push-pull shorting switch (Telsen, Bulgin, Ready Radio, Tune-well, Sovereign, Lissen).
- 1 Terminal (Belling & Lee, Bulgin, Clix, Igranic, Goltone, Ealex).
- 1 Neutralising condenser (Igranic, Bulgin, Peto-Scott).
- 1 Terminal strip, 2½ × 1½ in. (Peto-Scott, etc.).
- 18-gauge tinned copper wire and sleeving, 6 ft. of each (Goltone, Wearite, etc.).
- 1 Set of short-wave coils (Igranic, Atlas).

the .0002-mfd. anode to filament by-pass condenser is removed the range drops to 20 to 35 metres.

With an Igranic four turn aerial coil and a six-turn reaction condenser the waveband will be 36 to 62 metres. As would be expected, the removal of the by-pass condenser has much less effect on this higher waveband. As a matter of fact, there is only about a two-metre drop so far as the minimum wavelength reached is concerned.

Although you will not find it difficult to tune in short-wave stations from the far corners of the earth direct on to the loud-speaker, it must be remembered that short-wave conditions are apt to vary rather considerably.

### Thrills of Short Waves.

Some evenings the stations simply roll in, while at other times there may appear to be fewer "on the air." But one good evening makes up for two or three comparatively quiet ones. There is nothing in radio to approach the thrills of short-wave listening on a good night when the Americans, or even Africans and Australians, sound almost as though they were local transmitters.

But you must not expect to be able to tune them in quite as easily as ordinary broadcasters. Most of them may want a little coaxing. If you rotate the tuning

(Continued on next page.)

The alteration in wiring is really very slight, and the new connections will be perfectly clear if you compare this diagram of the L.F. side of the set with your original blueprint. The short-wave switch should be fitted above the wire from L.S. + terminal to 30,000-ohm resistance.

## SHORT WAVES ON THE "APEX."

(Continued from previous page.)

dial at an ordinary kind of speed, you will hear nothing of them at all.

Also it is quite essential to tune them in by their carriers in the first instance. It is useless searching without reaction. The set must be made to oscillate, and you can do this without fear of disturbing the peaceful broadcast activities of your neighbours.

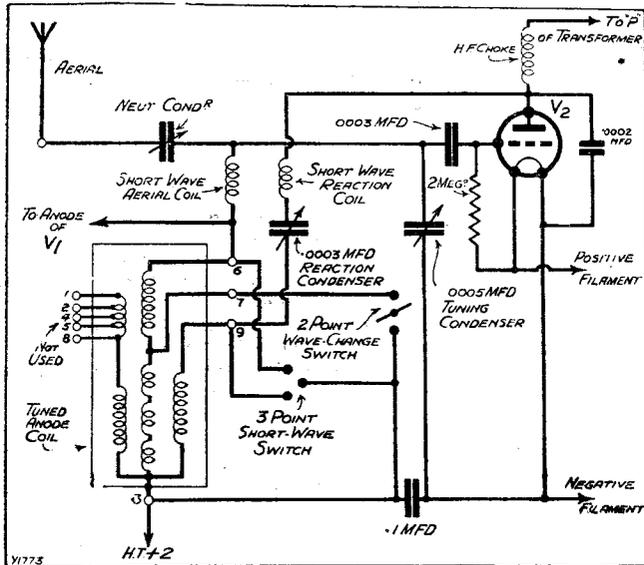
But don't throw the reaction control hard over, as this will have a paralysing effect. The set must only just enter into the oscillating condition.

It is a fascinating feature of short-wave reception that the tiniest of squeaks, or "carriers" as they are termed, sometimes resolve into hefty programme providers.

But the "resolving" demands a little patience and a very careful manipulation of the reaction and tuning controls.

Remember that there may be a score of stations within a matter of a few de-

### THE ALTERATIONS IN THEORY



The theoretical explanation of the short-wave additions, showing the new aerial and reaction coils and also demonstrating how the new aerial terminal is connected via the neutrodyne condenser to the grid of the detector valve.

Some slight adjustment of the detector H.T. may be needed. I say slight advisedly because the H.T. plus 2 terminal also serves the L.F. valve, and so must not be given a voltage much below the maximum available or the quality may be impaired.

Still, a matter of 10 volts or so won't matter a scrap, because it must be admitted that impeccable quality is not a feature of short-wave reception!

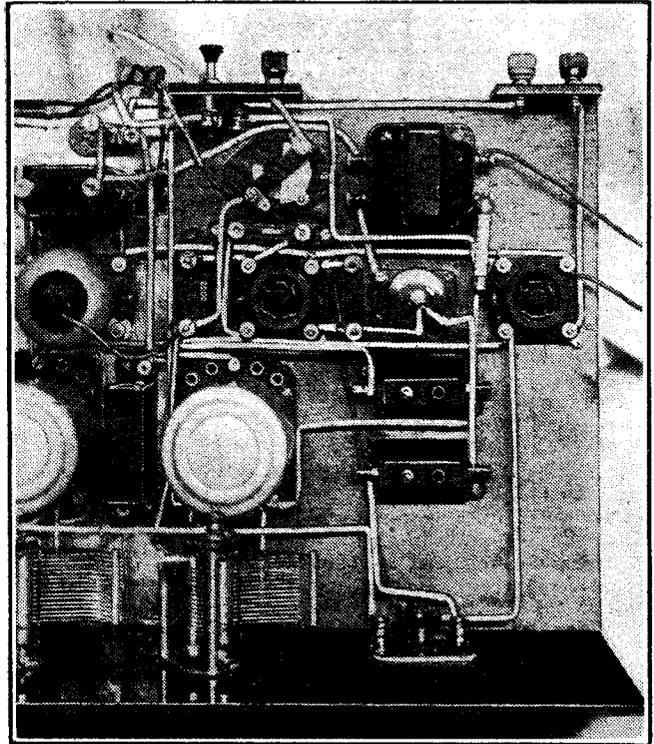
#### Hefty Programme Providers.

It will be well worth while to invest in a comprehensive range of short-wave coils so that you can experiment with reaction-coil sizes should you not feel quite satisfied with the reaction effects you obtain.

I say this because if you decide to go seriously into the short waves you will open up an entirely new world of wireless for yourself. There are literally hundreds of short-wave stations, and there are no geographical limitations as to the "Apex" performances that lie within the bounds of probability.

You will meet the stations in the first instance as tiny little heterodyne squeaks. But don't judge their possibilities too quickly by these.

### PRACTICAL APPLICATION



When your wiring is complete have a look at your "Apex" from above. The result should be exactly as shown in this detailed photograph.

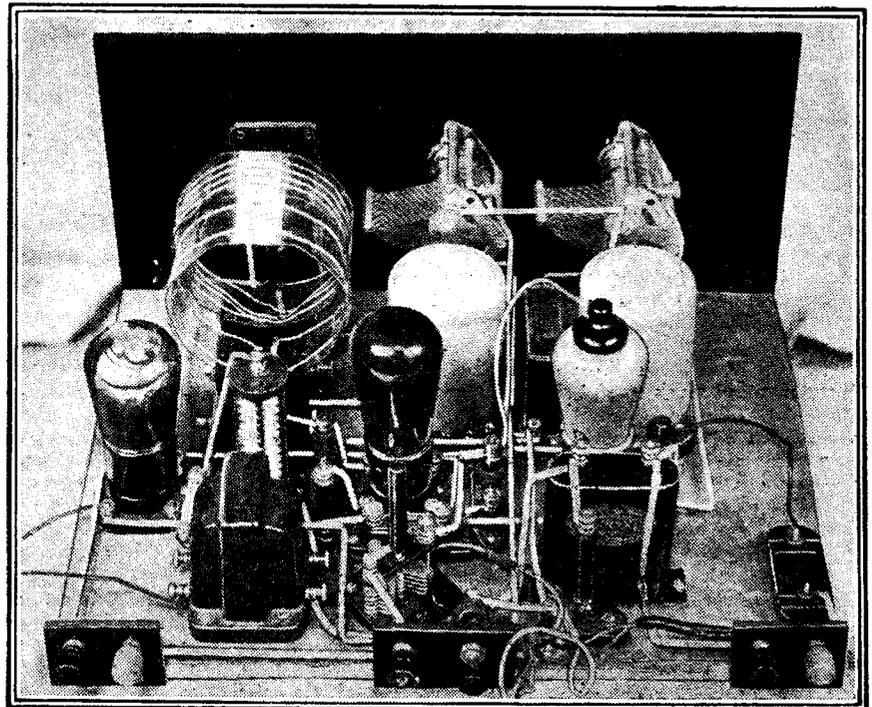
grees on the tuning dial, and operate this control accordingly.

You must not expect to find any short-wavers spreading in the same way as do some of

the medium and long wavers. In fact, tuning is a matter of hairbreadth adjustment.

However, do not let this discourage you. I have had letters from "first set" constructors who, with no previous experience, have managed to tune in American and even Australian stations. Modern slow-motion dials have made this rather a commonplace, and it is no longer a feat implying great skill.

### READY FOR WORK



Here is the short-wave "Apex" waiting for the aerial and battery connections. Note the short-wave aerial and reaction coils plugged into their holders.

## KIT KRITICISMS

### THIS WEEK: The Sovereign "Ambassador"

By Mr. PETER SIMPLE.

"WHAT an easy job you've got," said a friend to me yesterday; "all you have to do is to sit down and pick holes in a piece of work which has probably taken someone else years to achieve. I wish I were in your shoes!"

He meant it as a joke, of course; but I don't think he quite realised how very inaccurate it was! It certainly would be very pleasant to have a job which consisted in finding someone else's bad points—but "criticising kits" isn't anything like that.

In the first place there are so few faults of any kind in present-day constructor's kits. Each one is, in its own class, as near perfect as the brains and skill of its designers can make it.

And, further, no one kit is like another, so that it is even impossible to find fault by comparison.

The result is that any criticising one does in this branch of radio design must be constructive; that is to say, it must consist of suggestions for making a good job better still.

#### Reliable.

The "Ambassador" kit, which Sovereign Products Limited sent me for test last week, is interesting in more than one way. But its particular interest lies in the fact that it is a genuine effort to provide a kit which shall be within the means of every home constructor and, at the same time, shall consist only of reliable and tried components.

Sovereign dual-range coils have already achieved a well-deserved popularity, and the "Ambassador" circuit is built round one of these units.

The price of the kit is £1 12s. 6d., and it seems almost impossible that for this price can be produced a three-valve receiver which, far from being "thrown together," is the result of much careful research work. As a matter of fact, when one includes the valves and batteries which the Sovereign firm recommend, the total outlay needed to produce the receiver in working order is not more than £3 13s. 0d.

#### Few Components.

For this achievement alone the manufacturers of the "Ambassador" are to be heartily congratulated.

The "Ambassador" kit is one which will delight the heart of the keen constructor. It is one of the kits which I, personally, like because it enables me to do everything for myself and, at the same time, does not give me very much chance to go wrong.

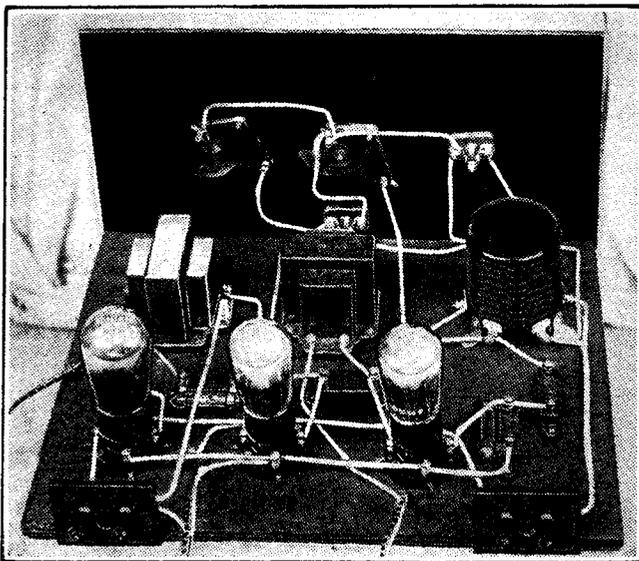
Components are few, two condensers, a dual-range coil, a transformer, a choke, valve holders, fixed condensers and resistances completing the list of essentials, and the wiring is straightforward.

#### A Novice's Effort.

When building this receiver I departed from my usual practice and handed the construction over to a friend who had never before constructed any radio set. I showed him how to make the loops at the end of the wires, and left him to it. The result you can see in the photograph on this page, and it is a good proof of the simple task which this kit offers to inexpert constructors.

The blue print and instructions which are provided with the kit make me wonder whether, after all, elaborate charts and

### HIS FIRST ATTEMPT!



The wiring shown here was carried out by an amateur with no previous knowledge of kit construction. It is a fine example of how the kit commends itself to the beginner as well as to the more expert constructor.

detailed wiring instructions are really necessary for the less complicated receivers.

#### Those Extras.

And here I offer my piece of constructive criticism to the makers. It would, in my opinion, greatly add to the attractiveness of the "Ambassador" if the kit were to include battery plugs, flex, and connecting wire and sleeving. The extra cost would be negligible and their inclusion would earn the thanks of those who are not regular constructors and, therefore, do not keep plugs and wire in the tool box at home.

The "Ambassador" is sure to appeal to the man of limited means who has never made a set before, and for this reason alone I make the suggestion.

Quite frankly, I did not expect any outstanding results from the "Ambassador" on test. A "Det. and 2 L.F." circuit, as a rule, does not have much of a chance on my very poor London aerial.

#### Sensible Arrangement.

Let me say, therefore, that I was delighted with the results which I did get. The principal British and some continental stations came in perfectly well on my loudspeaker at a very excellent strength. Tuning on the single dial was simple and the reaction worked smoothly. The two low-frequency stages mean that the "Ambassador" is the ideal "local" receiver for powerful output—with quite distinct "foreign" possibilities. Selectivity, although it did not allow of a minute separation of foreign stations, was nevertheless sufficient to prevent undue interference from neighbouring broadcasters.

Considering that the "Ambassador," at the low price charged, is in a class by itself, results are a good deal better than one would expect.

The idea of a kit set being built round a special component—as is the case with the "Ambassador"—strikes me as an eminently sensible arrangement in every way. This is especially so in the case of a coil such as the Sovereign dual-range.

#### In Good Company.

In the first place the manufacturer is certain that his cherished product is in thoroughly good company and therefore able to prove its merits to the utmost. And, secondly, the constructor has the advantage of having built a receiver from component parts each of which has been designed in relation to the others.

It does not take an article to point out the advantage which this arrangement has over the receiver which is "thrown together anyhow."

#### Remarkable Work.

Anyhow, this "matching" idea has certainly enabled the Sovereign firm to provide a receiver which, when one considers its simplicity, does really remarkable work. And because of this remarkable work I would ask the makers to go just one step farther and provide with each kit full instructions for tuning.

There is no denying that an expert can get better results out of any set than the tyro can. And a receiver with no H.F. stage needs very careful handling if anything beyond the "local" is to be achieved. But I am sure that the veriest beginner could achieve just as big a "bag" of stations both at home and abroad as I was able to do were he to be given just that little bit of direction which makes all the difference.

I would suggest that the "Ambassador" is an ideal for the home constructor to build as his first incursion into the realms of practical radio. He will find that it will give him an insight into the working of a modern three-valve receiver which no book study could do, and he will find that the pleasure of building the set will be added to afterwards by the knowledge that he has made for himself an instrument of which he may well be proud.

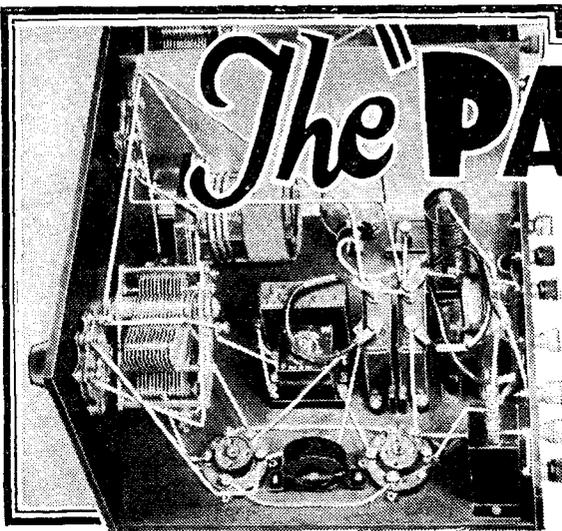
#### ALL ABOUT THE KIT

**MAKERS:** Sovereign Products Ltd.

**VALVES:** Three (Detector and 2 L.F.).

**FEATURES:** Sovereign dual-range coil, simple tuning, four terminals only.

**PRICE:** £1 12s. 6d. (without valves or batteries).



# The "PARALLEL-FEED" IN PRACTICE

The increasing popularity of the parallel-feed system of coupling low-frequency transformers is largely the outcome of the ever-present quest for realistic reproduction. That the method has definite advantages is shown in this highly interesting discussion of the pros and cons

By A. JOHNSON-RANDALL.

**I**F I were asked to name the most important factor in radio reception, I would unhesitatingly say Fidelity. When a broadcasting station transmits a programme, no matter whether it is dance music, a play or even a talk, we expect the sounds we hear from our loudspeaker to bear a fairly close resemblance to the genuine article. Unless this is so, broadcasting to most of us means—exactly nothing.

### Loudspeaker Improvements

Apart from the loudspeaker itself, there is no link in the receiving chain so vital as the low-frequency stages.

In the distant days of the horn type speaker—which was at the best merely an enlarged telephone earpiece, with a sound channel stuck on to it—the L.F. side didn't matter so much.

For of what use was it to harness a very imperfect reproducer to a perfect magnifier? The ludicrous aspect strikes us immediately when we consider what sort of response the average horn speaker gave us.

Bass? There wasn't any. Middle and top?—Yes, full of resonances and false notes. Still, there was nothing better at the time so we put up with and even liked the results, because broadcasting was then a new science possessing vast possibilities.

But with the advent of the cone and moving-coil speakers we began to view the low-frequency stages in our sets with no small measure of suspicion. Was the amplifier all that it should be? You see, the improvements in loudspeaker design were beginning to show up any deficiencies in the amplifying chain.

### Swing of the Pendulum

Enthusiasts began to translate all music into its equivalent frequencies—pure resistance coupling was tried and discarded in spite of its undoubted advantages, owing to its low stage gain.

And then back went the pendulum to the much maligned transformer, which, whatever its alleged failings—*did* deliver the "punch."

The technicians got to work and concentrated on transformer improvement with the result that the modern instrument is very near perfection, and far ahead of any other method of coupling.

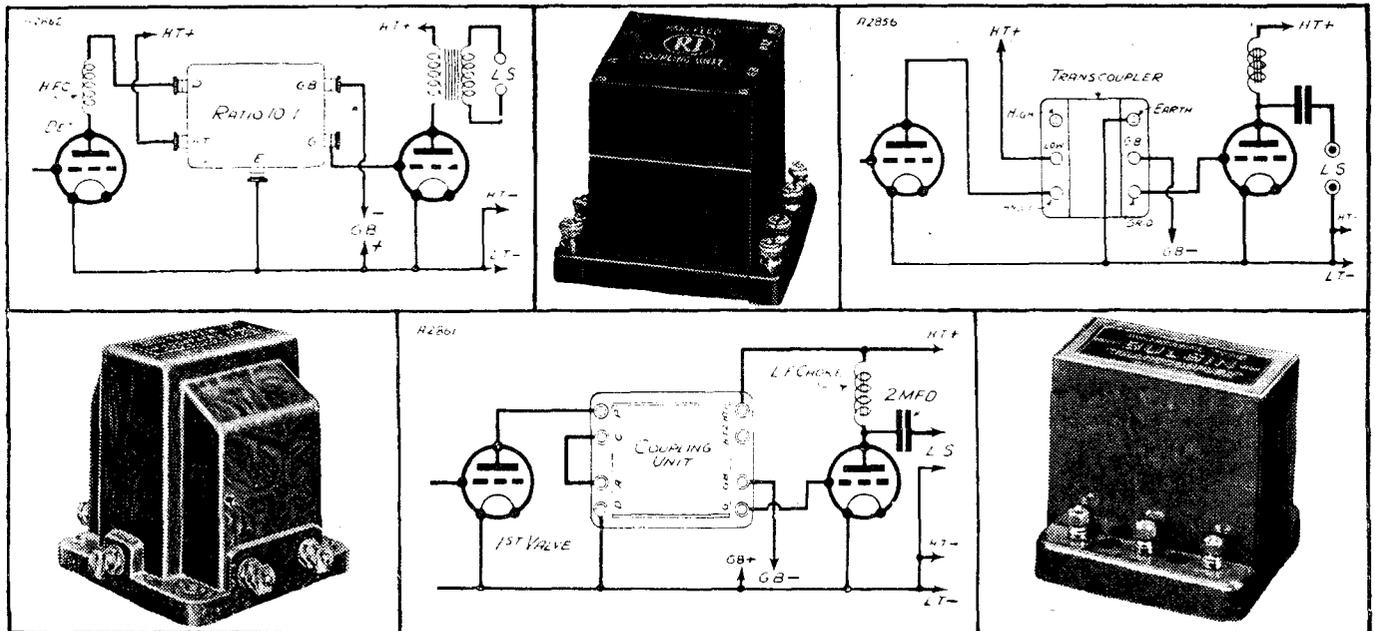
### Price and Bulk

The present tendency is in the direction of parallel or "shunt" feed, and a question which naturally arises is "Cannot the desired results, i.e.—first-class reproduction, be achieved by direct coupling?" Actually they can, but it is not so much a matter of technical design as one of price and bulk.

An essential factor in any transformer designed for tone quality or fidelity is high primary inductance. The degree of amplification for any musical note or frequency is dependent upon the ratio of primary inductance (it is really the impedance; that is, the inductance, capacity and resistance) to the impedance of the valve in series with the primary.

This primary—valve impedance ratio must be high—very high—if the amplification of

(Continued on next page.)



Here are three well-known coupling units together with their schematic circuits. In each case the feed resistance and coupling condenser are included in the unit. On the left is the Telsex coupler which has a ratio of 10 to 1, and in the centre the R.I. "Parafeed" unit which readily lends itself to the auto-transformer method of connection. The coupler on the right is the Bulgin "Transcoupler," and an interesting feature of this component is that two alternative "feed" resistance values are available.

## PARALLEL-FEED IN PRACTICE

(Continued from previous page.)

the bass notes is to be such as to preserve the correct balance of tone over the whole gamut of musical frequencies.

A low primary inductance—or impedance—means that the low notes will only be magnified to a small degree—perhaps not at all, depending upon the inductance to valve impedance ratio.

Hence we see that if we are to get decent reproduction a very high inductance primary winding is essential.

### High Inductance.

From this it would appear that our purpose is achieved if we take an iron core and wind on sufficient turns to give the required high inductance.

But there is much more in it than this. When a current passes through a winding

But the real essence of the parallel-feed method lies in its application to transformers which utilise cores of special alloys. These alloy cores have a remarkably high permeability—and in consequence an excellent performance can be obtained with a component of small physical dimensions.

### Alternative Ratios.

This is all to the good, but these special cores are more susceptible to the effect of the steady anode current than certain other types.

In practice, therefore, in order to take full advantage of the many excellent features of transformers of this type it is advisable to deflect the steady anode current from the primary winding by adopting the parallel-feed method shown in Fig. 2.

In this arrangement the anode current flows through the resistance R to the plate of the valve and the fixed condenser C ensures that only the low-frequency currents are applied to the primary winding of the transformer.

Thus the designer is able to turn out a component of small physical dimensions possessing excellent characteristics at a very moderate price. To take one particular instance, the N.P.L. curve of the R.I. "Parafeed" transformer shows that when

suitably connected the frequency response is substantially constant from 25–8,000 cycles, the voltage amplification being in the neighbourhood of 35.

Now one of the advantages of the parallel-feed scheme is that it provides us with a method of obtaining alternative ratios by connecting the windings as an auto-transformer. In Fig. 3, for example, the two windings are connected in series, the directions being arranged to be the same (i.e.—one winding assists the other). Therefore, if the ratio of the transformer be called (N), the equivalent ratio when joined as an auto-transformer using the Fig. 3 method is (N) + 1. That is to say, with a 3/1 transformer it would be 3 + 1 = 4/1.

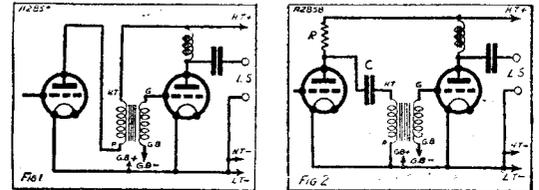
### Getting the "hump."

Similarly, if the windings are joined as in Fig. 4 so that the primary turns are in the reverse direction to the secondary, the ratio is (N) - 1, or 2/1. The value of the coupling condenser C must be chosen to suit the circuit conditions, and a haphazard choice may result in a "hump" in the region of 25–50 cycles. The effect of this in practice will at once be evident. Any tendency for the L.F. stages

to motor-boat will be enhanced and in an A.C. set there is a likelihood of background hum at mains frequency being aggravated.

These remarks, of course, do not apply to any of the commercial parallel-feed

## DIRECT AND INDIRECT FEED



These two circuits illustrate the direct and indirect or parallel-feed methods of coupling. It will be seen that in Fig. 2, the steady anode-current is deflected from the primary winding by the resistance R and the condenser C.

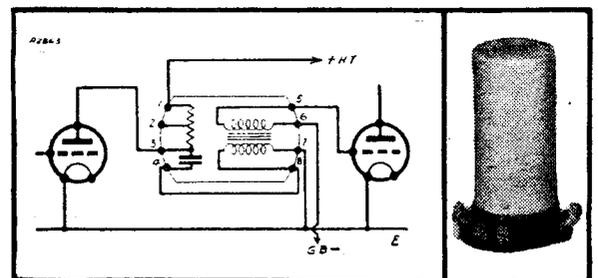
coupling units, the values in these cases having been carefully calculated and arranged to give virtually a straight-line characteristic.

## SOME RANDOM REMINDERS

### On Important Reception Topics.

An old-fashioned remedy that often proves remarkably successful in cases of humming is to reverse the wiring to the primary of the L.F. transformer. In other words, take the wire or wires which go to the H.T. plus to the "P" (or "A") terminal instead, and the latter wiring to the H.T. plus terminal.

## PROVIDES CHOICE OF RATIOS



The Formo "Multicoupler" can be arranged as a parallel-feed transformer having three ratios, and with its two "feed" resistances is in the true sense a multi-purpose unit. When connected as in the above circuit the ratio is 3 1/2 to 1.

Don't forget when screening an H.F. stage that it is usually just as necessary to screen between variable condensers as between two coil units.

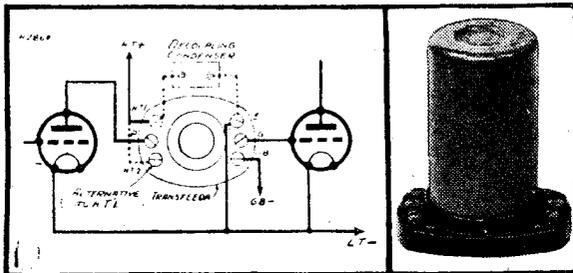
When changing an A.C. valve for one of somewhat different characteristics or make, remember that if automatic grid bias is employed in the circuit it is likely that the resistance for this will also need to be changed.

Generally speaking, all the screening in a set should be joined together and connected to the earth terminal.

If your aerial runs close to your neighbour's at the same height, you may have difficulty in cutting out the programme he is receiving, so always get as much space between aeriels as possible.

Remember that to run wiring through the clearance slit between the door and doorpost is to ask for trouble, as there is certain to be a strain on it due to slight movements.

## AN EASILY DE-COUPLED COUPLER



The Benjamin "Transfeeda" is an adaptable little unit inasmuch that the L.F. stage can be de-coupled merely by adding a large fixed condenser externally. There are also optional H.T. tapplings, the choice depending upon the valves used.

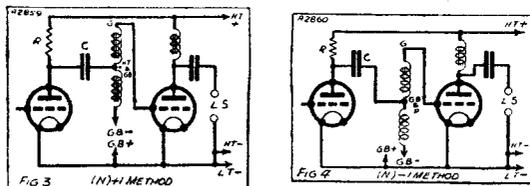
it tends to reduce the permeability of the iron core, and so to lower the inductance value of the winding.

This is what happens with a transformer whose primary is connected directly in the anode circuit of the valve, as in Fig. 1.

### Specia! Alloys.

With careful and skilled design it is possible to make a transformer that does retain the necessary high inductance at current values within the limits met with

## METHODS OF AUTO-TRANSFORMER COUPLING



With parallel-feeding it is possible to obtain different ratios. For instance, when the windings are joined so as to assist each other, as in Fig. 3, the ratio is increased by one. In Fig. 4, the primary is in the reverse direction to the secondary, and the ratio is, therefore, reduced by one.

in practice, and there is little to be gained by parallel feeding in these cases. This efficiency however, is generally obtained at some sacrifice of price and size.

Many of the lower priced transformers on the market can be improved, in so far as their response is concerned by adopting parallel-feed.



GRAPHICALLY DESCRIBED by a "P.W." TECHNICIAN.

**O**CH aye! But ye ken I been having a reet gude time in Bonnie Scotland, an' I'm tellin' ye I would na' ha' missed it for poonds!

No! Not even for honest-to-goodness Bank of England "flimsies" would I have missed that show up in Edinburgh; and the curious part about it is that I can't quite tell you why!

**Absolutely Full of it.**

The show itself was smaller than any I have seen in other parts of the country this year—the hall gave me the impression that it was much more suited for the exhibition of potatoes than potentiometers and things—the exhibits were such as could have been seen in London, Manchester or even Belfast, and yet, despite *all* that, I've just returned to London absolutely full of it.

It's a curious thing, isn't it? Yet there is not an atom of doubt about it, for in very truth, I just revelled in every minute of my stay!

Take, for instance, my first morning in Edinburgh.

A real super-effort at getting up, an early breakfast, and a truly delightful walk along Princes Street with a determined resolve to get in some "spade"-work while the day was yet young and (hush!) while the ordinary visitors were still taking advantage of the nip in the air.

**With an Easy Conscience.**

The Waverley Hall, my destination, is normally, I gather, a "fruit and veg." how-much-you-give affair, which no doubt accounted for my complete failure to register surprise when, on presenting myself for admission, there was slight discoloration of the atmosphere. However, it was with an easy conscience that I was able in response to inquiries to assure the guardian of the portal that quite definitely I was on business bent, and although, as I passed through the entrance, I had a lurking sort of feeling that it was a some-

what stringent condition of entry, at least my further progress was uninterrupted.

But now, for the next part, here's a serious and very sober question for you:

What in the name of goodness would you have thought if, on entering, your eyes had fallen upon a public address speaker mounting guard over an assortment of "veges" that would have done justice to Covent Garden itself? Probably the same as I did—that this was indeed "spade"-work with a vengeance!

Of course, I suspected that something was wrong. Carrots may make a good earthing connection, and Edinburgh may be 400 miles from London, but surely there could not be all that much difference between what I had seen in London and what I was hoping to see in Scotland. No, not a bit of it!

Definitely, something was wrong, and my

2 p.m., especially when, by so doing, they are enabled to knock a shilling off the charge for admission.

Sixpence was all that it cost to enter this third annual mecca of Scottish Radio, and during my short stay in the town it is true to say the "saxpences were being banged" literally by the thousand. Of all the exhibitions that it has been my privilege to visit during the past few months, I can honestly say that I have never seen such enthusiasm, or, for that matter, such crowds, as I joyfully rubbed shoulders with in Edinburgh. And that is saying an awful lot!

**Irresistible Attraction.**

I wonder if that had anything to do with my own unbounded enthusiasm? Or was it just the combination of all the little things I saw which proved to be such an irresistible source of attraction?

I like a "gadgety" show. I like to be able to press buttons and see, for instance, such things as selectivity graphically illustrated. I like to be able to sit and watch broadcasting in the making, to see the artistes performing in a sound-proof studio and

to know that they are entertaining not only those of us in the hall, but countless listeners all over the country and possibly all over other countries as well.

**The New Set.**

It seems to put life into the very show itself. People see the artistes performing, they hear right on the spot exactly how the reproduced version should sound, they compare it with their own reproduction, and they realise possibly more than by any other means that they cannot leave the show without deciding upon a new set. At least, that is how I figure it out!

And think of the advertising value of a studio actually in the exhibition hall. Think of the good that must be done by the

(Continued on next page.)

**All about a visit to the Third Annual Scottish National Radio Show, held at the Waverley Hall, Edinburgh, from October 12th to 22nd. Our representative spent a most enjoyable time in the Scottish capital, and has some very interesting comments to make on the arrangements and apparatus there.**

inquiry (in Scotch!) which followed elicited (in the most delightful Cockney ever!) the information that "a course this ain't no blinkin' radio expedition 'til this afternoon."

So that was it! Edinburgh experiences, in so far as radio was concerned, could not commence until afternoon, and meanwhile as and when the necessity arose, certain of the stands which were provided with wheels were "taken for a ride" to make room for Edinburgh's "cats" department.

That, to my way of thinking, is a noble idea. Who, other than inquisitive Press-folk from a "foreign" country would want to go to a radio show in the morning, anyway?

Point number one, then. I take off my hat to the Scots idea of opening up at

## EDINBURGH'S EXHIBITION

(Continued from previous page.)

continual announcements that the broadcast is taking place from the radio exhibition! Would it be possible to define any other scheme which would be likely to promote such wholehearted enthusiasm as this one?

I think not. The day is past when people are content to walk round a show which is little more than a large retailer's shop window.

### More For Their Money.

They want—and, in my opinion, quite rightly so—a little more for their money than just a meaningless array of sets and components, and at Edinburgh very definitely they got it.

Yes, it was a great show, and possibly the most striking tribute I can pay both to the organiser and to the manufacturers who were represented is to say that although, before I went to Scotland, I was familiar with almost all the new models and components, I found sufficient in the Waverley Hall to keep me there for two days!

As for the manufacturers who were represented (and there were very few of them who were not), I feel that they are to be congratulated upon the excellent show that they put up.

Much as I should like to give a complete review of all that I saw—that, I am afraid, is outside the scope of the present article. But, at least, I feel that I must mention just one or two of the more outstanding exhibits, particularly those that were in some way responsible for my present enthusiastic frame of mind.

I have already referred to the splendid work done by the Scottish authorities of the B.B.C. in providing a studio on the spot. The idea is not new, I know, but I am desirous of calling the attention of the powers that be to the wonderful stimulating effect of such a provision.

### A Pat On The Back.

Not on one single occasion when I passed the studio corner of the Scottish Exhibition could I get within about 25 yards of the sound-proof glass front, which is surely adequate justification for its presence.

Then I want also to give our much-criticised Post Office officials a well-merited pat on the back for the highly instructional demonstrations that they gave concerning the causes and cures of interference troubles.

This, again, was not new, but the completeness of the demonstrations is well worthy of comment. Also, there seemed to be a much more homely atmosphere about the way in which it was carried out in Edinburgh.

I must be honest with myself and admit that the co-operation of these two public bodies did more to contribute to the complete success of the show than is perhaps generally realised. But, in saying that, I do not wish to detract from the credit that is due to the manufacturers.

### Scotland Is Ahead.

I always feel that the success of any show is dependent to some extent upon its entertainment merits as distinct from its more serious business aspect.

That is why I feel disposed to compliment Philips, the General Electric Company, Cossors, the Dagenite firm and several others for their foresight in providing gadgets and models of an instructional character for the entertainment of visitors.

As for the home-constructor side of the

## "I'M FLOTSAM—HE'S JETSAM."



To prove that there was no fake in the Ekco "Direct Comparison" demonstrations—now being staged all over the country—Messrs. K. D. Rogers and G. T. Kelsey, of "Popular Wireless" Technical Staff, were asked to examine the apparatus that is being used. They are shown here, with Messrs. Flotsam and Jetsam (to left and right of set respectively) and with Mr. Barry Kay, Sales Promotion Manager of E. K. Cole, Ltd.

show, there is every indication that Scotland is ahead of many other places in the country.

Take, for instance, the Ferranti POPULAR WIRELESS "Apex" constructional chart. On the second day of the show, the Ferranti people had to wire to Hollinwood for further supplies because, in just two days, the whole of a very large consignment which it was thought would be adequate for the rest of the show had been completely exhausted!

Michael Black, too, who is one of Scotland's biggest wholesalers, was doing a roaring trade in the "P.W." "Apex" charts; in fact, "Apex" charts were to be found almost all round the Exhibition.

The Scots may not have the facilities for staging an exhibition on a par with London, but what they lack in size and elaborate-

ness they certainly make up for in enthusiasm. I am afraid that, short of having made a visit yourself it will be impossible for you to appreciate the full significance of these words, but you can draw your own conclusions from the fact that it was with feelings of genuine regret that I had to drag myself away from the show to return to London.

But I didn't say good-bye—just au revoir—for it is my fixed intention again to visit Edinburgh on the occasion of the show next year. Ye ken I would na' miss it for poonds!

## A READER REMEMBERS

More reminiscences of short waves from a "P.W." enthusiast.

The Editor, POPULAR WIRELESS.

Dear Sir,—The article by Alf. W. Mann in the Sept. 10th issue of POPULAR WIRELESS, entitled "Short Wave Reminiscences," took the writer back to the most interesting years of radio.

My short-wave experience began in 1923. I have before me one of my first log books and I note that on Sunday, October 26th, 1924, there is heavily underlined the astounding fact that my "hook up" was persuaded, after innumerable attempts, to oscillate down to 60 metres.

I well recall the first time I received K D K A on, I think, about 104 metres. The "hook up" was a really fearsome contraption, consisting of components for a single valve amply spaced on a bread board about 18 inches square, the condensers having double-spaced vanes and being fitted with extension handles about 14 inches long.

### Novel Tuning.

Even with that length, I remember that all fine tuning was obtained, after having tuned as well as possible by the condensers, by gently moving my feet up and down under the table on which the "hook up" stood, thus altering the capacity of the set to earth! But how one's feet ached after about an hour!

On February 21st, 1925, in POPULAR WIRELESS, No. 143, Volume 6, I was fortunate enough to have published an article entitled, "A Successful Short-Wave Receiver." (Unfortunately, I have long ago lost my copy, and I am afraid that it would be hopeless to try to obtain one now!)

How many experimenters will ever forget the tremendous "kick" they felt, on receiving their first faint chirp, generally consisting of unrectified or nearly "raw" A.C. from the other side of the world? The dates, in my case, were: Canada, C 1 A R, November 16th. U.S.A., U 2 B B N, November 18th. New Zealand, N Z 3 A A, December 5th; and Australia, A 3 B Q, December 5th.

All these occurred in 1924, and were all heard on about 80 metres, long before 40 metres and below had been dreamed of.

### Praise for Amateurs.

How we amateurs were disappointed when we were deposed from the 1,000 metre and 400 metre amateur bands. The commercial people had no use for short waves, until the amateurs discovered that they were the "goods"; now just take a swing round the dial and note the number of commercials!

I am afraid that the amateurs do not get the credit for being the pioneers on high frequency work that is their due, especially those stalwarts, the transmitters, who bridged half the world on as little as 5 watts input to a single valve "hook-up."

The enthusiasm shown in those days, in setting the alarm clock for 3 and 4 a.m., in order to hear, perhaps, one faint Morse signal (no telephony then!) from an Aussie; sitting in a bitterly cold radio shack, perfectly still; and how the phones seemed like an instrument of torture after about three hours continual wear!

My test schedules on fading and signal strength variations, with F I S Q Q of Saigon, French Indo-China, and many others produced some very interesting results; and, incidentally, many good friends of the ether, whom I have never seen. One transmitter from Pasadena, U.S.A., I did meet, when he came over to Europe for a Paris Convention.

I have still, in my junk boxes, many portions of my first short-wave set, and one wonders how ever the thing worked. And what about the thrill of acquiring one's first dull emitters, 2 volt 25 amps, after using the old "R" type, which acted not only in the capacity of a thermionic valve, but also as a means of illuminating the "shade."

In conclusion, many thanks to Mr. Mann for bringing these happy memories back again.

Yours faithfully,  
JOHN L. HARMAN.

Brighton.

# TELSEN

# L.F. TRANSFORMERS COUPLING UNITS and OUTPUT CHOKES

## TELSEN "RADIOGRAND" L.F. TRANSFORMERS

Typical of all that is finest in British Radio craftsmanship. Designed in accordance with recent research, constructed on the soundest engineering principles and tested rigorously for immaculate performance and ensuring efficiency.

Ratio 3-1 **7/6**  
Ratio 5-1

## TELSEN "RADIOGRAND" (Ratio 1.75-1) TRANSFORMER

For use in high-class receivers employing two stages of L.F. amplification. When used following an L.F. stage employing choke or resistance coupling, it gives ample volume with remarkable reproduction. **10/6**

## TELSEN "RADIOGRAND" (Ratio 7-1) TRANSFORMER

Gives extra high amplification on receivers employing only one stage of L.F. amplification. Not recommended for use with two L.F. stages, as overloading is likely to occur. **10/6**

## TELSEN POWER PENTODE OUTPUT CHOKES

For mains operated pentodes taking an anode current of up to 40 m.a. Serves both to prevent direct current passing through the speaker and to match the speaker to the pentode valve, with the choice of three ratios—1-1, 1.3-1, 1.7-1. Used with a 1-mfd. condenser it gives a great increase in both quality and volume. **10/6**

## TELSEN TAPPED PENTODE OUTPUT CHOKES

For mains and battery operated pentodes taking an anode current of up to 20 m.a. The single tapping provides (by reversing) ratios of 1-1, 1.6-1, 2.5-1, ensuring perfect matching under widely varying conditions. Also suitable for matching a low impedance speaker with an ordinary power valve, a 1-mfd. coupling condenser being recommended for this purpose. **7/6**

## TELSEN INTERVALVE L.F. COUPLING CHOKES

Primarily designed for use as coupling chokes, but may be used in any circuit carrying not more than the stipulated maximum current. The 100 H type is for H. or H.L. type valves, and the 40 H type is for L. types.

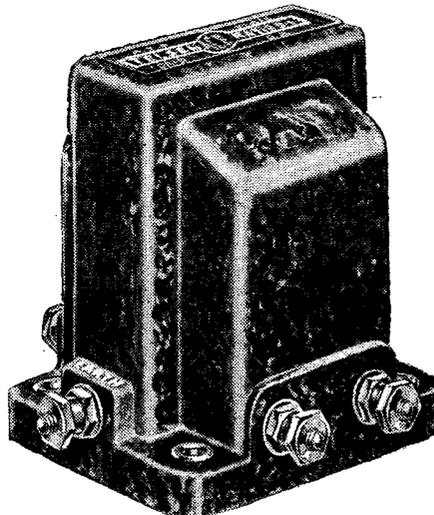
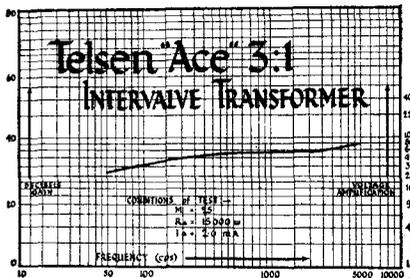
Ratings	Normal Current	Max. Current	
40 H	5 m.a.	10 m.a.	<b>5/-</b>
100 H	3 m.a.	8 m.a.	

## TELSEN OUTPUT CHOKES

Designed for use with power or super-power valves taking an anode current of up to 40 m.a., this output filter provides an ideal response curve under all conditions. For use with a condenser of not less than 1 mfd. capacity. **7/-**

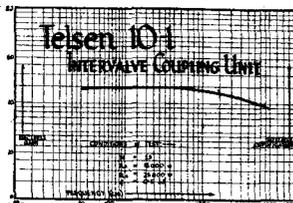
## THE TELSEN "ACE"

The Telsen "Ace" is eminently suitable for Receivers where highest efficiency is required at low cost and where space is limited. As its characteristic curve will show, it gives a performance equal to that of the most costly transformers. Ratio 3-1 **5/6**  
Ratio 5-1



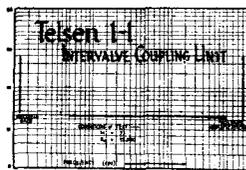
## TELSEN 10-1 INTERVALVE COUPLING UNIT

A filter-fed transformer using a high permeability nickel alloy core, securing a 10-1 voltage step-up while preserving an exceptionally good frequency characteristic. The response is compensated in the higher frequencies for use with a pentode valve giving an amplification greater than anything previously achieved, equal to two ordinary L.F. stages but with better quality of reproduction. **12/6**



## TELSEN 1-1 INTERVALVE COUPLING UNIT

A modern development of the deservedly popular R.C. unit incorporating a low pass filter feed in its anode circuit, thus preventing "motor-boating," "threshold howl" and other instability due to common couplings in eliminator and battery circuits. Used with an H.L. type valve it gives an amplification of about 20 and a perfect frequency response on a negligible consumption of H.T. current. **7/6**



## TELSEN MULTI RATIO OUTPUT TRANSFORMER

For use with moving-coil speakers, having a low impedance speech coil winding and suitable for anode currents of up to 40 m.a. Three ratios—9-1, 15-1, 22.5-1—allow for correct matching of speakers of widely varying characteristics. **10/6**

## TELSEN OUTPUT TRANSFORMER (Ratio 1-1)

For connecting the speaker to the output stage, using a triode valve. Avoids saturation by isolating the D.C. from the speaker windings. Also keeps H.T. voltage from the speaker and its lead, which is especially important where a D.C. eliminator is being used. Suitable for anode currents of up to 40 m.a. **10/6**

# TELSEN

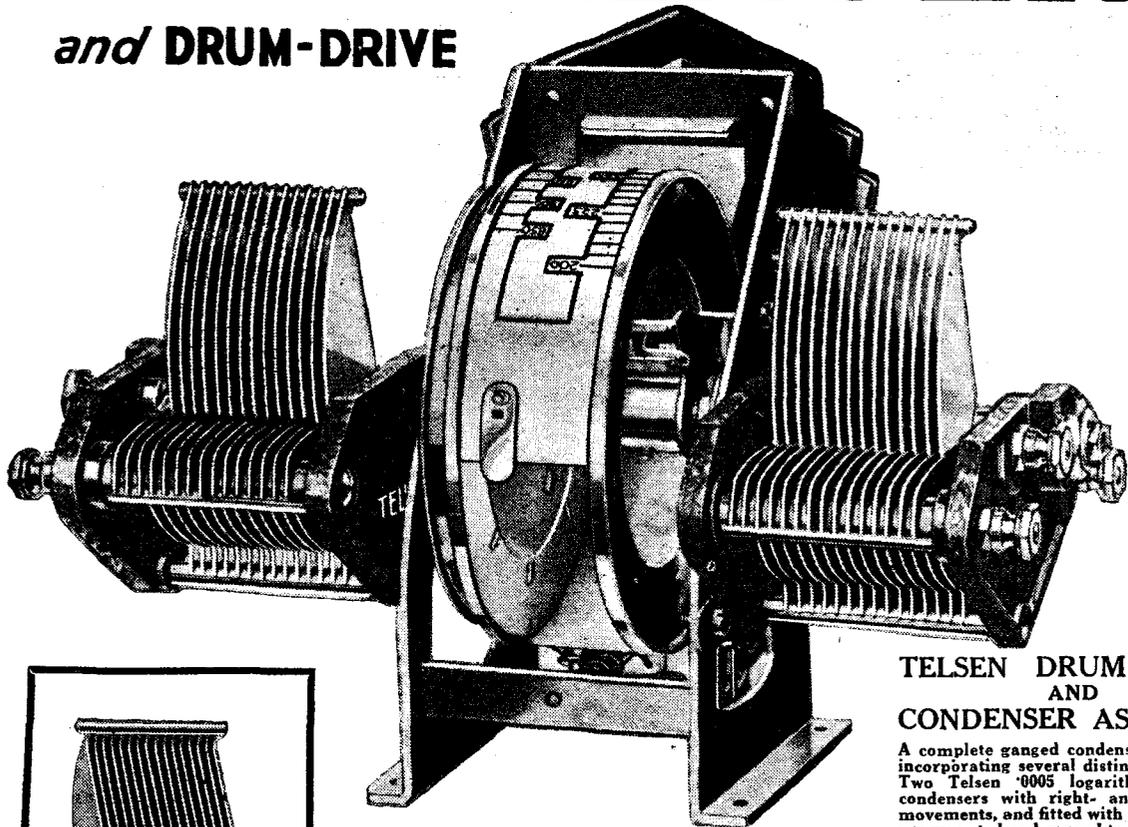
RADIO COMPONENTS

**BUY A COPY OF THE TELSEN RADIOMAG - PRICE 6d.**

ANNOUNCEMENT OF THE TELSEN ELECTRIC CO., LTD., ASTON, BIRMINGHAM.

# TELSEN LOGARITHMIC CONDENSERS

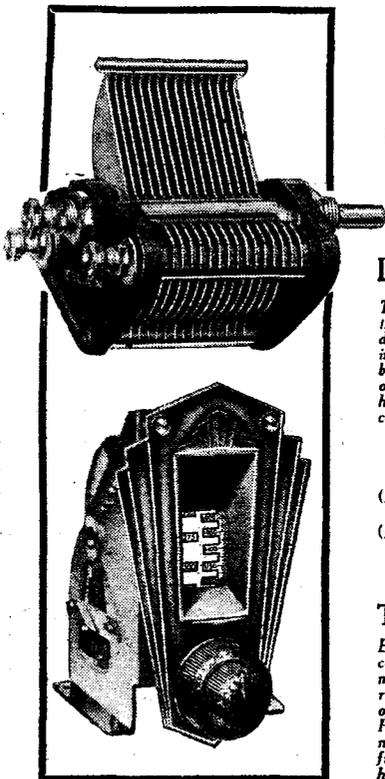
and DRUM-DRIVE



## TELSEN DRUM DRIVE AND CONDENSER ASSEMBLY

A complete ganged condenser tuning unit incorporating several distinctive features. Two Telsen '0005 logarithmic variable condensers with right- and left-handed movements, and fitted with compensators, are mounted and ganged together through a rigidly constructed drum-drive control. Mounted on the same spindle axis as the main tuning drive is a trimmer, giving a swinging movement of about 20 degrees to the stator vanes of the right-hand variable condenser enabling perfect matching of the condensers to be maintained throughout the tuning range. Two scales are supplied, one marked in wavelengths and one in graduations from 0-100. The scale is illuminated and is easily removable when it is desired to fit one of special calibration. The escutcheon is handsomely finished in oxidised silver, with knobs of the push-on type. Provision is made for panel and baseboard mounting; full instructions for mounting, together with a double-ended spanner for fitting the variable condensers, are included with every unit.

**17/6**



## TELSEN LOGARITHMIC CONDENSERS

The frame is braced by three solid pillars, and the vanes clamped at three points, making distortion impossible. The rotor is also built into a rigid unit, the vanes being held at both ends. Generous bearings obviate backlash or end-plate. Models with left-hand and right-hand movements respectively incorporate a compensator (max. cap. 60 micro-microhenrys).

- Cap. '00025..... 4/6
- Cap. '00035..... 4/6
- Cap. '0005..... 4/6
- (Left-hand movement with trimmer)
- Cap. '0005..... 5/-
- (Right-hand movement with trimmer)
- Cap. '0005..... 5/-

## TELSEN DRUM DRIVE

Embodies numerous refinements, including a cord drive, arranged to reduce wear to a minimum and to prevent over-run, and a rocking stator trimmer, which gives a variation of 20 degrees, and visual indication of setting. For use with Telsen screened coils, an extra scale, marked in wavelengths, is supplied free. Illustration shows escutcheon, handsomely finished in oxidised silver.

**8/6**

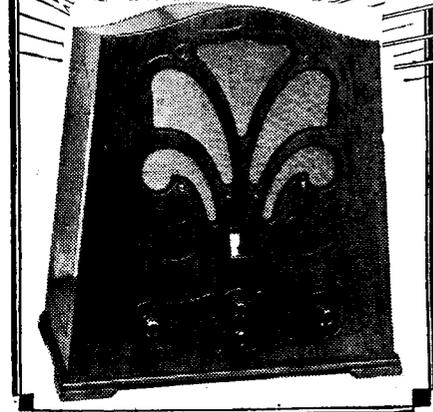
# TELSEN

**RADIO COMPONENTS**

**BUY A COPY OF THE TELSEN RADIOMAG - PRICE 6d.**

# RECEIVERS OF RENOWN

## No. 8—THE MARCONIPHONE SEVEN-VALVE TRANSPORTABLE RECEIVER FOR A.C. MAINS.



FOR those who desire to receive a multitude of stations at full loudspeaker volume together with hair's breadth selectivity, there is nothing to beat a well-designed super-het.

It has been said that this class of receiver is not ideal from the standpoint of reproduction; but technically there is no reason at all why the quality given by a super-heterodyne should not be just as good as any other type of set.

### "Second Channel Eliminated.

One of the drawbacks of super-het circuits in the past has been the existence of "second channel" effects. Powerful stations were often received at several points on the tuning range, and a beat

full-wave rectifier, and does not take any part in the amplifying chain. Its function is to convert the A.C. mains voltages to pure D.C. for the anodes of the valves.

The receiving circuit itself follows the most up-to-date practice, incorporating as it does a pre-first-detector S.G. valve, an arrangement which eliminates "second channel" interference and improves the general selectivity of the set.

### Modern Design.

Then again, full use is made of that modern improvement in valve design—the variable-mu-valve. There are two of these in the set, and in addition there are an M.H.4 second detector and a P.X.4 output valve.

Some idea of the volume available can be gathered from the fact that the P.X.4 is a valve capable of handling 2½ watts without distortion. This amount of energy will fill a small hall if such big volume is at any time required.

A good set requires a good loudspeaker, and in the case of the Model 256 there is a mains energised moving-coil fully competent to deal with the maximum output of the P.X.4 without showing any signs of distress.

Simple control is the keynote. The tuning and oscillator circuits are "ganged" and operated by a single control. There is an aerial "trimmer" with means for adjustment at the back of the chassis, and the tuning scale is illuminated and fitted with a magnifying lens to assist in accurately tuning the set to the wavelength desired.

A feature of the receiver is the tone control, a device which enables the listener to vary the tone to suit his own particular requirements.

### Valuable Feature.

A control of this nature is of the utmost value in these days of many stations, because it definitely helps to eliminate those irritating heterodyne whistles caused by the mutual interference between stations.

Moreover, a small movement of the knob instantly renders surface scratch from a record bearable—a particularly worthwhile point when the pick-up is being used on a well-worn disc.

On the back of the chassis are two pick-up sockets, a mains aerial plug, and two more sockets for connecting up an external loudspeaker. It is interesting to note that there is a dual volume control for both "radio" and "gramophone."

The results we obtained on test in our laboratory were just what might be expected from such a powerful receiver—a wide choice of stations and ample volume for all

practical purposes. At night all those transmissions that are worth listening to should come in with the greatest of ease on an average out-door aerial—subject, of course, to the usual fading and noise level effects which are no fault of the set.

The wave-range of the set is approximately 200-550 metres on the medium waves and 1,000-2,000 metres on the long waveband.

With regard to the selectivity, we found this to be of a very high order indeed; the London Regional being reduced to silence by a fractional movement of the tuning scale.

### Good Reproduction.

The loudspeaker is free from objectionable resonances and speech is crisp and clear.

In spite of the fact that there are six valves, excluding the rectifier, the set is no more difficult to handle than one utilising a third of this number. Throughout there is evidence of skilled craftsmanship—in the mechanical perfection of the chassis assembly, the smoothness of the controls and the beautiful cabinet work.

The standard model is intended for use on mains of normal voltage and frequency, but the makers can also supply price quotations for models suitable for non-standard mains if required.

Truly a product fully in keeping with the traditions that the Marconiphone Company so worthily uphold.

*(Continued on next page.)*

## TECHNICAL SPECIFICATION

**NUMBER OF VALVES.**—Seven including Rectifier.

**GENERAL DESCRIPTION.**—All-electric Super-heterodyne for A.C. mains 200-250 volts, 50-100 cycles, with band-pass tuning and preliminary S.G. stage before first detector.

Variable-mu valves are employed in the intermediate stages and the output valve is a P.X.4.

**CONTROLS.**—One for tuning, one for volume, one for tone control, and switch giving medium, long waves, "off," and "gramophone" positions.

**DIMENSIONS.**—Height 18½ ins., width 18½ ins., depth 12 ins.

**PRICE.**—24 guineas.

**MAKERS.**—The Marconiphone Co., Ltd., 210-212, Tottenham Court Road, London, W.1.

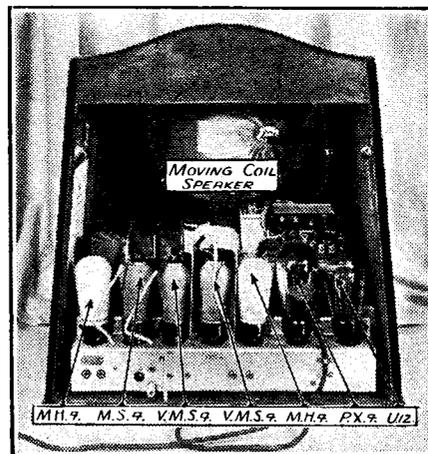
note was heard interfering, perhaps, with the programme to which it was desired to listen.

Another difficulty has been that of eliminating long-wave C.W. Morse, but these troubles are entirely absent from a good modern super-heterodyne, which behaves in precisely the same manner as the so-called straight circuits with the exception that the selectivity and sensitivity are definitely of a higher order.

### A Magnificent Example.

The Marconiphone Model 256 seven-valve receiver is a receiver of the super-heterodyne class, and it is in every way a magnificent example of its type. Although the specification makes use of the words "seven-valves," one of these is, of course, the U12

## POWER WITH COMPACTNESS



Although the Model 256, with its wealth of controlled power, employs six valves in addition to the rectifier, its dimensions are no larger than the ordinary mains "three."

**THE MARCONIPHONE SEVEN-VALVE TRANSPORTABLE RECEIVER**—(Cont. from previous page.)

**MARKED IN WAVELENGTHS**

Separate scales are used for long and for medium waves, and instead of arbitrary figures the actual wavelengths are shown—a fact which greatly facilitates searching for stations.

**ADJUSTING THE VOLUME**

The volume is increased by rotating the control in a clockwise direction. But this knob should be used in conjunction with the tuning control which should be readjusted slightly until the station is heard at the desired strength.

**SEPARATELY SHIELDED**

Between each section of the ganged tuning condenser is a screen to prevent any unwanted feed-back taking place between the various circuits. With modern high-magnification valves this is a wise precaution if full efficiency is to be attained.

**ONE-KNOB TUNING**

The tuning circuits are operated by a single control, the oscillator and band-pass circuits being "ganged" together.

**THE FINAL TOUCHES**

A feature of the set is the fact that the tone is adjustable, a knob being provided for this purpose. This control is valuable for eliminating heterodyne whistles and needle scratch.

**SIMPLIFIED CONTROL**

A turn of the switch alters the indicator below the tuning scale so that it shows the waveband required, viz., "M.W." for medium waves and "L.W." for long waves.

**WELL-SMOOTHED SUPPLY**

The output from the mains rectifier is carefully smoothed and the set is remarkably free from background hum.

**TO SUIT YOUR MAINS**

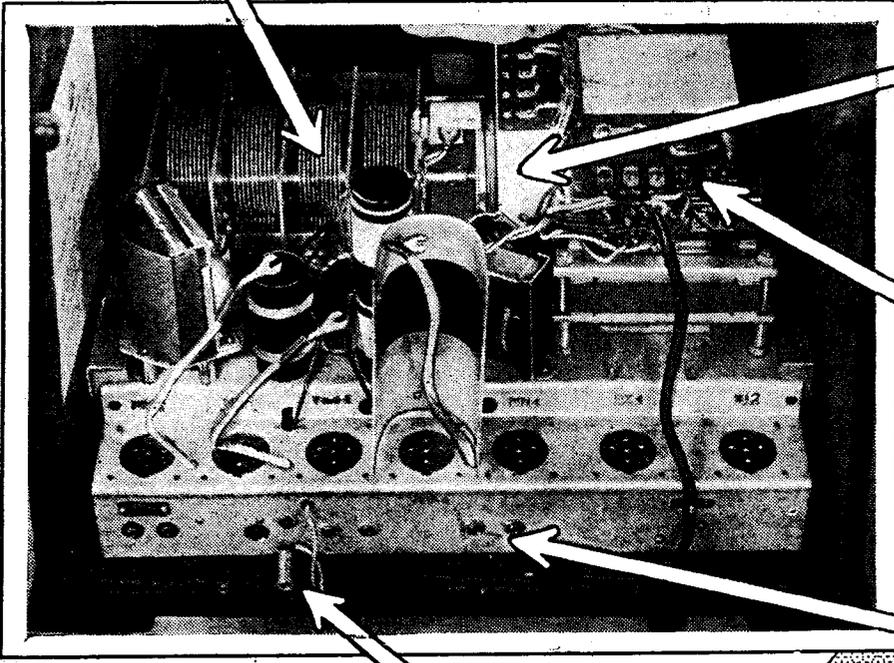
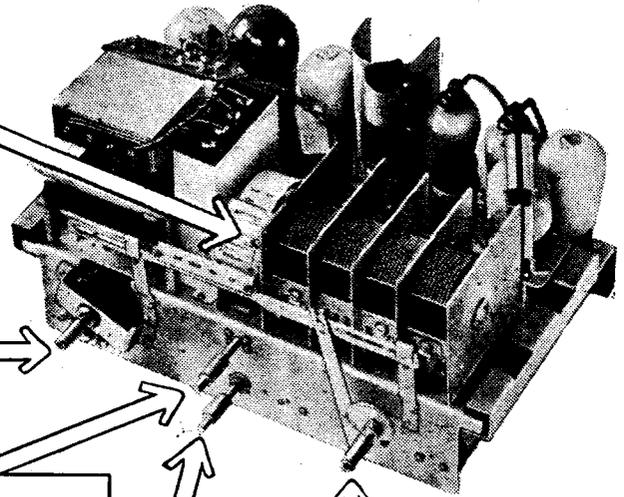
Tappings are provided for various voltages, and before the set is installed the appropriate voltage connection is made by means of the flexible lead provided.

**RADIO OR GRAMOPHONE**

These two sockets are for the two leads from a pick-up, which is brought into circuit by the simple movement of a switch on the front of the cabinet.

**A CONVENTIONAL AERIAL NOT ESSENTIAL**

The receiver is equipped with a mains aerial plug which can be inserted into the aerial socket, as shown. When the mains aerial is not used the plug is placed in the socket above the one to which the aerial is normally connected.



# AMAZING DISCOVERY

## 98% RADIO SETS "DOWN" IN EFFICIENCY THROUGH FAULTY GRID LEAKS OR MICA CONDENSERS!

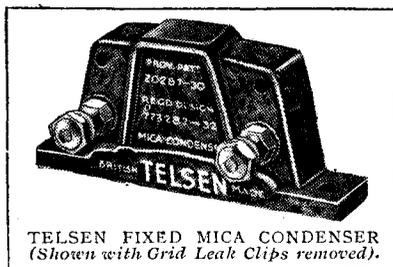
**A** RECENT analysis of Kit sets and Home Constructor Receivers reveals the astounding fact that 98% were considerably 'down' in efficiency through faulty Grid Leaks or Mica Condensers. These tests were carried out by one of the foremost Radio Engineers in the Country on sets which the owners thought were working satisfactorily.

The above facts were brought to the notice of TELSEN Engineers who immediately commenced intensive research and experimental work to discover the causes. Every known make of Grid Leak and Mica Condenser was tested and examined in conjunction with all types of Receivers.

Invaluable information and new data were obtained from these investigations among which were startling revelations concerning the rapid deterioration and consequent loss of efficiency in these components.

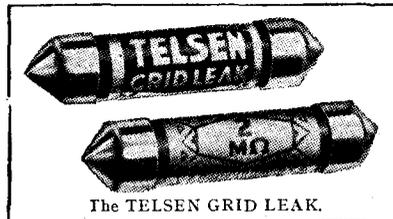
The new TELSEN Grid Leaks and Mica Condensers are the direct outcome of this

amazing discovery. They have been designed on entirely new lines and embody the new



TELSEN FIXED MICA CONDENSER (Shown with Grid Leak Clips removed).

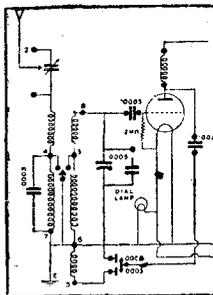
principles formulated by the Telsens Radio Engineers to overcome the numerous faults



The TELSEN GRID LEAK.

disclosed and to attain permanent efficiency.

### TRY THIS SIMPLE TEST

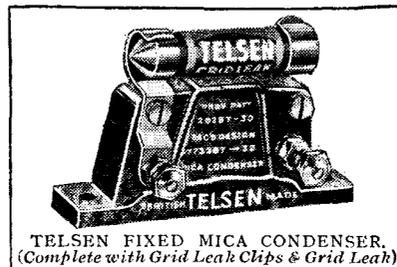


Tune in a station at the top of the medium wavelength band—say the Northern Regional. Note the signal level. Now connect a Telsens Mica Condenser (up to .0003 mfd. in value) across the aerial tuning condenser. Decrease the value of the

tuning condenser until the same station is heard, and it will be found that the signal strength is equal to that previously obtained, proving that the Telsens Mica Condenser has an efficiency comparable with that of the variable air condenser, the most efficient type of condenser used in radio broadcast reception.

The new TELSEN Grid Leaks and Mica Condensers set a world's standard in lasting efficiency.

IT'S THE 'LASTING EFFICIENCY' THAT COUNTS



TELSEN FIXED MICA CONDENSER. (Complete with Grid Leak Clips & Grid Leak)

### WE HEAR

That well over a quarter of a million radio components are produced every day in the new Telsens Works (the largest and best equipped radio organisation in the world, employing in the neighbourhood of 8,000 workpeople)—and that even this record output is only barely sufficient to meet the enormous and still rapidly increasing demand for these popularly priced quality components.

★ ★ ★

That enormous numbers of home constructors are fitting the new Telsens Drum Drive and Ganged Condenser Assembly, whose single knob operated tuning scale, calibrated in actual wavelengths, makes station logging literally as easy as A.B.C.

★ ★ ★

That the new Telsens Telornor (illuminated variable ratio slow-motion Disc Drive, whose handsome silver oxidised escutcheon plate permits of the very effective grouping of all controls) gives home-built sets the dignity and beauty of line of expensive commercial radio receivers.

★ ★ ★

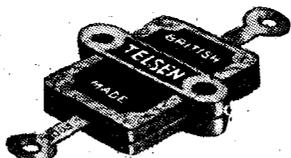
That home constructors everywhere are thrilled with the performance of the sensational new Telsens JUPITER S.G.3 and AJAX 3 receivers, and that free 1/- blueprints and constructional details of these amazing sets are given with the Telsens Radiomag No. 3, price 6d.

**TELSEN**

**MANSBRIDGE AND MICA**

# CONDENSERS

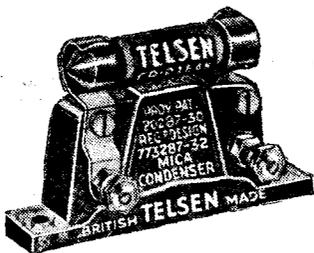
**THE 100% PERFECT CONDENSERS**



**TELSEN TAG CONDENSERS**

Of extremely compact and sturdy construction. May be mounted on either insulated or metal panels by utilising the two baseboard screw holes in the neatly designed moulded casing. The tags enable the condensers to be connected to any other components, either directly or by soldering. H.F. losses are negligible.

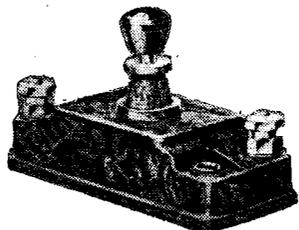
In capacities of '0001 mfd. to '002 mfd. .. .. **6<sup>D</sup>**



**TELSEN MICA CONDENSERS**

Represent an important advance in technique: H.F. losses have been practically eliminated, even in the larger capacities. Enclosed in a very attractive moulded case, adaptable to flat and vertical mounting. Grid-leak clips, which may be mounted in series or in shunt are supplied at no extra charge, with capacities of '0001, '0002, and '0003 mfd.

In capacities of '0001 mfd. to '002 mfd. .. .. **1/-**  
Also '006 mfd. .. .. 1.3



**TELSEN PRE-SET CONDENSERS**

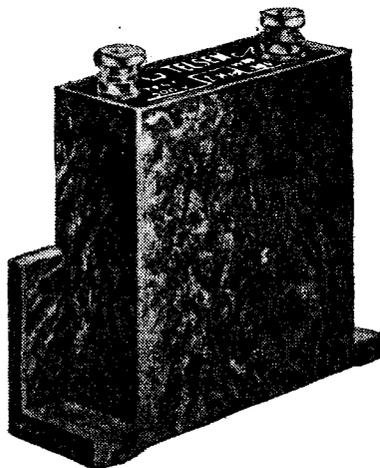
Very low minimum capacity, giving a wide range of selectivity adjustment when used in the aerial circuit. Substantially made, easily adjusted and provided with locking ring. High insulation and low loss.

In maximum capacities of '0001 mfd. to '002 mfd. .. .. **1/6**

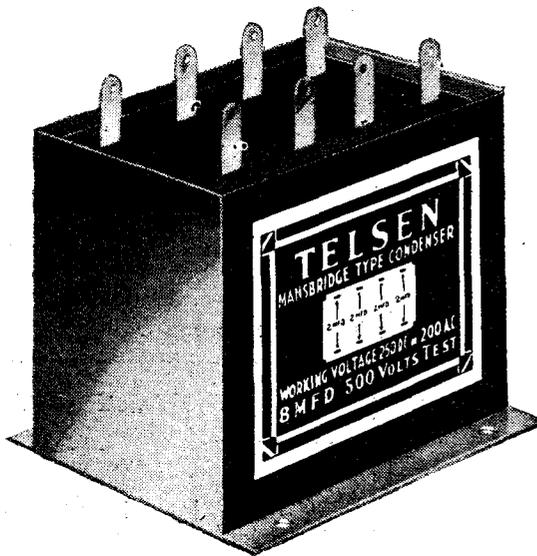
**TELSEN MANSBRIDGE TYPE CONDENSERS**

Made by the most advanced processes from the finest materials, triple sealed and guaranteed non-inductive, and subjected during manufacture to stringent tests up to Admiralty and Post Office standards. Offered in two types — the capacities from '01 to 2 mfd. in bakelite cases and in blocks of 4, 6 and 8 mfd. in metal cases with soldering tags.

Cap. mfd.	500 volt test	Cap. mfd.	500 volt test
'01	1/6	'25	2/-
'04	1/9	'5	2/3
'1	1/9	1	2/3
		2	3/-



**THEY SET A WORLD'S STANDARD IN LASTING EFFICIENCY**



**TELSEN MANSBRIDGE BLOCK CONDENSERS**

Contained in metal cases with fixing holes. Like all Telsens Mansbridge Condensers, they are triple sealed and guaranteed non-inductive, being tested during manufacture to Admiralty and Post Office standards. Made in three types, each having total capacities of 4, 6 and 8 mfd., each type being divided into 2-mfd. sections, so that several arrangements of capacity may be obtained. Soldering tags provided for each section.

Cap. mfd.	500 volt test	1,000 volt test.
4	5/6	9/6
6	8/-	14/6
8	10/6	

**TELSEN**

**RADIO COMPONENTS**

**IT'S THE 'LASTING EFFICIENCY' THAT COUNTS**

# CAPT. ECKERSLEY'S QUERY CORNER



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

**DIRECTIONAL RECEPTION—INSTABILITY—NOISES—VALVE CAPACITY—  
POWER SUPPLY.**

## Twisted Transmissions.

L. O. P. (Chelsea).—"I am unfortunately compelled to use a portable receiver, owing to inability to erect an outdoor aerial, and notice that while it is usually stated that the frame aerial should point towards the station being received for maximum, that it is necessary to turn the frame nearly at right angles to this line in order to obtain satisfactory volume.

"Do you think that the fact that the building is of 'steel frame' construction is the cause of this effect, or if not, can you offer any suggestion as to the reason?"

Certainly the steel frame building makes the apparent direction of the waves different from the direction of the line joining your flat and the transmitting station. A steel frame building has the effect of "twisting" the field of the transmitted wave because currents are set up in the steel frame at phases different from the phase of the components of the original wave, and these currents cause re-radiation of the waves, and so a twisting of the resultant field made up by transmitted wave proper and re-radiated wave.

It's as if water waves were beating against a hard wall when the reflected wave jumbles the symmetry of the arriving wave.

\* \* \*

## New Valves in Old Sets.

T. B. B. (Torquay).—"In an effort to improve reception I purchased some of the latest type valves for my old set (det. and 2 L.F.).

"I am surprised to find, however, that the set is now very unstable, and even decoupling the first L.F. stage only partly cures the trouble. Can you offer any suggestions?"

"I use an H.T. eliminator and a 4-volt L.T. accumulator."

The use of modern valves has probably greatly sensitised your set and made it, with the old circuit but the new valves, inherently unstable.

You have done the right thing in arranging for decoupling. Do it some more, detector especially from first L.F.; and first L.F. from output. If you use transformers try reversing one winding of one or another.

Remember a receiving set is an entity and circuit design is terribly important and that valves are only components of a circuit and have no more or less value than the circuits which surround them.

## Singing in the Rain?

M. G. A. (Harrow).—"Since the studios used by the B.B.C. are really immune from external noises, how was it that during a recent heavy shower of rain I distinctly heard the noise made by the rain coming from my loudspeaker?"

Probably because the rain was charged with electricity, and hitting your receiving aerial, discharged its charges through your set. Now tell me you have an indoor aerial.

Even if you have, the effect might be caused by induction of currents due to the rain discharges. Anyway, I do not think you heard the sounds of that sacred rain which dared to damp the environs of the great halls where music, song and culture are so beautifully classified and portioned out for our delectation.

Incidentally, was it raining at Harrow when you heard these sounds, or were the sounds only due to heavy microphone hiss? Sometimes mistakes are made, a speaker stands too far away from the microphone, or the announcer switches on the wrong one, perhaps, who knows?

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

## Calculating Capacity.

D. A. (Gloucester).—"When one calculates the capacity of a condenser with an air dielectric the specific inductance capacity is taken as one. If some other substance than air is used for the dielectric the S.I.C. is given by text books as being something greater than one.

"What would be the S.I.C. figure used in calculating the capacity between the electrodes of a valve, where the dielectric is a vacuum?"

The answer is 1, because air is assumed to be a vacuum as far as S.I.C. is concerned. Perhaps some gases and some airs have an S.I.C. value slightly different from unity, but the difference between the real value and unity is negligible in ordinary calculations.

\* \* \*

## A.C. or D.C.?

B. R. N. (Bristol).—"I am thinking of constructing a mains type set, but have only a 50-volt supply available, so I will have to use a rotary converter or else a motor generator, depending on whether I use D.C. or A.C. valves.

"Which would you advise building, a set with A.C. or one with D.C. valves?"

I assume you have a 50-volt D.C. supply. Then get an A.C. generator.

The whole future of power and lighting mains supply technique will be based upon the use of A.C.—at least, so it seems to-day.

Therefore, the technique of wireless will move and is moving towards an A.C. lighting technique.

Modern A.C. valves do not introduce hum if properly circuited, and so in every way I recommend A.C. for the set's sake.

Moreover, the rotary brush gear is simpler with A.C. technique—D.C. brushes are a nuisance and cause interference with wireless reception. You've got to use one pair, but do not use two pairs.

## IMMUNE FROM OUTSIDE INTERFERENCE



This photograph of the Debates studio at Broadcasting House would seem to confirm Capt. Eckersley when he assures M. G. A. (Harrow) that the noises he heard did not originate at the studio.

# RANDOM JOTTINGS

A Breakdown Record—"Radio Reith"—S O S Calls—The Romance of a Pickle Jar.

By A STAFF CONTRIBUTOR.

WHATEVER criticisms are levelled from time to time (and that means day by day) against the B.B.C. programme department, or against the "Higher Command" dealing with general policy, it must be admitted that there is little or nothing about the engineering side which calls for criticism.

It was revealed the other day that during a period of four months of broadcasting, the breakdown period totalled only one hour. Or, if you like more specific figures, the proportion works out at one minute in 2,800 minutes!

## Breakdowns are Rare.

These figures serve to remind us how remarkably rare a breakdown is, and how efficient is the general conduct of the B.B.C.'s technical department.

During last year there were 64,000 total hours of broadcasting—an average of about 3,600 hours from each station, and the percentage for breakdown works out at '028 per cent.

Mr. Noel Ashbridge, the chief engineer, and his colleagues are certainly entitled to very hearty congratulations.

Here are some more facts and figures about another aspect of the B.B.C.'s work:

A summary of the S O S messages broadcast during the first half of the present year shows a marked increase in numbers. The total for all stations, including London, was 493 for the six months, as against 833 for the whole of 1931.

## More Messages.

There was a considerable increase in the number of messages for missing persons, which was 191 for the half year as against 270 for the whole of 1931.

In all classes of messages, except those concerning witnesses of accidents, the percentage of successful messages was rather higher than in 1931. Even the messages for missing people, which used to be successful in one out of five cases, has risen to the ratio of one out of four. The percentage of appeals for relatives of sick persons is still over 50.

The "Passing Show" recently devoted a page to "Radio Reith"—the Director-General of the B.B.C. Here are a few extracts from the article describing the "D.-G." as "Autocrat of the ether, ruler

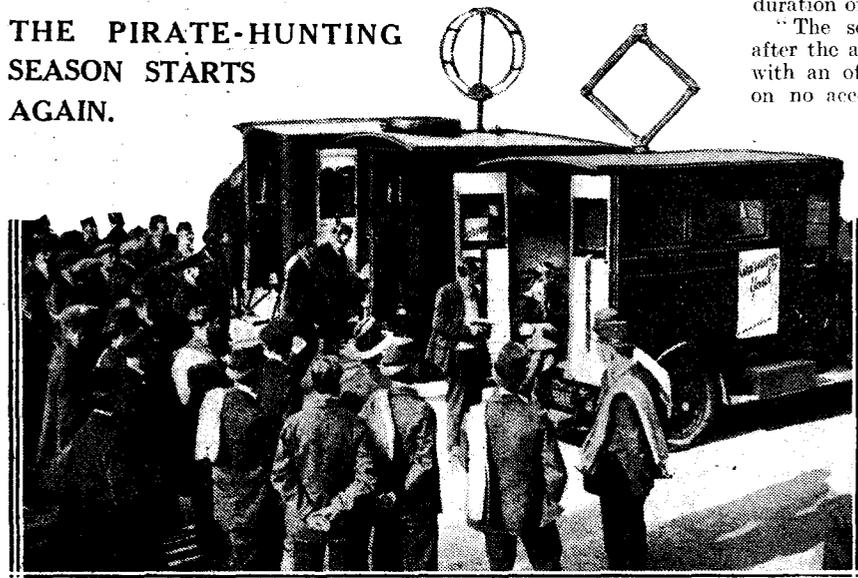
of the radio reactions of untold millions." "Brusque and serene with everybody—including Sir John Reith." Allows himself no liberties. He is almost a teetotaler, eider his deepest dissipation. His smiles are frequent—among friends. But very few people have heard his laughter.

## "Come Off it John."

He is a man without a hobby. His real hobby is the High Horse . . . If you know him *very* well indeed you say: 'Come off it, John.' Then he dismounts with charming grace. But don't attempt that sort of familiarity during official hours. He can play the fool in his own house. But nowhere else. He is a generous host, and he can be a genial one . . . The Director-General's decision is final. The public cries aloud for what it wants. Like a child crying for the moon. What hopes? None. Might as well stop crying and be a good public. Because—Here is your wireless entertainment. Take it. Or leave it!"

Here is an interesting dramatic story of

## THE PIRATE-HUNTING SEASON STARTS AGAIN.



It seems to be becoming a regular thing each winter for the G.P.O. to organise a special campaign against the users of sets who do not possess licences. Warnings were recently issued via the microphone, and the reason for the success of the venture seems to be more psychological than technical.

war, radio—and a pickle jar, which appeared the other day in the "Daily Express."

## When War was Declared.

"On the night of August 4th, 1914, a schoolboy sat experimenting with a primitive wireless set made from a pickle jar. Suddenly he was thrilled to hear Admiralty messages being broadcast to ships at sea. He was listening in to the official orders of the British Government.

Next day he was discovered by the Post Office authorities. He was taken away, but later released.

That was eighteen years ago—but the pickle-jar set is still going."

Mr. R. Park, of Queen Alexandra Road, the maker of the set, recently found this pioneer receiver in a lumber-room, and it is now on exhibition in a shop window.

## Parts from Alarm Clock.

It is made out of a pickle jar covered with cardboard and 100 yards of insulated wire. The detector consists of two crystals fitted to parts from an old alarm clock.

"I was on holiday when war was declared," Mr. Park told a reporter, "and hurried home to hear what news I could get by wireless.

"The moment I picked up the earphone I heard a constant buzzing of Morse messages to ships at sea. Official orders were overheard by me, translated, and relayed to those in the house.

"There was a tremendous thrill when I picked up a Morse message to a destroyer cancelling previous instructions and ordering it to return immediately to the Tyne for fresh bunkers and await secret instructions on arrival.

## Taken for a Spy.

"The sequel came next day, when six officials from the General Post Office at North Shields called. They discovered the log I kept of all messages received.

"They promptly hauled me off to the post office. When they were satisfied I was only a schoolboy, turned spy by accident, they discharged me with a warning not to dabble again in wireless for the duration of the war.

"The set was confiscated, and after the armistice it was returned with an official notice that it must on no account be set up without permission from the Postmaster General.

"I stored it in a lumber-room, and when I rediscovered it last week I found it was still in working order."

It seems the G.P.O. was just as vigilant in those days as it is to-day over "unauthorised" listeners.

## Congratulations.

I congratulate Mr. Park on his early experimental efforts—but I hope he will forgive me for suggesting that, as his Pickle Jar set has had its day, he might now care to build himself an "Apex" . . .!

## POPULAR WIRELESS

NEXT WEEK

will contain, among other features  
Articles on

"THE 1933 FOUR"

AN EVENING WITH AN "APEX"

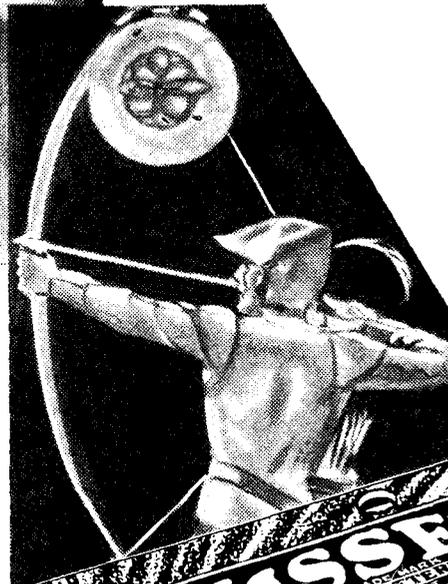
and  
MODERN TONE CONTROL

DON'T MISS THEM

HOW STUDIO SOUNDS  
ARE PRODUCED



# The Twang of a Bow String



Test your radio reproduction by noticing how the twang of a guitar and the twang of a bow (produced in the studio by plucking elastic) sound. Does your set give you that gradual fading away of the reverberations, or is the sound quickly cut off so that it seems to have no tail to it? It is the tail of the twang that tells the tale of the studio. Best reproduction is built up of detail, and purity in your high tension current is absolutely necessary if you desire to have *detailed* reproduction.

No current is purer than the current of a Lissen Battery—no current is longer lasting—none flows so smoothly, none so noiselessly. Ask firmly by name for a Lissen High Tension Battery—every radio dealer sells it.



# LISSEN<sup>H.T.</sup> BATTERY

an exclusive process makes it last longest and provide a pure high tension current that gives realism to your radio—always

# MAKE YOUR OLD SET

# BETTER THAN IT

Is your radio set behind the times? Is it failing to give you modern efficiency? Do you realise how easily and cheaply you can make it even better than it was when new? Take advantage of the many improvements in design and efficiency which have been discovered since your set was built and bring it right up-to-date with Ready Radio Components. Every Ready Radio Component is the outcome of extensive laboratory research of the famous designer, Mr. G. P. Kendall, B.Sc., and possesses special features which will give you greater efficiency and reliability. As soon as you put Ready Radio Components into your set you will be impressed by the improvement.

Have you a straight two- or three-valve Detector-L.F. Set? The Ready Radio Dual Range Coil will give you a degree of selectivity and sensitivity such as you have never

Dual Range Coil	10/6
Standard H.F. Choke	1/6
Volume Control	3/9
S.C. Coils (complete)	8/6
S.W. Coils	4/-
On-Off Switch	10d
Wavechange	1/6
Panel Light	2/3
H.T. Fuse Holder	6d
Fuse	6d
L.F. Transformer	8/6
400-ohm Potentiometer	2/9
S.C. Choke	5/6

# READY RADIO

# WAS WHEN NEW ..... for a few shillings

had before. Your set will also be much easier to operate because of the unique four-in-one control which operates on-off, wavechange, selectivity, and volume control—all with one knob. Worth 10/6 isn't it? Are you losing efficiency in your tuning condenser? The Ready Radio "Micalog" has a special di-electric which gives it an amazing degree of efficiency—yet the cost is only 3/6.

Whatever your set Ready Radio Components will give it new life and vigour—in the easiest and cheapest way. We show you how FREE.

Post coupon now and we will send you a free copy of the wonderful 1/- Book of Kendall-Price Circuits. It contains full details, plans, photographs, and diagrams of ten modern circuits with complete instructions for modernising your old set or building an entirely new one.

THIS BOOK  
*Free*



'Micalog' Condenser	3/6
Disc Drive 25 to 1	4/-
Snap switch	2/9
Log Law Condensers	from 1/9
Valve Holder,	
4-pin	6d
5-pin	9d
Thermium Grid Leaks	10d
Differential Condenser	2/6

Post coupon now for your FREE copy of the Kendall-Price Book of Circuits.

-----COUPON-----

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

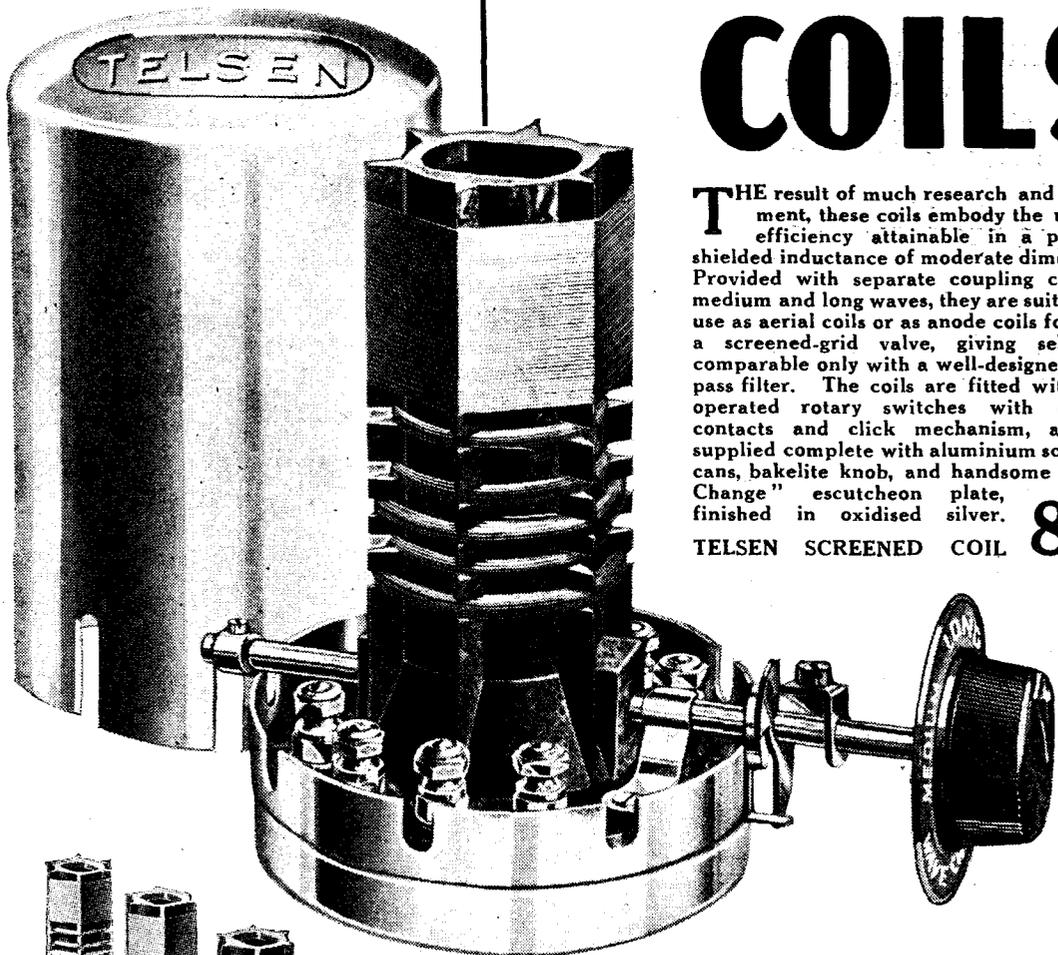
Please send me Free copy of the Kendall-Price 1/- Book of Prize Circuits. I enclose 1½d. stamp for postage. (If you also require set of ten full-size blueprints enclose 1/- in stamps with this coupon.)

NAME.....

ADDRESS.....

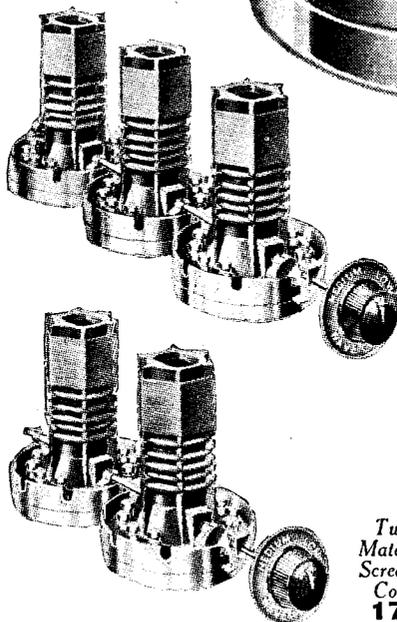
P.W.9.

# TELSEN SCREENED TUNING COILS



THE result of much research and experiment, these coils embody the ultimate efficiency attainable in a perfectly shielded inductance of moderate dimensions. Provided with separate coupling coils for medium and long waves, they are suitable for use as aerial coils or as anode coils following a screened-grid valve, giving selectivity comparable only with a well-designed band-pass filter. The coils are fitted with cam-operated rotary switches with definite contacts and click mechanism, and are supplied complete with aluminium screening cans, bakelite knob, and handsome "Wave Change" escutcheon plate, finished in oxidised silver.

TELSEN SCREENED COIL 8/6



Triple Matched Screened Coils 25/6

Twin Matched Screened Coils 17/-

Full instructions are supplied with every Telsens Screened Tuning Coil, showing you the alternative methods of mounting the coils, either singly or in twin-matched or triple-matched form as required.

# TELSEN

RADIO COMPONENTS

**BUY A COPY OF THE TELSEN RADIOMAG - PRICE 6d.**



# BEHIND the GRAMOPHONE RECORD

A peep at a little-known side of studio life.  
By A SPECIAL CORRESPONDENT.

**A**UTUMN. Falling leaves and grey skies. Good-bye to summer! Winter ahead! Early sunsets and the lighting of the first fires! Armchairs and slippers! And the radio-gram comes into its own—

All summer it has been silent. We've turned on the radio, but that's simple. Why bother with pick-ups and records? As if they were any bother! Now, though summer has fled. Welcome back, radio-gram! Familiar friend with familiar tunes!

Yet how little we know of the romance behind you! Most people visualise the scene in the broadcasting studio as they listen to wireless programmes, but how many imagine the recording studio as they listen to their gramophone? How many know that there is actually a building converted to the use of that other "mike," a brief next-door-but-one to Broadcasting House?

#### Plain Enough to See.

Aspirants pass it on their way to auditions and in all probability give broadcasting's sister not a single thought. Yet it is plain enough to hear! Jumbled and discordant sounds frequently drift down to the pavement!

And it is plain enough to see! The sign, affixed to a doorway to the right of the main entrance to Queen's Hall: "Small Queen's Hall. H.M.V. Recording Studios" is sufficiently prominent. Let's pull aside the curtain and peep inside and see the ways of artistes as they record their talents for a possible posterity—and, of course, for our sweet selves.

Surely we know that Lancashire accent? That song about a pig and a poke? A red light warns us that recording is in progress, but as we watch the light flickers into nothing, and here is a concert hall in miniature. Of course, it's our Gracie. Ours, surely, for the only other occupants of the hall are a piano and the studio manager.

#### Nothing But Perfection.

"Sorry," the latter is saying. Gracie grimaces. She has fallen under the record-maker's curse—chipped wax. A mésalliance between her voice and the microphone, and a flaw has been found on

the surface of the wax. Nothing but perfection will suit you and me—the public!—and so a fresh "master" must be made.

In the adjacent recording room—a mare's nest of wires—the recording operator in his white apron points out the chip in the toffee-coloured wax. He indicates other pinpoint defects on the grooved surface.

"That note was too loud just there!" This individual is a wizard. He can tell by looking at a record surface whether it is the outcome of the efforts of an orchestra, a solo instrumentalist, or a singer. Probably, too, he is blasé.

#### A Lengthy Business.

He remembers when unbreakable, lightweight records were first made, so don't tell him that these are "something new." Otherwise, he will begin his customary tirade. "Why—in 1910——!"

Well, this is going to be a lengthy business. We'll go and have lunch. At this recording studio, recording and audition

work goes on every day from ten till one and two till five. The records that find their way into the shops represent not a third of the material that actually passes through the "mike."

Returning, we find Ambrose and his band—Ambrose is in the act of turning to a saxophone player.

#### Playback of the "Number."

"A wrong note in the sixteenth, I think!" That just shows you the precision! They rehearse the tune once more, and then make a test record.

A handsome young man mouths at the microphone, but his words, one thinks, are drowned by the banjoist at his side. The final bars, and everyone remains still and silent until a buzz tells that the recording operator has lifted the recorder from the wax.

"Rather long, Mr. Ambrose. Can we have twenty-five or so seconds off that?"

"Surely!" says Ambrose, and turns to a violinist. "Cut out that repetitional passage. Go straight on to the trumpet!"

The player nods. We all listen to the playback. Now we see that both the banjoist and the singer knew their business. The former is a mere background, the latter, strong and clear. Meantime, Ambrose keeps up a running commentary.

"Too loud, that cymbal, there! Violin slightly uneyen there——"

Pass on to the Queen's Hall. The other day they were recording a symphony in the main concert hall itself, while a solitary charwoman formed an unappreciative audience. The microphone has made all the world a record.

#### The Record Recorder.

Another studio of interest is in a building of modernistic atmosphere on the edge of the country. Here come Mark Hambourg and Peter Dawson and others who have never accustomed themselves to unfamiliar conditions and who prefer the old work-rooms.

We find Peter in his shirt-sleeves about to boom a stirring pirate song. Having made records for thirty years, he holds a record in the profession. Between his "test" record and the play-back, he recalls

(Continued on next page.)

### A PRIME FAVOURITE



Yes, it's Peter Dawson—one of the most popular of all the gramophone stars.

## BEHIND THE GRAMOPHONE RECORD

(Continued from previous page.)

a time when he was assisting in making a dramatic record, "The Wreck of a Troop-ship."

"A friend of mine who was busy with a hammer and a thunder-sheet was so violent in his noise-making, that he wrenched the sheet from its moorings in the ceiling and down the whole lot fell—on top of me. That wasn't so bad, but my surprised friend then let go of his hammer and that hit me, too! I was completely knocked out!"

### Freedom of the Microphone.

They tell, too, in the recording studios, of a tenor who was having a difficult job with a song, the last bars taking him through some particularly trying passages. Again and again he rehearsed. When perfection was reached he was nearly exhausted.

Then again and again he made master records only to spoil them through "blasting." Afternoon dwindled into tea-time, and other people were itching to go home. The tenor decided to make one last attempt before giving it up till another day.

He sang like an angel! The recording was perfect. The operator was in ecstasies. The song ended at last in a flow of perfect melody, and the operator motioned to move the point from the wax.

Before he could do so, some spoken words came through the guiding loud-speaker to be forever engraved on the last grooves.

"Thank goodness that's over! I

couldn't make a better one if I tried for years!"

So now you know a little of what goes on "behind the scenes." But in these days "behind the scenes" might be almost anywhere. The advent of electrical recording eight years ago meant the banishing of the old horn apparatus and the freedom of the microphone.

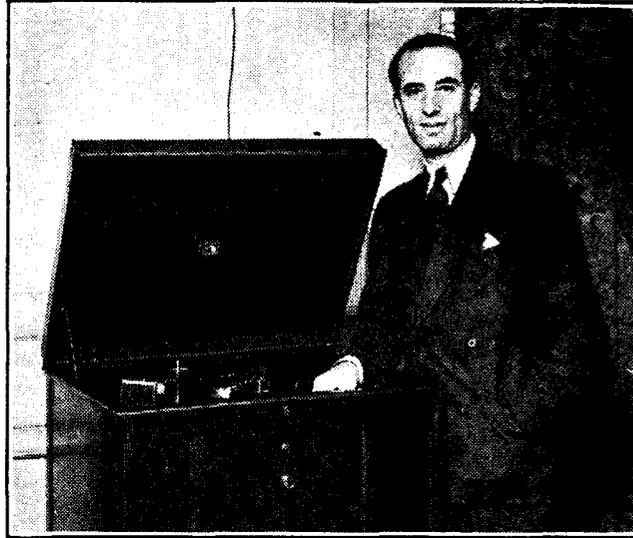
They have made records at the Zoo, St. Paul's, the Albert Hall, a garden in Surrey where Beatrice Harrison enchants the

nightingale, at Aldershot, on the cliffs of Cornwall, and even in Oxford Circus Tube Station. The little discs have come to the aid of music schools, psychologists, dentists, and scientists in other lines of thought.

The chosen few—such as Hylton and Payne, and Gracie and Dawson—make small fortunes annually from the piling up of royalties on their records. The common idea that record makers are invariably highly paid, however, is entirely erroneous.

A song is never recorded until it has been accepted by a publisher and then it will bring its composer only ten or fifteen guineas. While the unknown performer is very lucky if he receives in the beginning five pounds per record for six records a year.

## "AMBROSE AND HIS (MECHANISED) ORCHESTRA"



The popular Dance Band conductor is listening to his new 9-valve automatic record-changing super-het. It is a "His Master's Voice" product, and receives over 90 stations on the one dial!

### Auditions.

Auditions are fairly easy to obtain if you have proven ability, for the majority of the gramophone companies now hold regular audition days for "young hopefuls." Serious test records are made of these aspirants for, like the B.B.C., the gramophone companies argue that "you never know."

But though many come, very, very few are chosen.

When Palermo relays the Rome programme it picks this up first by radio, as there is no suitable landline link between the two places.

Radio Paris engineers, not perfectly content with their new station, have been experimenting with increased power.

A new long-wave station is being erected at Toulon by the French naval authorities, to communicate with submerged submarines.

Madrid is one of the few stations to broadcast the proceedings of the Town Council regularly.

One of the proposals in the new Spanish Regional scheme is a station for Bilbao, to work on 229 metres.

Like many of the other Germans, the Han-over station pins its faith on wooden masts. The one in present use there is 195 ft. high.

The melody played by the Danish stations when closing down for the night is a folksong, "There is a beautiful country."

### A MUSICAL INTERVAL SIGNAL.

Heilsberg, the powerful German Regional on 276.5 metres, uses the notes D flat and A flat repeated three times in four and a half seconds, followed by a pause of four and a half seconds, as an interval signal.

Leningrad, on 1,000 metres is one of the several European stations that employ a cuckoo call as interval signal.

Breslau recently started giving the names of the announcers to be on duty each day, at the beginning of the morning programme.

## ROUND THE STATIONS

From Palermo to Berlin

The old Leipzig transmitter will probably be re-erected at Trier, on the Franco-German border, owing to the difficulty of picking up other German stations direct in that district.

The constant interference which is experienced on Leningrad's wavelength is due to the fact that he has chosen the same wavelength as the British direction-finding and beacon stations that continually transmit powerful signals to ships.

Munich's new high-power station is supposed to be ready in October.

The aerial of the new Leipzig station is of an experimental nature, being supported on six masts arranged in circular fashion. It is supposed to concentrate most of its radiation in the horizontal fashion.

The new electric-power organ at Hilversum is to have church-bells, carillon, harp, and various orchestral instruments, besides 50 organ stops.

Under Spain's latest broadcasting scheme, a new 20-k.w. station is proposed for Seville. It will work on 263 metres.

The lonely Pacific island Tristan da Cunha, is supposed to be one of the best places in the world for radio reception.

The Poste Parisien masts, at Molières, are about six hundred feet in height.

A census taken this year disclosed the fact that approximately forty per cent. of homes in the United States have radio apparatus installed.

Application has been made by a communications laboratory in the U.S.A. to erect two transmitters to work at Hillsborough, N.J., on wavelengths between 1 and 3 centimetres (The former represents a frequency of 30,000,000,000 cycles per second!)

### RADIO PICTURES FOR THE POLICE.

It has been proposed to fit all the large French police centres with Belinographs, for picture transmissions.

The Italian name for Florence is "Firenze," and this is how the name sounds when tuned in on 500 metres.

An interesting programme idea tried out by Palermo was the playing of unannounced gramophone records, for listeners to guess the music and executants. Lots were drawn by the successful competitors for a number of records given weekly as prizes.

One of the Los Angeles stations claims to have been on the air for twenty-four hours a day for over three years.

The Funkturm, Berlin's famous radio tower, is the site of the Berlin 7-metre transmitter.

# 7 GREAT Improvements to YOUR Radio with 1 Accessory

**1** THE PERFECT INSULATED LEAD-IN



**2** A WONDERFUL STATION SELECTOR



**3** A REALLY GOOD ATMOSPHERIC ELIMINATOR



HEAR stations you have never got clearly before . . . protect your home from lightning . . . enjoy listening at the pleasantest volume, free from static . . . be able to cut out your interior wiring from the aerial in a moment: you can easily do all this by fitting a Pressland Aerial Control COP. The best-made and most practical Lead-in on the market . . . now being used in thousands by new listeners and as replacements for old-fashioned patterns.

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By every post comes news of the success of the COP . . . how it is improving reception in all parts of the Country and making wireless a pleasure by removing the annoyance of interfering stations, excessive volume, and static noise. And what peace of mind it gives to the nervous members of the family, to know that lightning cannot strike a COP-protected set! Get a COP from your local radio dealer to-day, or send P.O. direct to the manufacturers. Delivery by return.

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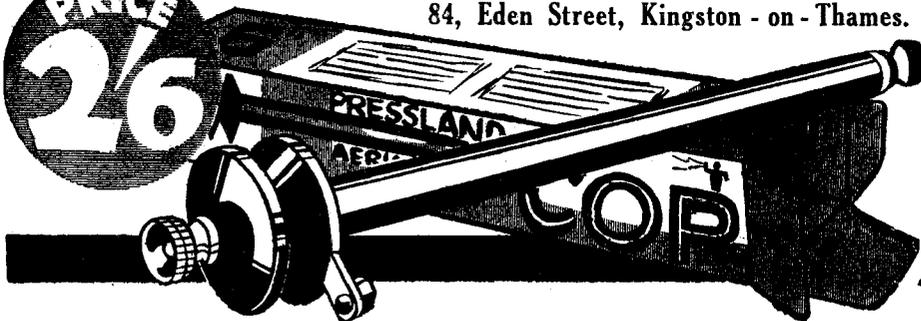
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THE MIRROR OF THE B.B.C.

By O. H. M.

## GENTLEMEN OF THE JURY

"CONSIDER YOUR VERDICT"—FRESH AGITATION—NEW SCHOOL OF DRAMATISTS—BARRELS OF GUNPOWDER.

I MUST congratulate the B.B.C. on the way in which it got itself out of a grave difficulty in connection with the first of the "Consider Your Verdict" series. Of course, the official announcement of the change simply indicated that the original case having been settled out of court there would be another cause to argue.

I hear on pretty good authority that the National Union of Teachers played a decisive part in effecting the change. The story is that the original cause was built up round a scandal. Anyway, the change was justified, but I am wondering how the organisation of the B.B.C. could ever have allowed the first case to go so far as to be publicly described.

There is something in this which suggests a lack of appreciation by some programme builders of fundamental policy.

### Fresh Agitation.

I hear that the new programmes of television, now entirely in the hands of the B.B.C., have gained some public, which is expressing itself in a growing volume of correspondence. I hear also that there is a fresh agitation to cut into normal programme time in order to gratify the television enthusiasts.

The B.B.C. would be well advised to consider very carefully before upsetting programme arrangements on behalf of what, in any event, is a small minority. On the other hand, I think it would be a mistake for the B.B.C. to curtail its present arrangements within at least a year.

The B.B.C. has gained considerably by absorbing the initiative about television, and it should not sacrifice this.

### New School of Dramatists.

Mr. Val Gielgud and his competent assistants are well advised in their new effort to secure original radio drama. There is room for a new school of dramatists and I hope that there will be no stinting of money to encourage its development.

Radio Drama is quite important enough to carry a budget that would make it worth the while of competent writers to pay attention consistently and over a definite period to this new branch of art.

### Barrels of Gunpowder.

When Mr. Guy Fawkes conceived his playful pranks which brought such sad consequences upon himself he could never have imagined the notoriety that was to be his, or that in 1932 millions of people would be sitting in their homes listening to the bangs of wireless fireworks, all because of a few barrels of gunpowder in whose vicinity he was unfortunately discovered in the cellars beneath the Houses of Parliament.

But there it is—Guy Fawkes may die in thousands of bonfires and his gunpowder blow up in tons of pyrotechnic displays, but he rises each year from the ashes as the firework manufacturers insist he should and would be very foolish if they didn't. For the first time since broadcasting began,

November 5th is to be appropriately celebrated this year with a new radio revue entitled "Fireworks," written entirely by Ashley Sterne and A. A. Thomson.

## THE WAVELENGTH CONTROLLER



Mr. Raymond Brailard, Director of the Central Wavelength Control Station at Brussels, which keeps a check on Europe's carrier-wave frequencies and reports all cases of heterodyning stations.

"Fireworks" is going to give the Effects Department at Broadcasting House such an opportunity of showing their worth as they have never had.

Squibs, rockets, jumping crackers and Roman candles were always noisy, and there can be no good reason to suppose that the B.B.C. Effects Department will decide that they should not be.

### Advance Information.

Two all-star vaudeville programmes are to be broadcast from London in the Birthday Week programmes between November 13th and 20th. One of these is of the "Music Hall" type, and the other an ordinary studio show.

It is seldom one is able to get behind the scenes at Broadcasting House until artists have been actually engaged, so that it is quite an important bit of news to learn that for the studio vaudeville show the B.B.C. is hoping to get Jeanne de Casalis, Marion Harris, Cicely Courtneidge, Florence Desmond, Leslie Hutchinson, Gillie Potter, Clapham and Dwyer, the Hulbert Brothers, the Four Harmony Kings, Georges Seversky, Bill and Elsa Newell and Colombo's Gipsy Orchestra.

### Bigger and Better.

To celebrate the tenth anniversary of broadcasting, the annual dance arranged by the Midland Regional Station on behalf of its Radio Circle Cot Fund will be promoted to a sumptuous Birthday Ball, to be held at the Grand Hotel, Birmingham, on Wednesday, November 16th. Philip Brown's band will play, and part of the music will be broadcast.

## THE LISTENER'S NOTEBOOK

A rapid review of some of the recent radio programmes.

I'VE sampled the new education; I've listened for a whole afternoon to the Broadcasts to Schools. After making allowances for the fact that I had a more comfortable seat than those usually supplied by local authorities, I am of opinion that "school" to-day isn't the unattractive thing it used to be.

### A Little Prejudiced.

I started off with a geography lesson. I learnt a lot of interesting things about Auvergne, but what impressed me most was that the lesson was given by a real Auvergnian—Mlle. Chouvy. I felt she ought to know as much about Auvergne as anybody, although she may have been a little prejudiced.

Her descriptions were full of colour which gave them a greater appeal. Her enthusiasm, too, was infective. She made me feel

as if I was in Auvergne with her, on a tour of inspection.

I fell for her voice and accent. I couldn't quite make out why, at times, it was impossible to think she wasn't English, while, at others, she was so obviously French. It was curious to think that she had thoroughly mastered our extraordinary pronunciation only in certain respects.

But, I suppose, had she sounded completely English, I wouldn't have had such faith in her. As it was, I believed every word she said.

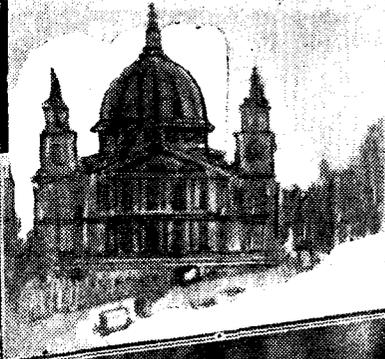
### Began to Fidget.

After the briefest interval in which to stretch my legs came Sir John Russell with a talk on "England, as it was." More geography, but how different from what had preceded it! I didn't like it nearly so

(Continued on page 440.)

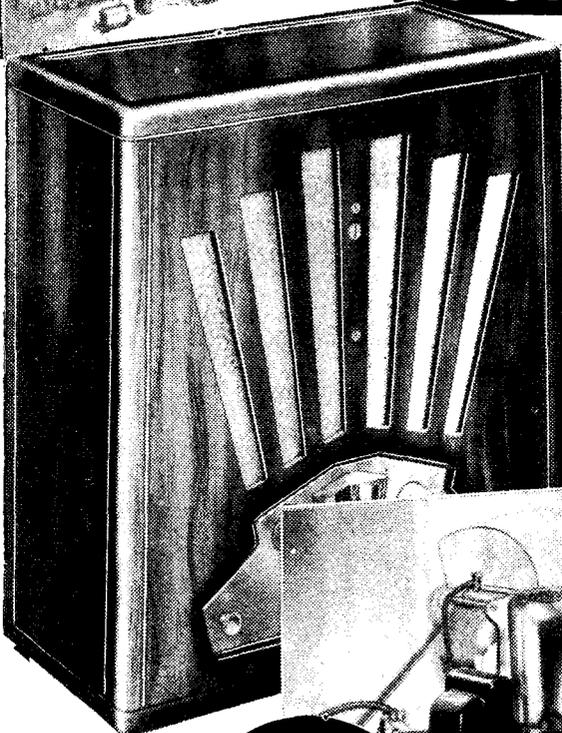
# TREMENDOUS EFFECT OF SKYSCRAPER VALVE POWER NOW REALIZED

## IN PERTSHIRE'S ISOLATED HAMLETS AS IN LONDON'S POWER LADEN ETHER!



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Say Constructor's Letters



## GREAT LISSEN CHART - FREE

TELLS YOU EXACTLY WHAT TO DO WITH EVERY SINGLE NUT and SCREW

*The* ONLY set you CAN build yourself, employing Metallised Screened Grid, High-Mu Detector & Economy Power Pentode Valves.

"Astonished at the power from three valves." . . . "Every station mentioned on your Calibration List." . . . 50-60-70 Loudspeaker Stations! Never before such a set as the Lissen Skyscraper—never before such universal success in building—never before so many appreciative letters from constructors as this Lissen Skyscraper has elicited.

It is the only set on the market that you can build yourself employing Metallised Screened Grid, High-Mu Detector and Economy Power Pentode Valves. No factory—however well-equipped—can build a better receiver. No manufacturer, however large, can produce a receiver whose results will surpass those you will get from the Lissen Skyscraper you build yourself. It is the only battery set that can deliver such power—yet the H.T. current consumption is far less than that of the average commercially-designed 3-valve set.

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

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

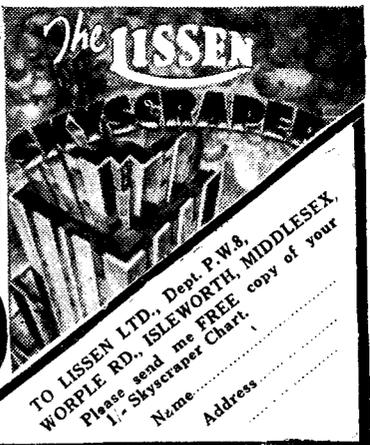
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THERE is a great deal in knowing both the receiving set and your way about the wave-bands. This was rather strikingly brought home to me on a recent evening when I was paying a visit to a friend who had just installed a new set of a type pretty familiar to me.

Though he is not quite a beginner at long-distance work, he is the kind of man who regards calibration charts and tuning charts with a certain amount of scorn and he is constitutionally rather too impatient to spend an hour or two in studying the little ways of a receiving set. It appeared that he was not at all satisfied with his purchase: In the course of rather more than a week he had been able to record only three foreign stations on the long waves and about a dozen on the medium band.

"Not good enough," he said, and I agreed. After he had put the set through its paces to show me how poor its performances were, I asked if I might try it myself.

#### A Typical Evening.

He readily agreed, and here's an account of what happened. I write it not to show what a gifted person I am in the matter of long-distance reception, but to demonstrate how handsomely it pays to take a little trouble over any set, whether you



Realising the importance of providing listeners with up-to-the-minute news about long-distance stations and conditions, "P.W." publishes every week the notes of a Special Correspondent who nightly searches the ether in order to provide a log that is really up to date.

build it yourself or buy it complete, before you condemn it as a "dud."

The first thing that I did was to tune in four easily-received home transmissions. These were the London National, the London Regional, the Midland Regional, and the North Regional. I did this to make sure that the trimming was as it should be, and the results I obtained showed me at once that it was most emphatically not. Some ten minutes were, therefore, spent in bringing the ganged high-frequency circuits more nearly into step.

This done, I started with the wave-change switch in the medium position and the condenser dial at its minimum setting.

#### Fécamp and Nurnberg.

Fécamp was the first station encountered and this was coming in at fine strength. There is nothing much above Fécamp until you come to Nürnberg. Most of the intervening stations are spoilt by jamming or heterodyning.

Nürnberg, though, was first-rate. Then

came Gleiwitz and a little above this station Horby was well heard.

"We ought to be able to get Toulouse P.T.T.," I said, "he's just between Gleiwitz and Horby." And sure enough we did get him at good strength, though he might easily have been passed over.

Turin was the next capture and once you have received Turin there is no difficulty about Heilsberg, who occupies the next channel above.

#### Plenty of Them!

Bratislava is an old friend of mine, and he was duly logged. We also obtained a French station, either Lyons or Montpellier.

Bordeaux, Genoa and Göteborg followed in succession, but the set was not selective enough to obtain Breslau clear of the Poste Parisien. By a little careful adjustment the latter station, which is the most powerful, could be brought in without interference from its wavelength neighbour.

Then came Brussels and Strasbourg.

To cut a long story short we logged on the medium waveband above 400 metres Katowice, Madrid, Stockholm, Rome, Paris Ecole Supérieure, Berömunster, Langenberg, Prague, Florence, Brussels No. 1 and Vienna.

I have since learned that my friend has increased his three long-wave stations to ten!

ALIAS for romance! She doesn't stand much chance when she comes up against the hard facts of this materialistic age.

The romantic idea was conceived by certain B.B.C. programme officials in Scotland to hold a "Ceilidh" in the hall of Acknacarry Castle, the seat of the Lochiel family, away north in Inverness-shire. Singers and story-tellers were to be gathered together under the hospitable roof of Colonel Cameron of Lochiel, to sing their songs and tell their stories in the traditional manner, but with a microphone eavesdropping.

#### By Candle-light!

The engineers said that the "ceilidh" would have to be held in candle-light as the castle's electricity plant might cause interference with the transmission, and must therefore be shut down, but—candle-light!—shades of Scotland's romantic past! This only added romance to the romantic idea.

But then the engineers went to the castle to carry out tests, and they discovered that much as the baronial hall might suit the Gaelic singers, it did not suit the microphone. This hard fact was communicated to the programme staff, who reluctantly changed the venue of the gathering to the Highland Hotel in Fort William, whence it was broadcast on October 4th.

## NOTES FROM SCOTLAND AND IRELAND

By OUR SPECIAL CORRESPONDENT.

This event was arranged in connection with the Gaelic "Mod" which brings a distinguished gathering of Gaelic singers together.

It is typical of the B.B.C.'s desire to make Scottish Regional transmissions typical of things Scottish.

Now that the Scottish National transmitter is working it is possible to develop this sort of thing.

The twin transmitters are in full service; exhibitions have been held in Glasgow, Edinburgh and in Aberdeen, the B.B.C. co-operating with a fully working studio at each exhibition.

#### Interest in Falkirk.

There is plenty of official activity to stimulate public interest in wireless in Scotland, but it must be confessed that the reaction to the new Falkirk station has been so far disappointing. And, of course, whilst Falkirk gives Scotland a service immensely superior to that of yesterday, it does not solve the problem of serving Northern Scotland.

The increase of the Belfast station's power to about 50 kilowatts, as is now proposed, will give much more powerful reception of the B.B.C.'s Irish transmissions not only in Ulster, but in that part of south-west Scotland where Belfast comes in at excellent strength even now.

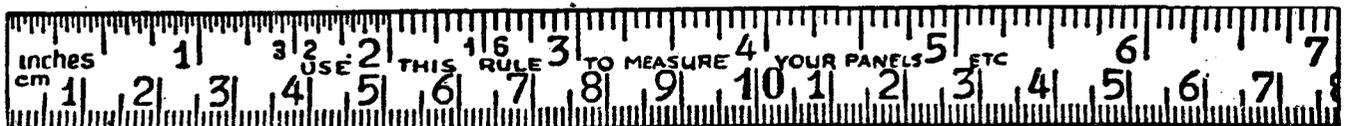
#### Sponsored Programmes.

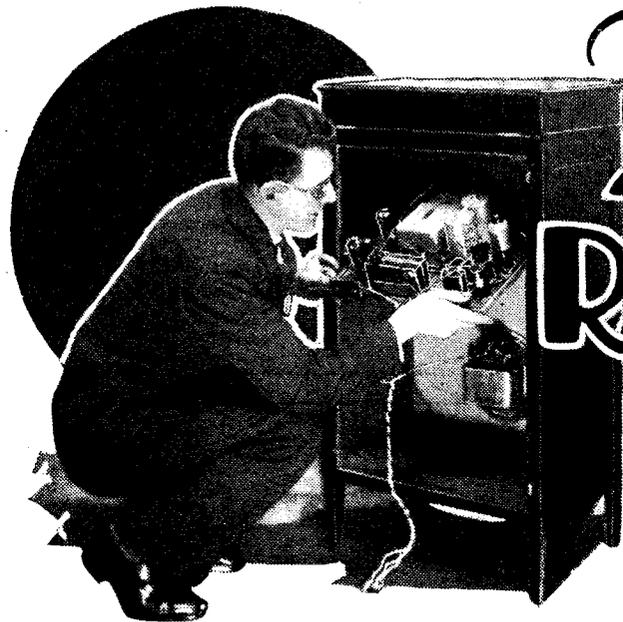
It has been said that this is the B.B.C.'s reply to the Free State high-power station at Athlone. But, of course, the B.B.C.'s intention to raise the power of Belfast was originally suggested as a part of their Regional scheme—now nearing completion.

Some months ago it was anticipated that the Free State programmes would be strengthened by extra revenue from sponsored features when Athlone came into full service, but the political situation has changed rapidly, and it is an interesting question whether the political situation between England and the Free State will not have a bad reaction on this scheme.

British firms are not likely to advertise through the broadcasting station operated by a country which imposes heavy tariffs on British manufactures.

"Tweed" was the title of "a programme in song and story of the history, romance and poetry of the River Tweed," broadcast in Scotland on October 8th. I understand that the B.B.C. has ideas for programmes featuring other Scottish rivers.





# The "P.W." RADIOGRAM

An essentially modern instrument which will give you, at a minimum cost, the advantages of a highly efficient radio set combined with the joys of an up-to-date gramophone—all in one cabinet!

Designed and Described by the  
"P.W." RESEARCH DEPARTMENT.

A FEW days ago I was talking to Christopher Stone after one of his popular broadcasts. As might be expected, the conversation soon drifted round to gramophones and gramophone records, and I learnt something of the tremendous number of letters which Christopher Stone receives after each of his appearances before the microphone.

Almost all these letters contain requests for records to be played in future broadcasts—many of them asking for "repeats" of old favourites.

### Much Better By Radio.

I wondered why, when almost everyone has a gramophone of some kind, there was so much anxiety to hear, in radio programmes those records which could just as well be played over and over again on the listener's own instrument at whatever time he might want them. And the reason, of course, is that a gramophone record sounds ever so much better when received by even a

moderately good wireless set than it does when reproduced on an ordinary acoustic gramophone.

Which fact accounts for the amazing popularity of the radio gramophone.

### Pure Record Reproduction.

Most receivers to-day have what is described as "provision for pick-up," which means that they may be used as a temporary "hook-up" for playing records, but such an arrangement cannot compare in any way with a self-contained radio set and gramophone in one, with a single switch to effect the necessary change-over from the B.B.C. programmes to the latest recording of Flannagan and Allen.

Having regard to the unfortunate fact that radio-grams as a rule cost quite a lot of money, "P.W." has designed for you an instrument which, since it can be built at home with no trouble and the minimum of cost, will make a decided appeal to the man who wants good radio reception and

pure record reproduction. In addition, the set is entirely battery-operated, which makes it ideal for those who either have no mains or do not want to use them for running a wireless receiver.

Have a look at the diagrams and photographs of the radio-gram. What could be simpler and yet, at the same time, so workmanlike? And its performance is even better than its appearance—which is saying a lot!

### Items of Excellence.

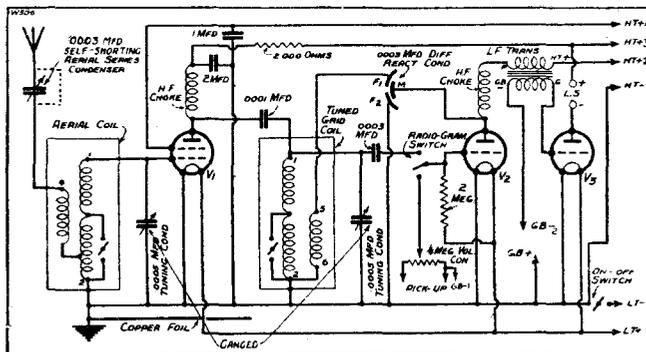
Single-knob tuning; wave-change and "on-off" switch in one; no troublesome screens to build; only four terminals; simple three-point "radio-gram" control; bracket for grid-bias battery on baseboard—we might go on mentioning the advantages for ever, if we were not so anxious to get right down to the building.

A three-valve receiver. So it will not cost you much, and at the same time you

(Continued on next page.)

## THE INGREDIENTS THAT WILL GIVE YOU THE RESULTS YOU WANT.

- 1 2-gang coil unit (Lissen) with on-off switch.
- 1 2-gang .0005-mfd. tuning condenser (Radiophone, Polar, J.B., Lotus, Utility).
- 1 .00025 to .0003-mfd. variable condenser with shorting switch (Telsen, Ferranti).
- 1 .0003-mfd to .00035-mfd. diff. reaction condenser (Lotus, Telsen, Ready Radio, Keystone, Polar, Graham Farish, J.B., Cydon, Lissen, Ormond).
- 1 3-point Rotary change-over switch (Ready Radio, Bulgin, Tunewell).
- 3 4-pin valve holders (Lotus, Lissen, Telsen, W.B., Benjamin, Tunewell, Ready Radio, Bulgin, Clix).
- 1 2-mfd. condenser (Dubilier 9200, T.C.C., Telsen, Igranic, Sovereign, Ferranti, Peto-Scott).
- 1 1-mfd. condenser (Dubilier type L.E.C., Telsen, Igranic, etc.).
- 1 .0001-mfd. fixed condenser (Dubilier 670, Telsen, Igranic, T.C.C.).



A circuit which has been designed to give you all the advantages of modern three-valve reception together with perfect reproduction of gramophone records.

- 1 .0003-mfd. fixed condenser (Dubilier 670, Telsen, Igranic, etc.).
- 1 H.F. choke (Goltone Super, Peto-Scott, Telsen, Ready Radio, Lissen, Tunewell, Wearite, Sovereign).
- 1 H.F. choke (Graham Farish, flat type, Lissen, Telsen, etc.).
- 1 2-meg. grid leak (Dubilier 1 watt, Lissen, Graham Farish).
- 1 2,000-ohm resistance (Graham Farish, Dubilier).
- 1 L.F. transformer (Ready Radio, Slektun, Igranic, Telsen Ferranti, Atlas, Lissen, Multitone, Tunewell, Graham Farish, Goltone, Varley).
- 1 Panel, 18 in. x 8 in. (Peto-Scott, Lissen, Goltone, Permeol, Becol, Wearite).
- 1 Baseboard, 16 in. x 10 in.
- 2 Terminal strips, 3 in. x 1 1/2 in. (Peto-Scott, etc.).
- 4 Terminals (Belling-Lee, Clix, Igranic, Goltone, Eelex, Bulgin).
- 1 Piece copper foil, 9 1/2 in. x 6 in.
- 1 6-way battery cord (Goltone, Lewcos, Bulgin).

# THE "P.W." RADIO-GRAM

(Continued from previous page.)

will have all the advantages on radio programmes which the popular S.G., detector and power output arrangement can give you.

For the gramophone part of the business, a motor and turntable, a pick-up, and a volume control are all you need to give you

that quality of reproduction which you have only dreamt of if you have never before built a really good radio-gram.

First of all, look at the wiring diagram. Not much to trouble us there, is there? About as straightforward as it could be.

Do you notice how the .0001 and the .0003-microfarad condensers, as well as the two resistances, are supported by their own terminal tags? This makes for easier wiring and, what is more important, for short leads.

Another point is the grid-bias battery

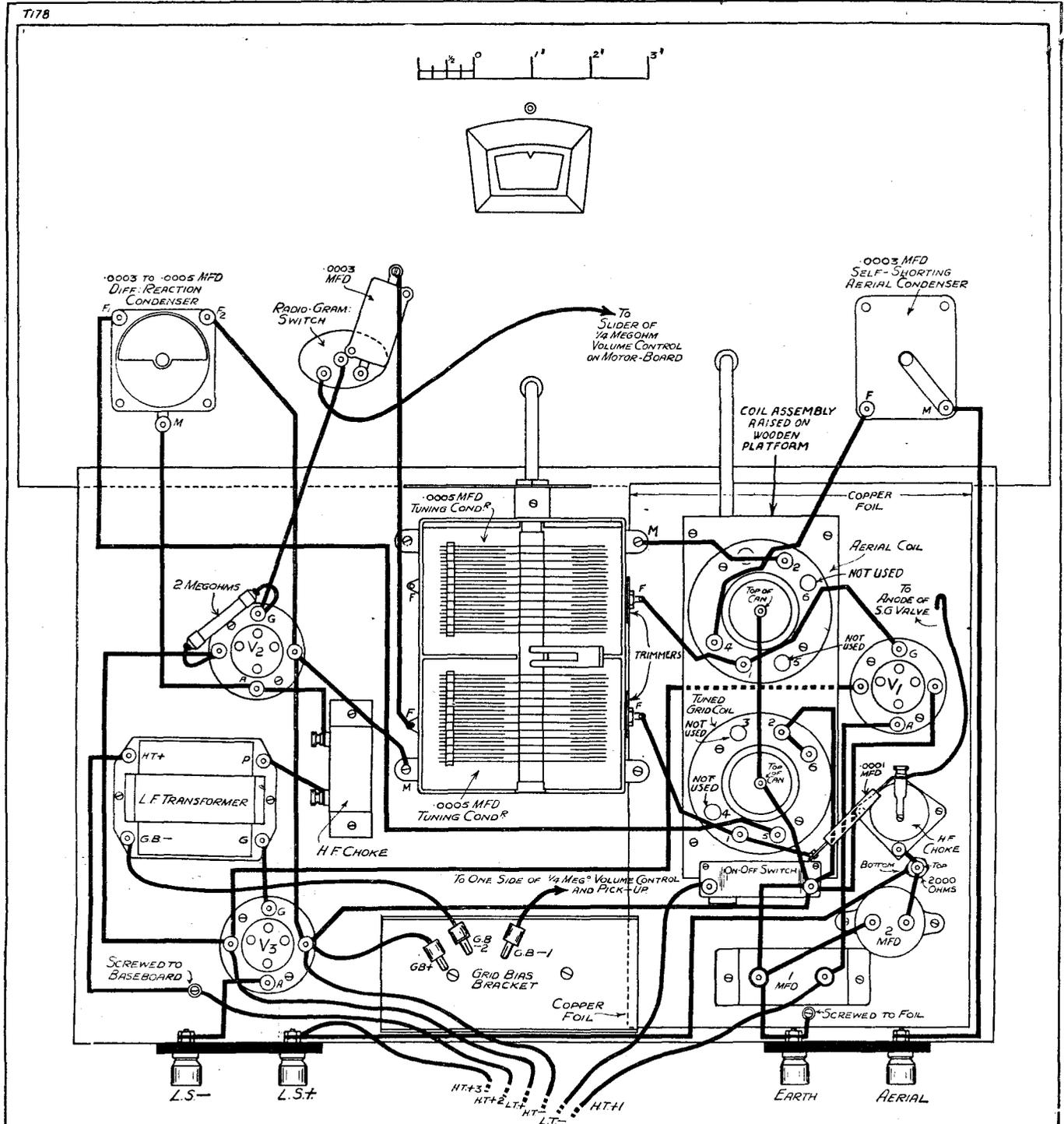
bracket at the back of the baseboard. This is screwed down to the base and is constructed to take two 9-volt grid-bias batteries. In this way, the grid-bias leads, too, are kept short.

One or two points in the construction may cause you a little hesitation unless they are explained.

You will notice that the "on-off" switch is built on to the same chassis as the coils, so that the one knob can control both operations. And since they are on the

(Continued on page 414.)

## THIS WILL KEEP YOU ON THE RIGHT LINES!



This "ground plan and front elevation" will make your work of constructing the "P.W." Radio-gram a positive pleasure. Simply follow the black lines from point to point, make sure you have left none out—and there you are!



Mr. G. V. Dowding, A.I.E.E., Technical Editor of several well-known wireless publications.

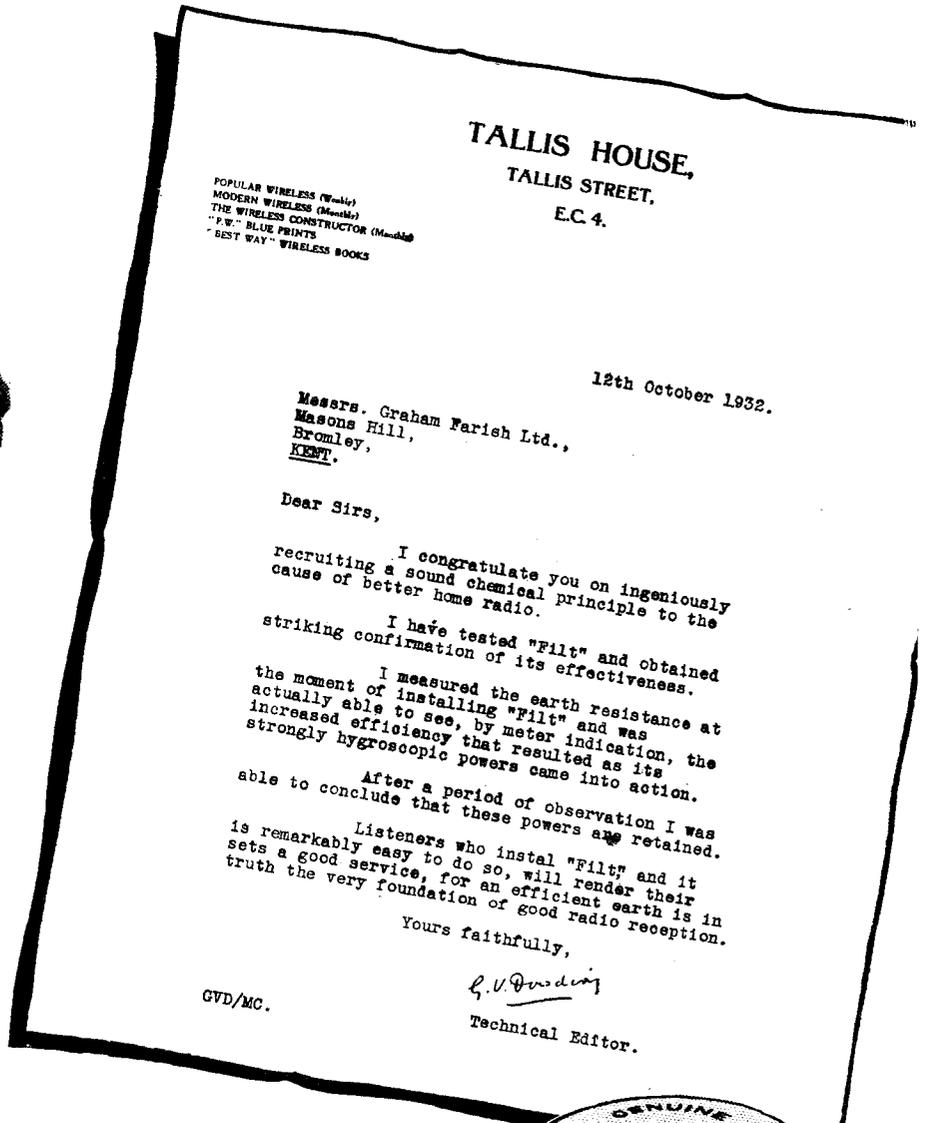
# Another Expert who praises FILT

## Why YOU should fit a FILT

Efficient earthing is vital to good reception. Without it you cannot obtain the power, purity or volume of which your set is capable.

FILT is the most efficient scientific earthing system ever invented. As soon as the copper receptacle is buried, the wonderful chemical it contains begins to spread through the soil, making a permanent highly conductive area to a depth of several feet, ensuring perfect earthing in any climate.

Get a FILT to-day. It may put right faults that you thought could only be remedied by expensive new valves or parts.



TALLIS HOUSE,  
TALLIS STREET,  
E.C. 4.

POPULAR WIRELESS (Weekly)  
MODERN WIRELESS (Monthly)  
THE WIRELESS CONSTRUCTOR (Monthly)  
"P.W." BLUE PRINTS  
"BEST WAY" WIRELESS BOOKS

12th October 1932.

Messrs. Graham Farish Ltd.,  
Masons Hill,  
Bromley,  
KENT.

Dear Sirs,

I congratulate you on ingeniously recruiting a sound chemical principle to the cause of better home radio.

I have tested "Filt" and obtained striking confirmation of its effectiveness.

I measured the earth resistance at the moment of installing "Filt" and was actually able to see, by meter indication, the increased efficiency that resulted as its strongly hygroscopic powers came into action.

After a period of observation I was able to conclude that these powers are retained.

Listeners who instal "Filt" and it is remarkably easy to do so, will render their sets a good service, for an efficient earth is in truth the very foundation of good radio reception.

Yours faithfully,

G. V. Dowding

Technical Editor.

GVD/MC.

GRAHAM FARISH

# FILT

PERCOLATIVE EARTH

Obtainable from your radio dealer or post free from the sole manufacturers,

Graham Farish Ltd.  
Masons Hill - - Bromley, Kent



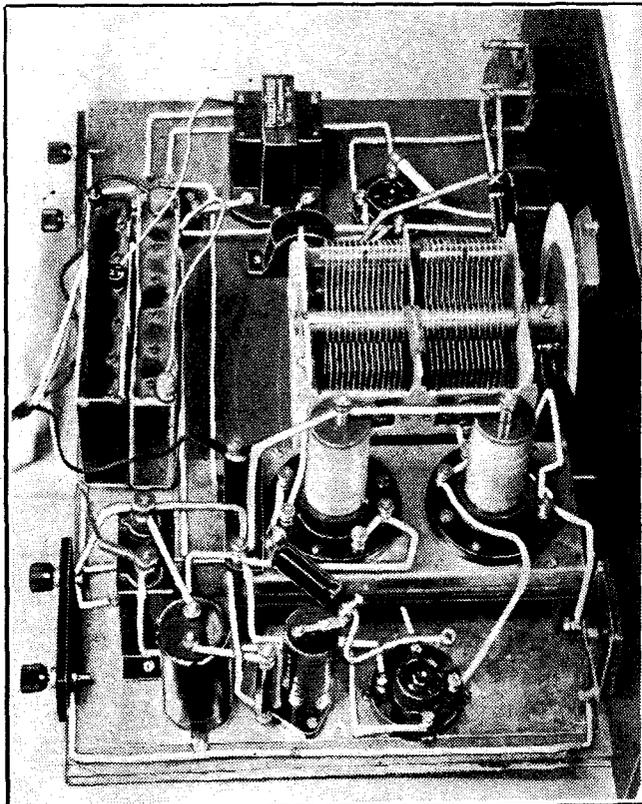
**THE "P.W." RADIO-GRAM**  
(Continued from page 412.)

same chassis you must avoid any chance of a short-circuit by putting the switch in the L.T. negative lead. Actually, since all unnecessary terminals have been done away with in this design, the L.T. negative lead is joined direct to the left-hand terminal of the switch.

a piece of 3/4"-ply wood, 6 3/4 in. long and 3 in. wide (to fit the bottom of the chassis), and should have two end pieces as supports, each 1 1/8 in. by 3 in. This will bring the wave-change switch on a level with the rest of the controls on the panel.

Four wood screws inserted through the bottom of the baseboard

**SHORT, SWEET, AND SELECTIVE!**



Short leads, sweet tone, and ample selectivity will be your reward if you build your radio-gram to look like this photograph.

There is another very important point with regard to the coil chassis. If this is mounted direct to the baseboard, the wave-change switch will be level with the very bottom of the panel. To avoid this it is necessary to build a small wooden platform on to which the chassis is fixed. This platform should be made out of

latter is screwed down.

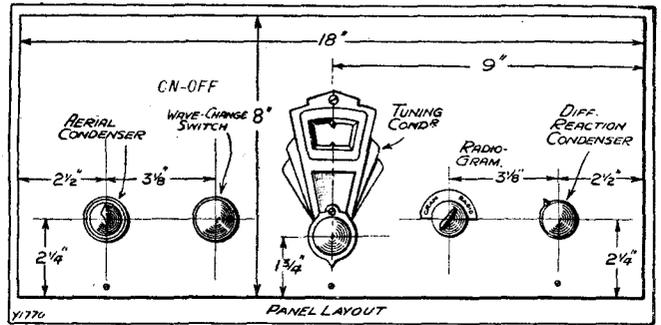
Before mounting, the dial of the condenser has to be fastened on. This should present no difficulty as long as you make sure that the dial is held firmly between the two metal rings on the condenser drive. As these rings are held together by a strong spring, it will be necessary to hold them apart with a screwdriver (or some such tool) while slipping the dial in. Don't forget to tighten the grub screws on the drive after fixing the dial.

**Avoiding "Feed-back."**

One joy of this circuit is that there is no screening other than that provided by the cans on the coils, and the cover of the condenser. You will, therefore, take special care to follow exactly the wiring on the diagram. Any alteration in the layout—especially in the detector grid circuit—will result in "feed-back."

Make sure that you have five wires going to the right-hand terminal of the "on-off" switch,

**KEEPING IT UNDER CONTROL**



When you have used this sketch to drill your panel, keep it by you. It may be a reminder that the wave-change switch also controls the "on-off" and must be used when you have finished playing your records for the night!

**WHEN THE SET IS BUILT**

**ACCESSORIES TO BUY AND USE.**

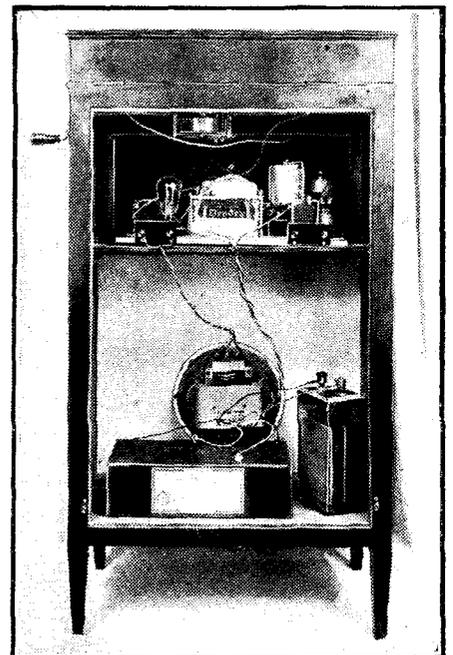
- 1 Pick-up (B.T.-H. Minor and tone arm, Celestion, Marconiphone, Radiophone).
- 1 Gramophone motor (Garrard No. 20). Specify "long handle" when ordering.
- 1 Potentiometer volume control, 1 mag. (Igranic, Bulgin, Wearite, Sovereign)
- 1 Radio-Gram cabinet (Peto-Scott, Voxkit).
- 1 P.M. loudspeaker (Atlas chassis model. Marconiphone, Blue Spot, Celestion. B.T.-H., R & A, W.B.). Aerial equipment. Electron Superial, Graham Farish "Filt" earthing device.

and four to the negative filament terminal of V3. It is so easy to miss one.

The H.T. positive 2 lead joins the set via a screw on the left of the baseboard near the loudspeaker terminal strip, and a lead goes from this screw to the transformer.

(Continued on page 424).

**A PLACE FOR EVERYTHING**



The back view of the completed set shows how the set is put on its shelf with the speaker and batteries underneath. The two flex leads from set to gramophone can be seen going up to the motor-board above.

**VALVES TO GIVE RESULTS!**

VALVES	H.F. Stage	Detector	Output Stage Suitable for batteries.	Output Stage For Mains Unit.
Mullard ..	P.M.12	P.M.1H.L.	P.M. 2 A	P.M.202
Cossor ..	220 S.G.	210 H.L.	220 P.A.	230 X.P.
Mazda ..	S.G.215	H.L.2	P.220	P.240
Marconi ..	S.22	H.L.2	L.P.2	P.240
Osram ..	S.22	H.L.2	L.P.2	P.240
Tungsram	S.210	H.210	P.220	S.P.230
Lissen ..	S.G.215	H.L.210	P.220	P.X.240
Six-Sixty	215 S.G.	210 H.L.	220 P.A.	S.S.220 S.P.
Eta ..	B.Y.6	B.Y.1814	B.W.1304	B.W.303

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

# Direct Radio

**159  
BORO  
HIGH  
STREET  
LONDON  
BRIDGE**

## DIRECT RADIO'S PRIZE WINNING "APEX" TRIPLE WAVEBAND KIT

	£ s. d.	(forward)	£ s. d.
1 Percol panel, 14 ins. x 7 ins. . . . .	4 0	1 Piece copper foil, 10 ins. x 5 1/2 ins. . . . .	1 0
2 Colvern screened coils, type T.D. . . . .	17 0	Plugs, screws, etc. . . . .	7
1 Ready Radio 0003-mfd. solid dielectric reaction condenser . . . . .	2 3	3 Mullard valves: PM12A, PM1HL, PM2A . . . . .	1 12 3
1 Ready Radio 3-pt. wave-change switch . . . . .	1 6	1 "159" walnut cabinet . . . . .	16 9
1 Ready Radio 2-pt. wave-change switch . . . . .	10	1 Blue Print Free . . . . .	
1 Bulgin on-off switch, Snap type S.80 . . . . .	1 6		
3 Valve-holders . . . . .	1 6	<i>Extra Components for Ultra Short Wave.</i>	
1 T.C.C. 0003-mfd. fixed condenser "S" . . . . .	1 3	2 Lotus 2-pin coil-holders . . . . .	1 4
1 T.C.C. 0002-mfd. fixed condenser "S" . . . . .	1 3	1 Ready Radio 3-point switch . . . . .	1 6
1 T.C.C. 0001-mfd. fixed condenser "S" . . . . .	1 3	1 Belling & Lee terminal . . . . .	3
1 T.C.C. 2-mfd. condenser . . . . .	3 10	1 Magnum neutralising condenser . . . . .	4 0
1 T.C.C. 1-mfd. condenser . . . . .	2 10	1 Terminal strip, 2 1/2 ins. x 1 1/2 ins. . . . .	3
2 Ormond 0005-mfd. s.m. variable condensers No. 6 . . . . .	13 0	1 Set Atlas short-wave coils . . . . .	10 0
1 2-meg. grid leak, wire ends . . . . .	10		
1 Dubilier 30,000-ohm resistance, wire ends, 1 watt . . . . .	1 0		
1 Dubilier 200,000-ohm resistance, 1 watt . . . . .	1 0		
1 Ready Radio H.F. choke . . . . .	1 6		
1 R.I. L.F. transformer, Dux . . . . .	6 9		
4 Belling & Lee indicating terminals . . . . .	10		
2 Terminal strips . . . . .	1 0		
1 Coil Glazite . . . . .	6		
1 Belling & Lee 5-way battery cord . . . . .	2 0		
(forward) 3 7 5			
		<b>6 15 4</b>	
		<b>KIT No. 1</b> (Less valves and cabinet) . . . . .	<b>£4 6 4</b>
		Or 12 monthly payments of 8/- . . . . .	
		<b>KIT No. 2</b> (With valves less cabinet) . . . . .	<b>£5 18 7</b>
		Or 12 monthly payments of 11/- . . . . .	
		<b>KIT No. 3</b> (With valves and cabinet) . . . . .	<b>£6 15 4</b>
		Or 12 monthly payments of 12/6 . . . . .	
		<b>KIT No. 4</b> , Complete with "159" Walnut Console Cabinet, Siemens Batteries, Oldham Accumulator, Epoch Twentieth Century Moving-Coil Speaker. . . . .	<b>£10 7 10</b>
		Or 12 monthly payments of 19/- . . . . .	

### ACCESSORIES.

	£ s. d.
1 Siemens H.T. Battery, 120 volt . . . . .	13 6
1 Siemens G.B. Battery, 9 volt . . . . .	1 0
1 Oldham O.50 Accumulator . . . . .	9 0
1 Epoch 20th Century Moving Coil Speaker, or Bluespot 66R Magnetic type & Major Chassis . . . . .	1 15 0
1 Bowyer Lowe A.E.D. Beta Pickup . . . . .	1 5 0
1 Collaro B.30 Automatic Stop Double Spring Gramo. Motor . . . . .	1 13 0
1 Atlas A.C. 244 H.T. unit . . . . .	2 19 6
1 Atlas A.K.260 H.T. unit, with trickle charger . . . . .	4 10 0

Telephone and Telegraph Orders receive immediate attention. Telephone: Hop 3000. Telegrams: Dirrad. Sedist, London.

## The "P.W." RADIOGRAM

	£ s. d.		£ s. d.
1 Lissen 2-gang coil unit with on-off switch . . . . .	17 6	<b>KIT No. 1</b> (less Valves and Cabinet) . . . . .	4 4 0
1 Utility 2-gang 0005-mfd. tuning condenser type W.312 . . . . .	19 6	Or twelve equal monthly payments of . . . . .	8 0
1 Telsen 0003-mfd. variable condenser with shortings switch . . . . .	2 3	<b>KIT No. 2</b> (with Valves less Cabinet) . . . . .	5 16 3
1 Wavemaster 00035-mfd. differential reaction condenser . . . . .	2 3	Or twelve equal monthly payments of . . . . .	11 0
1 Ready Radio 3-pt. Rotary change-over switch . . . . .	2 9	<b>KIT No. 3</b> (with Valves and Cabinet) . . . . .	9 1 3
3 4-pin valve holders. 1 Dubilier 2-mfd. non-inductive condenser . . . . .	1 6	Or twelve equal monthly payments of . . . . .	17 0
1 T.C.C. 1-mfd. condenser . . . . .	3 9	<b>KIT No. 4</b> (Complete kit with Valves, Radiogram Cabinet, Epoch 20th Century Moving Coil Speaker, Collaro B.30 Gramo. Motor, A.E.D. Beta Pickup and Volume Control) . . . . .	14 0 0
1 Dubilier 0001-mfd. fixed condenser type 670 . . . . .	2 10	Or twelve equal monthly payments of . . . . .	1 6 0
1 Dubilier 0003-mfd. fixed condenser type 670 . . . . .	1 0		
1 Lewcos H.F. Choke . . . . .	1 0		
1 Ready Radio H.F. Choke . . . . .	6 0		
1 Choke . . . . .	1 6		
1 Dubilier 2-meg. Grid Leak 1 watt type with wire ends . . . . .	1 6		
1 Tuber 2,000-ohm resistance . . . . .	1 0		
1 Ready Radio L.F. Transformer . . . . .	1 0		
1 Percol Panel 18 in. x 8 in. drilled to specification . . . . .	8 6		
2 Terminal strips 3 in. x 1 1/2 in. . . . .	5 6		
4 Belling Lee terminals . . . . .	6		
1 Piece copper foil 9 1/2 in. x 6 in. . . . .	10		
1 Belling Lee 6-way battery cord . . . . .	1 0		
1 On-off switch . . . . .	2 6		
1 Connecting wire, flex, screws, etc. . . . .	10		
3 Mullard Valves: PM12, PM2DX, PM2A . . . . .	6		
1 Special Radiogram Cabinet . . . . .	1 12 3		
	3 5 0		
	<b>£9 1 3</b>		

### THE CALIBRATOR EASY STATION FINER FREE.

Every "Popular Wireless" enthusiast must have a Calibrator, the new gadget that identifies Foreign Stations by name. Amazingly simple to use, it trebles the entertainment value of any Receiver. No set is complete without it.

**THAT IS WHY WE GIVE ONE ABSOLUTELY FREE WITH EVERY DIRECT RADIO KIT.**

**COMPLETE CATALOGUE  
OF ALL SETS ACCESSORIES  
AND GADGETS  
PRICE 1/- POST FREE**

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

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

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

NAME.....

ADDRESS..... P.W.29/10/32

### MANUFACTURERS' KITS

**Telsen Ajax Three Kit.**  
Kit 1 (less Valves and Cabinet) . . . . .**£3.1.6**, or deposit 10/- and 11 monthly payments of 7.6.  
Kit 2 (with Valves less Cabinet) . . . . .**£4.4.3**, or deposit 10/- and 11 monthly payments of 7.6.  
Kit 3 (with Valves and Cabinet) . . . . .**£4.15.0**, or deposit 15/- and 11 monthly payments of 8.6.  
**Telsen Jupiter 3 Kit.**  
Kit 1 (less Valves and Cabinet) . . . . .**£3.17.0**, or deposit 10/- and 10 monthly payments of 7.6.  
Kit 2 (with Valves less Cabinet) . . . . .**£5.18.0**, or deposit 15/- and 11 monthly payments of 10.6.  
Kit 3 (with Valves and Cabinet) . . . . .**£6.15.0**, or deposit 20/- and 11 monthly payments of 11.6.  
**New Gossor Melody Maker.**  
All-Mains Kit No. 357, with Mains Valves, Speaker, and handsome Console Cabinet, **£11.15.0**, or deposit 25/- and 11 monthly payments of 21/-.  
Battery Kit No. 355, with new high efficiency Valves, Speaker, and Console Cabinet, **£7.17.6**, or deposit 17/6 and 11 monthly payments of 14.6.  
**R. for M. Stationmaster 3.**  
Battery Model "A" with table type Cabinet and Valves, **£5.11.0**, or deposit 15/- and 11 monthly payments of 10/-.  
Battery Model "B" with Console type Cabinet, Valves, and Celestion Speaker, **£7.10.0**, or deposit £1 and 11 monthly payments of 13/-.  
A.C. Model "C" with Walnut Console Cabinet, Mains Valves, and Magnavox Moving Coil Speaker, **£14.0.0**, or deposit 35/- and 11 monthly payments of 25/-.  
A.C. Model "D" chassis only with Mains Valves, **£10.0.0**, or deposit 30/- and 11 monthly payments of 18.6.  
**Ready Radio "303"**  
Model "A" (with Valves, Cabinet, and Moving Coil Speaker), **£6.17.6**, or 12 monthly payments of 13.6.  
Model "B" (complete kit with Valves only), **£3.10.0**, or 10 monthly payments of 8.-.  
**Ready Radio "Meteor S.G.3."**  
Model "A" (with Valves, Cabinet, and Moving Coil Speaker), **£8.17.6**, or 12 monthly payments of 17.-.  
Model "B" (complete kit with Valves only), **£5.7.6**, or 12 monthly payments of 10.6.  
**Kendall-Price S.G.3 (A.C. Model).**  
Complete Kit, with Mullard Valves and "159" Cabinet, **£7.8.10**, or 12 monthly payments of 14.-.  
**Kendall-Price S.G.3 (A.C. Model).**  
Complete Kit, with Valves and Cabinet, **£16.8.7**, or 12 monthly payments of 30.-.

### DEMONSTRATIONS

Make a point of visiting our Showrooms at 159, Borough High Street, for interesting demonstration of all new Kit Sets and Loud Speakers.

**ANY COMPONENT CAN BE SUPPLIED SEPARATELY**

## FROM THE TECHNICAL EDITOR'S NOTE BOOK



# TESTED AND FOUND?

with any speaker, and its response is clear-cut and clean.

In view of the compactness of the cabinet, the bass reproduction is distinctly commendable, while the high notes are crisp and free from prominent peaks.

### A LANCHESTER SPEAKER

UNDOUBTEDLY many loudspeakers would give better results than they do if it were possible more closely to match them with the sets with which they are used.

It is very important that a definite relation between the speaker windings and the anode circuit of the output valve should be established.

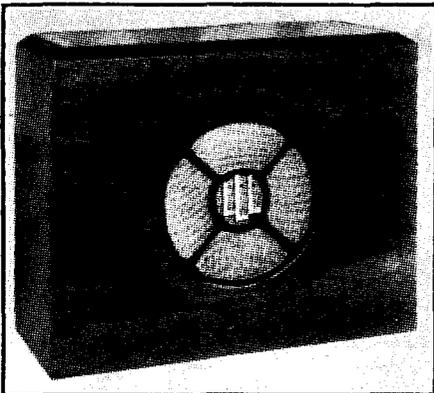
This is now almost universally recognised, and modern speakers invariably embody means for adjusting them to the conditions.

The Lanchester "Monitor" is particularly well equipped in this regard, for it has a four-ratio transformer which renders it widely adaptable.

This is readily accessible from the back and concise instructions are given for making the initial adjustments required to match the speaker with any one particular set.

It is a well-built moving-coil instrument and has an attractive mahogany cabinet. Its sensitivity compares favourably

### A FOUR RATIO INPUT



The Lanchester "Monitor" embodies a four-ratio transformer.

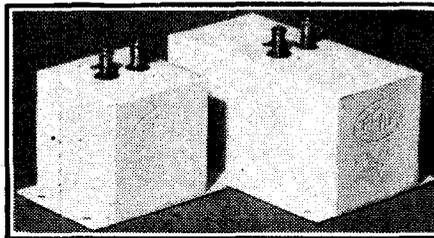
### PEAK CONDENSERS

It is often necessary that a fixed condenser should possess negligible inductance, although it probably does not occur to many constructors that any condensers could possess anything but capacity.

But they can and do—especially those of higher capacity values.

Messrs. Wilburn & Co. are makers of non-inductive condensers. They call them "Peak" condensers, and these are available in seven values from 0.25-mfd., at 3/6, to 4-mfd., at 12/6.

### TESTED AT HIGH VOLTAGE



Peak condensers are stated to be tested at 2,000 volts D.C.

Altogether this Lanchester "Monitor" is quite a sound proposition, and should be borne in mind when the question of a new speaker for that new set arises.

Peak Condensers are tested at 2,000 volts D.C., and are specified to have a continuous working voltage of 800 D.C.

I find these "Peaks" perfectly satisfactory components. They have high insulation resistances, and thus hold their charges well, and their values accord with their ratings.

We have given them stringent A.C. and D.C. tests, and these have failed to reveal weaknesses.

I can recommend them to constructors as safe and efficient condensers for all purposes, including high-power mains apparatus.

### RECEIVED FROM TELSEN

I believe I reviewed the Telsen screened coil before it was actually on the market. It is now in full production, so I will take this opportunity of reminding readers that it is a most satisfactory component from all points of view, and one which I can recommend without hesitation or qualification.

Another new Telsen production is the tag condenser, which sells at 6d., in a full range of values from .0001-mfd. to .002-mfd.

It can be mounted on either an insulated or metal panel, or a baseboard by means of two screws. Alternatively, it can be connected by its tags direct to another component.

Obviously, then, it should appeal strongly to the home constructor. On test my samples gave capacities substantially as specified and high insulation resistances.

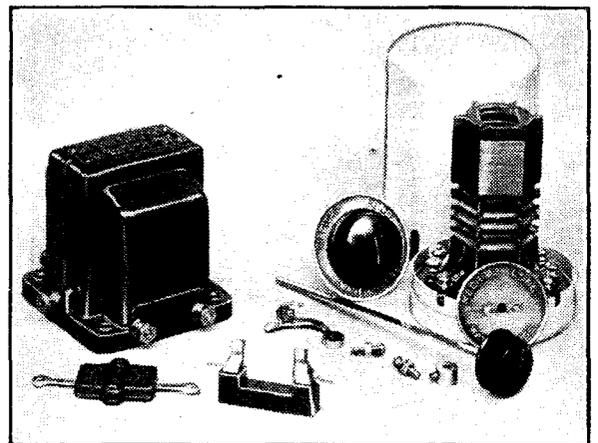
Despite their cheapness, they are clearly high-grade components.

The Telsen power fuse-holder is a useful and well-made item. It is designed to carry Telsen power fuses (which are dependable items constructed on the wire and sealed glass tube principle—they cost 6d. each, and can be obtained for fusing at 1/2, 1, 2 and 3 amperes).

The holder retails at 6d.

(Continued on page 438.)

### A GROUP OF TELSEN COMPONENTS



The Telsen coupling unit, coil, tag condenser and fuse-holder can be seen in this photo.

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

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

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



THROUGH  
PROGRESSIVE  
STAGES  
OF  
AMPLIFICATION

VALVES  
GIVE THEIR  
BEST —  
POWERED WITH

**EVER READY**

**BRITAIN'S BEST BATTERIES**

The advertisement features a central graphic of a microphone with a large, dark, textured vertical bar behind it. To the left of the microphone are four vacuum tubes. The text is arranged in a dynamic, overlapping layout. The top text reads 'THROUGH PROGRESSIVE STAGES OF AMPLIFICATION'. Below this, on the left, is 'VALVES GIVE THEIR' and on the right is 'BEST — POWERED WITH'. At the bottom, the brand name 'EVER READY' is prominently displayed in a large, outlined font, with 'BRITAIN'S BEST BATTERIES' underneath it in a smaller, bold font.

*There is an Ever Ready battery specially made to power each and every set properly. Write for list to*

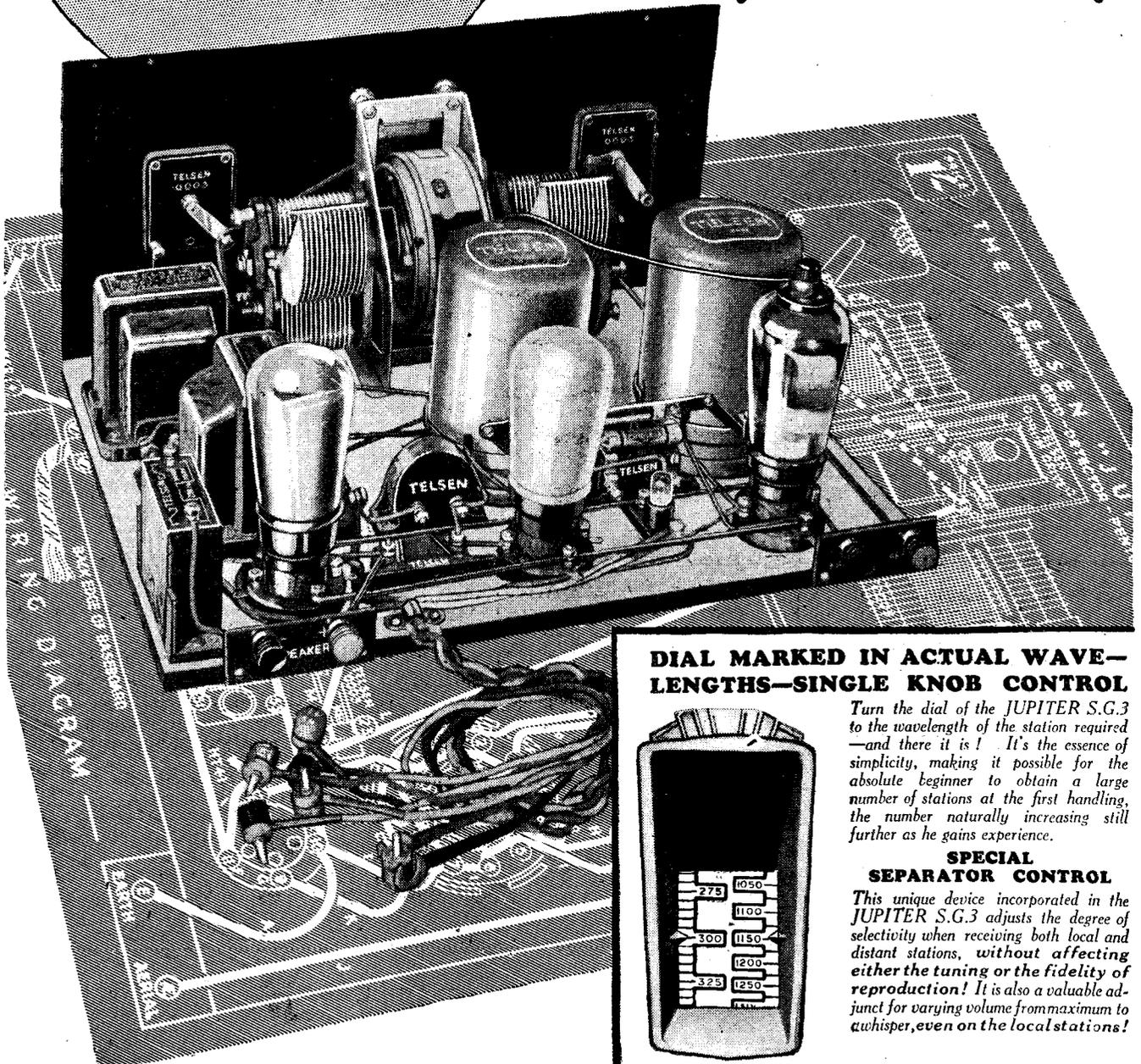
THE EVER READY CO. (GT. BRITAIN) LTD., HERCULES PLACE, HOLLOWAY, LONDON, N.7.

The most  
marvellous  
home constructor  
set ever  
produced!

# Super-selective!

# TELSEN

Single knob tuning!



**DIAL MARKED IN ACTUAL WAVELENGTHS—SINGLE KNOB CONTROL**

Turn the dial of the JUPITER S.G.3 to the wavelength of the station required—and there it is! It's the essence of simplicity, making it possible for the absolute beginner to obtain a large number of stations at the first handling, the number naturally increasing still further as he gains experience.

**SPECIAL SEPARATOR CONTROL**

This unique device incorporated in the JUPITER S.G.3 adjusts the degree of selectivity when receiving both local and distant stations, without affecting either the tuning or the fidelity of reproduction! It is also a valuable adjunct for varying volume from maximum to a whisper, even on the local stations!

**MAKE SURE YOU GET YOUR**

ANNOUNCEMENT OF THE TELSEN ELECTRIC CO. LTD. ASTON, BIRMINGHAM

*Hyper-sensitive!! Ultra-modern!!!*

# JUPITER S.G.3.

*Dial marked in wavelengths! Special Separator Control!*

**Full size 1/- Blueprint given FREE with the TELSEN RADIOMAG No. 3.**

Never before has it been possible for the ordinary home constructor to build so powerful a 3-valve receiver as the Telsen JUPITER S.G. 3! For never before has such amazing power, such tremendous range and such superlative selectivity been attained with the use of only standard components! Child's play to build, child's play to operate, it is beyond

question the most *sensational home constructor set ever produced*. Yet it is not a "Kit" set, but purely a circuit design using specified components—some of which you may already have and will not therefore need to buy!

In keeping with the highest modern practice, the Telsen JUPITER S.G.3. incorporates Ganged Condensers, Ganged Coils, a Tuning Dial calibrated in wavelengths, and Matched Output, the brilliant circuit arrangement providing for absolute control of selectivity, with entire prevention of L.F. oscillation. The revolutionary 10-1 Coupling Unit specified gives an L.F. stage gain equal to that of a *two-stage amplifier*, ensuring (in conjunction with the special low loss coils) an overall amplification never hitherto approached in any receiver of its type.

Yet you can build it yourself—in an evening—with the aid of the full size 1/- Blueprint and complete constructional details contained in the Telsen Radiomag No. 3. PRICE 6d. Get your copy NOW!



**3** full size 1/- Blueprints given FREE with the new **TELSEN RADIOMAG**

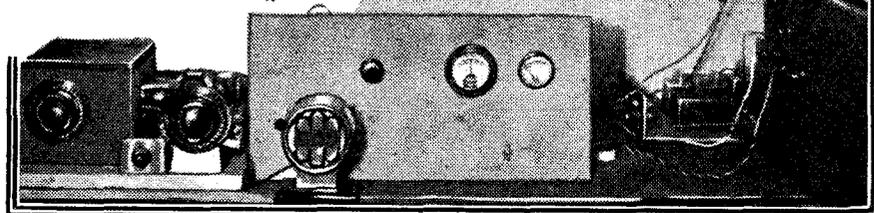
*The Telsen Radiomag No. 3 tells you how to build the very latest types of receivers—how to modernise and improve your existing set—how to rectify little faults—how to get the best out of radio in every way. Get your copy now—price 6d. of all radio dealers and newsagents.*

# TELSEN

**RADIO COMPONENTS**

**TELSEN RADIOMAG No. 3**

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



I WISH it were possible for me to acknowledge separately the many cheery letters that readers send me, full of their experiences and thrills on short waves. But there are far too many of them. So if you have written to me and have not seen your initials in print, don't imagine that your letter was unread or unappreciated.

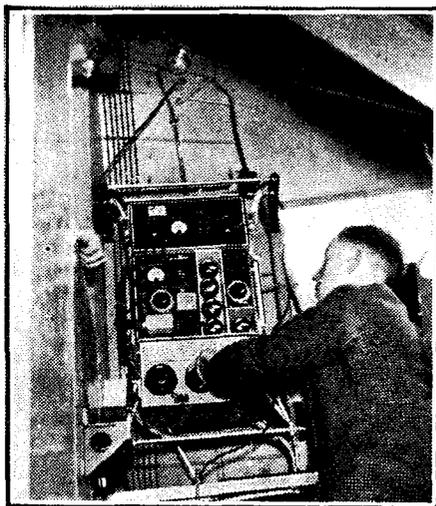
Those that I choose to mention week by week are those containing facts or suggestions that I think will be of general interest to all; individual troubles and grievances are best kept private.

## Becoming a "Ham."

A. M. (Sawley) wants me to publish a "thumbnail" circuit diagram of every set or circuit that I refer to in these notes. That can't very well be done, A. M., but the Editor has in hand a short series of articles on "Short-Wave Circuits," copiously illustrated, as the book publishers say. Your query about the small transmitter is rather upset by the fact that one must have a full transmitting licence, even if the range is only a few hundred yards.

H. B. B. (Birmingham) wants identification of a station signing A O P F on about 31.3 metres. Can anyone help? He also wants to know about the best means of absorbing knowledge on transmission, with a view to becoming a "ham" himself one day.

## CAPE TO CAIRO RADIO



The operator at work on the short-wave set which is fitted to the "Atalanta" for Imperial Airway's Cape-to-Cairo service.

I suggest that he joins "Mars," which, being interpreted, means the Midland Amateur Radio Society. Most of the Birmingham and Coventry transmitters are active members and will no doubt be glad to supply details.

Membership of a locally-run transmitters' society like this is of more value to one than all the theoretical knowledge imaginable. South London boasts a similar society, and, with a membership of forty or so, the average attendance at the monthly meetings totals something like thirty-five! That is a good indication of keenness for you.

I must just acknowledge a long letter and list of stations from G. L. C. (Dorset). He endorses my recent remarks that remarkable volume can be coaxed out of what appears at first to be a faint chirp on the short waves. How easy it is for a "ham-handed" amateur to miss some of the stations altogether, while another man with a similar set is making entries in his log-book.

D. B. (Selly Oak) is toying with the idea of starting a local club (not in connection with transmitters this time), and would be glad to hear from other readers in the district. Please write to Mr. D. Baker, 76, Harrington Road, Selly Oak, Birmingham.

## A "Free" Translation.

S. J. D. (Salford) wants to know how one takes up 5-metre work—particularly how one is to know when one is on 5 metres. I can't suggest anything more original than my own plan of making an absorption wave-metre and calibrating it from a similar instrument made by someone who got there before you did!

W. N. C. (Birmingham) is puzzled by the legends on Q S L cards to this effect: DX: Fone, CT-D-F-FM-GI-LA, etc. For the benefit of others who are puzzled I had better explain that the letters are the "prefixes" allotted to the various countries. The particular screed quoted means "Best distances worked on 'phone are: Portugal, Germany, France, Morocco, Ireland, Norway, etc."

F. E. A. (Guernsey) mentions that he has written to me in *Cumberland* several times. You are right off the track, F. E. A. I know that there happens to be an amateur transmitter in that part of the world whose initials are W. L. S., but the two firms have no connection whatever.

If he reads this, I hope he will accept my apologies for the letters that I know he has received from other sleuths! My address is "c/o POPULAR WIRELESS, London."

## Using Old Parts.

So much for the correspondence. I now want to deal with a general point that is often raised. People often want to make up "scratch" receivers from their boxes of old parts—hardly "junk-boxes," because the parts are thoroughly serviceable but hardly up to date. It is the policy of "P.W.," in describing receivers, to state the makes of the components actually used, so that readers can follow the wiring

diagrams down to the smallest detail, with very little risk of trouble of any kind.

Those readers who pride themselves on a little more knowledge of the subject than the average often make up set after set, using their same parts, with the greatest success. The comparative novice, however, finds himself stumped at every turn.

## Advice to the Novice.

Can he use a .0002 grid condenser when the diagram says .0003? His variable condenser has the moving-plate terminal on the opposite side from the one in the pictures. And so on indefinitely.

My advice to the novice is to follow "P.W." diagrams faithfully every time. But for the benefit of the man who knows his short waves pretty well, and reads these articles more for the news they contain than for the occasional "tips for tyros," I have prepared a short set of articles on short-wave circuits.

These are illustrated by theoretical diagrams only, and it can be taken for

## ARMY SHORT WAVERS



Modern military manoeuvres depend greatly on short-wave technique for quick communications. This is a test of a pack-horse set.

granted that the circuits are sufficiently straightforward and well tried to work with any good components of the sizes and shapes mentioned.

## Chance to Find Out.

Here, for example, are the "ingredients" of a simple short-wave two-valver: One .0001 tuning condenser and one .0002 reaction condenser, one set of short-wave coils, .0003 grid condenser and 2-megohm leak, one L.F. transformer, one decoupling resistance (about 10,000 ohms), and a 2-mfd. condenser.

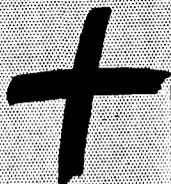
Together with terminals, switches, and valveholders, these same parts may be put together in an almost limitless number of ways for the purpose of trying out one short-wave circuit against another.

The circuit articles are in the Editor's possession already, and were written chiefly because of several requests from readers for something of this kind. Here is a chance to cut away from accepted layouts and find out things for yourselves, and I am looking forward to the evolution of some startling new circuits!

# RG 23

**RADIO-GRAMOPHONE**

**The  
radio set  
of the year**



### TEN DOMINATING FEATURES OF THE MOST UP-TO-DATE SET

1. Very latest type of three-valve circuit (Screen Grid, Detector and Pentode).
2. Wide choice of stations from home and abroad at full loud-speaker strength.
3. Can be used without an aerial or earth if desired.
4. Simplicity itself—single knob tuning with illuminated dial calibrated in wave-lengths.
5. Latest type moving-coil speaker.
6. Selectivity and volume control.
7. Connections for gramophone pick-up and additional speaker.
8. Figured walnut bakelite cabinet.
9. Westinghouse Metal Rectifier in A.C. Model.
10. All electric—just plug in to your electric supply and switch on—that's all.

### + these Gramophone features

1. A powerful and silent electric motor.
2. New type pick-up giving realistic reproduction.
3. Gramophone Volume Control.
4. Automatic Stop and special regulator.
5. Beautiful modern walnut cabinet.

Model R.G.23—3-valve Receiver with moving-coil speaker and electrically-operated Gramophone.

**A.C. MODEL 30 gns.**

or 12 monthly payments of £2, 17, 9

**D.C. MODEL 32 gns.**

or 12 monthly payments of £3, 1, 7.

*Also ask your Radio Dealer to show you EKCO 5-valve Super-Het Console Model S.H.25 at 24 guineas and Radio-Gram Model R.G. 25 at 42 gns. (or by Easy Payments).*

**Plus all the  
advantages of a  
modern radio-gram**



*Post coupon for full details.*

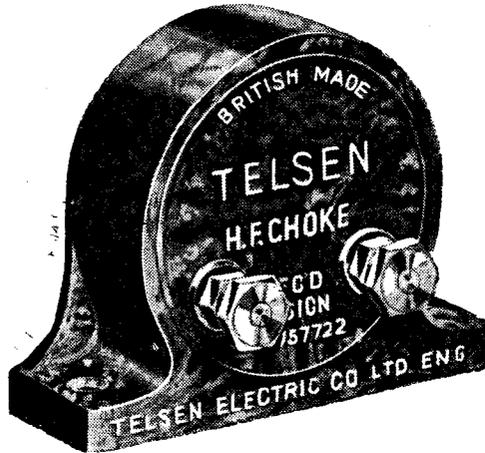
To: E. K. COLE, Ltd., Dept. A.24,  
EKCO Works, Southend-on-Sea.

Please send me illustrated FREE literature of EKCO  
All-Electric Radio.

Name .....

Address .....

# TELSEN H.F. CHOKES



## TELSEN STANDARD H.F. CHOKE

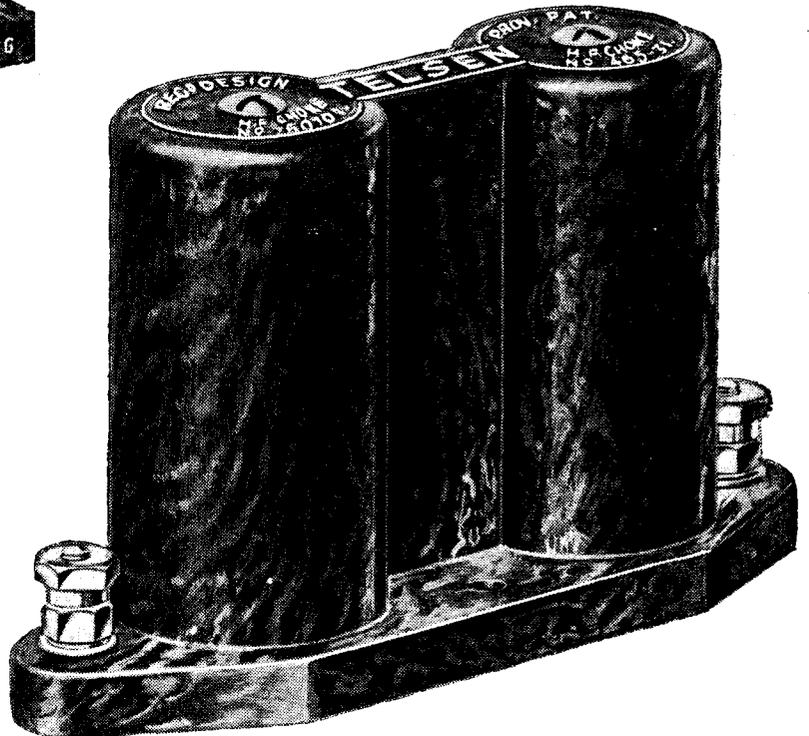
Covering the entire broadcast band, and occupying only the minimum of baseboard space, the Telsen Standard H.F. Choke has proved deservedly popular ever since its introduction. With an inductance of 150,000 microhenrys, a resistance of 400 ohms, and an extremely low self-capacity, it is highly suitable for use in reaction circuits, and is constantly being specified in this respect by the leading set designers.

**2!**

## TELSEN BINOCULAR H.F. CHOKE

In H.F. amplification, the performance of a choke is of supreme importance. Where the very highest efficiency is the primary requisite, the Telsen Binocular H.F. Choke is the inevitable choice. It has a high inductance of 250,000 microhenrys, with a very low self-capacity and a practically negligible external field (due to its binocular formation). It is from every point of view the *ideal* choke—and where high class circuits are concerned definitely the *essential* choke.

**5!**



**TELSEN**  
RADIO COMPONENTS

**BUY A COPY OF THE TELSEN RADIOMAG - PRICE 6d.**



# “WHAT IS THE MATTER WITH THE PROGRAMMES?”

Asks HAROLD A. ALBERT,

who suggests that the programmes from Broadcasting House might reflect better the desires of the majority of listeners if they were organised by men with experience of entertainment enterprises rather than by “arty” young men from the Universities.

HERE and now let me say that I'm well aware the B.B.C. programmes are the most criticised things of the century. Whenever a newspaper is hard up for news or stunts, it organises a campaign against them. Whenever a journalist doesn't know what to write about, he thinks, “Yes, criticise the B.B.C.!” But having attacked the administration of Savoy Hill or Broadcasting House I must be thorough. So what is *really* wrong with the programmes? That's the question I've set myself to answer.

### A Million Letters.

I can criticise not only as an ordinary listener, who likes variety programmes, revues, plays, light orchestral stuff, symphony concerts and practically everything except chamber music, the monotony of which drives me to distraction, and the singing voices of some women—but also as one who knows something of the inside workings of the B.B.C. I know how hours of continuous work go to the selection of programme items, and how zealous the programme officials are in their search for new ideas. So perhaps I am fairly well qualified to tell what's what.

The fundamental fault with the radio programmes, to my mind, then, is this: They are chosen by those who know little or nothing about public entertainment, by a body of men who can have no reasonable means of knowing what the public wants. They certainly receive two thousand letters from listeners a week at the B.B.C. headquarters, and that is a million letters a year, but what percentage is this to judge by when there are at least ten million listeners in the British Isles?

True, as the powers that be state in the B.B.C. Year Book, the body of opinion acquired from letters is “tested against that sense of responsibility to the country as a whole which is the central conception of British broadcasting.” But what exactly is “that sense of responsibility”? A tendency to uplift? Yes!

### Selected by Specialists.

The B.B.C. needn't be so inordinately proud of having so many well-known musicians on its staff, or proclaim so loudly that the musical programmes are selected by specialists. We know that. No statement of theirs was ever so true. The programmes of ordinary concerts are chosen by impresarios, the arrangers, who have box office experience of public taste. In lecture halls, a speaker may say what he wishes, but no manager of a lecture hall would allow him to say it or engage him to say it, if he did

not know by experience that the talk would find an interested public. (And this factor of choice does not stifle originality, since originality is always keenly desired.)

### Programmes Committee.

But at Broadcasting House there is no such check on the public taste, because they have there no men with experience of public entertainment apart from broadcasting. The musician-specialists, who are so over-boomed, are giving us what they themselves desire or what they think we ought to have, not necessarily what we ourselves want.

Why not have a permanent committee of programmes, with impresarios, theatre managers, cinema managers, music-hall

would not go to a cinema if they had one in the neighbourhood? There are two and a quarter million cinema seats in Great Britain, each occupied at least twice daily—say twenty-seven million cinema-goers every week, at a moderate estimate. Believe that many people visit the cinema twice weekly, take no count of theatre-goers or concert fans, and you will still have a tremendous figure. What possible ground has the B.B.C. for supposing this public and wireless listeners to have nothing in common?

### Three Hours of Variety.

For an experimental period, at least, let the Corporation banish its prejudices and act on the advice of a representative programme committee, for one outstanding thing is indicated by cinemas, theatres and concert halls, if only one. I mean that a programme of bits and pieces is generally unpopular, and that a short programme, even at cheaper prices, is usually unenticing.

With the exception of O.B. symphony concerts, listeners are at present given no programme of more than ninety minutes' duration. Certainly, all tastes have to be satisfied, and there is no room for a three hours' variety programme when chamber

## NOT MUCH THE MATTER WITH THIS!



Typical of the many “intimate” revues broadcast from the studios of Portland Place. On the left you see Harry Pepper, the composer and author, and on the right (with black coat) Anona Winn, who has over 130 broadcasts to her credit.

owners, lecture arrangers, publishers, all these represented upon it as well as musicians, radio dramatists, and men with a very real knowledge of the limitation of the “mike”? These people, if paid well enough, would be unbiassed, and we should then have experts on the job. We might not altogether escape programme flops even so, but I fancy there would be fewer failures than there are now.

This arrangement has never been attempted because the B.B.C. authorities declare listeners to have little affinity with the public of the theatre or cinema. Yet they bring forward no figures to support their assertion! One fails to see how it is justified.

Admittedly, many listeners dwell in what is left in these days of a remote countryside, but what grounds are there for thinking they

ber music fiends are crying for three hours of their favourite concoction and studious folk are yearning for three hours of mixed talks. But why not spread this pleasing of all tastes over the entire week?

### Having It Both Ways.

At present, if I am a “low-brow” listener, some small item of worth offers itself every evening. If I wish to visit the picture house or “speakerless” friends on no matter what evening, I must always miss something which I might have enjoyed. You may say I cannot have it both ways, but why not? If I knew that a variety programme was always forthcoming on Saturday nights, and a play on Tuesday, and a symphony concert on Wednesday, and talks on Thursday, and light music on

(Continued on next page.)

## WHAT IS THE MATTER WITH THE PROGRAMMES?

(Continued from previous page.)

Mondays—always with a suitable contrast on the alternative programme, I should know when to visit the cinema and when to plan that hilarious party. The B.B.C. already gives us a three-hour symphony concert every Wednesday, but they might extend the idea farther.

Do these suggested alterations in the programme business sound drastic? They might in any case be tried for a time. We have had no radical changes in the programmes since broadcasting first began, only alterations in the hours here and improvement in the method of presentation there. The present pathway must eventually result in a stagnant form of monotonous routine.

### Enterprise.

Enterprise is needed, and daring experimentation. And this, I repeat, always in conjunction with a representative programme committee which

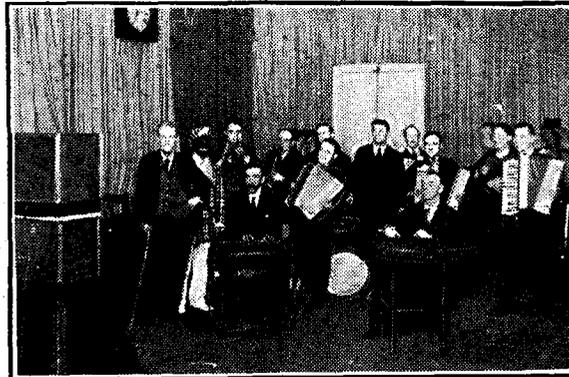
will see to it that enthusiasm in any one particular cause does not overstep the mark.

The B.B.C. experiments at the present time, but to no great advantage. I have been repeatedly struck, during my many visits to Savoy Hill, by the number of fine young men one finds there. No theatre manager would think of utilising the talents of the majority of them.

### Assisting Art.

The B.B.C., however, allows them full scope, under the impression that it must assist and never stifle ART. True worth will out, no matter what the circumstances.

## FROM STREET TO STUDIO



Well-known street performers gathered together in the studio for a special "buskers" programme, an event which proved most popular.

The ideas of many of these young gods of Savoy Hill are false and shallow, cultured with all the culture to be derived from a University education, but nothing more.

It is a strange fact that the really clever men of this world never think themselves clever.

Again, I very seldom meet any ordinary listener who enjoys the military band programmes of the present time, and which are served up to listeners every other night. The B.B.C. is proud of the "symphonic pitch" of the Wireless Military Band, and receives many pats on the back from professional musicians who rejoice that the breezy brass bands of pier and park are being regarded as things of the past. But do listeners?

### Second-Rate Sopranos.

Why so many second-rate sopranos? And why not spend more money on all-star variety and less on third-rate revue (so-called)?

I am venturing into personal prejudices, but I have set down my two main points.

The B.B.C., I affirm, can show no good solid reasons for supposing the wireless public to be different from that which patronises any other entertainment, and we need more daring experiments with the programmes, not mere niggling changes.

What do you other listeners say?

And what does the B.B.C. reply?

Another screw close to the earth terminal takes the foil, which covers the H.F. side of the set, to earth.

Before leaving the set and going on to the gramophone side, be quite sure that the flex leads from the radio-gram switch, and from the G.B.-1 plug, are sufficiently long to reach comfortably to the volume control and pick-up on the motor board above. Also that the battery leads will reach the batteries on the floor of the cabinet. Your radio-gram will work so much better if everything is connected up properly!

There is no need to give details of how to drill the motor board. Most makers of

## THE "P.W." RADIO-GRAM

(Continued from page 414.)

gramophone motors supply a drilling template with the motor—and if they don't, the job is perfectly straightforward and simple.

You will also have to fix the pick-up so that the needle is in proper alignment with the centre of the turntable.

The volume-control potentiometer is fitted to the left-hand side of the motor board near the front, and a hole will, of course have to be drilled for this.

You will also need to fit a stop for the turntable and, if you are feeling very luxurious and tidy, you can treat yourself to a needle cup or two, which can be placed to your liking.

### If You are Tidy.

We have now finished constructing the radio-gram. It does look good, doesn't it? Let's test it out, shall we? Yes, but don't be in too much of a hurry. It isn't very difficult,

as you know, to burn out a new set of valves, and it really isn't worth it.

Before you put the valves in or connect the batteries make a thorough check of the wiring. I know it's a dull job, but it is worth while.

Everything O.K.? Now the valves can go in.

Batteries next. H.T.-1 plug about 60 volts, H.T.-2 about 90 and H.T.-3 as much as you can give it (120, isn't it?).

Turn the radio-gram switch to "radio," the reaction condenser over to the left and the aerial condenser to the right. Plug in H.T. —, and switch on.

### Return to the Local.

The British regional stations will come in nice and strongly—you will probably need a little reaction for the more distant foreigners, but the tuning is so easy that it won't trouble you. Anyhow, when you have wandered about Europe a little, you will probably return to your local.

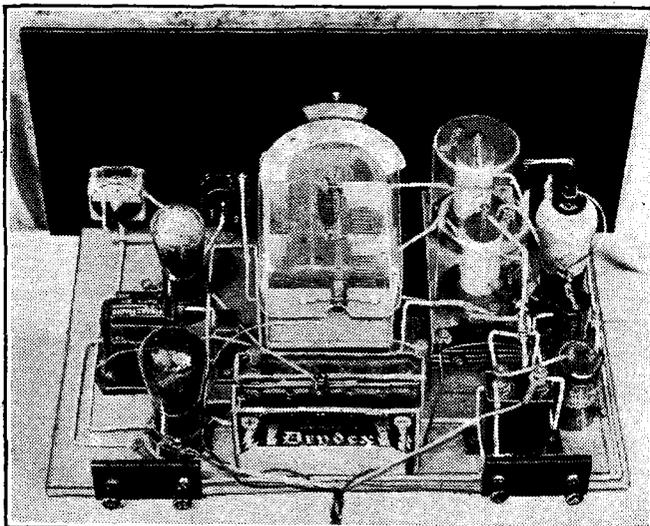
What's that they're playing? Yes, it would stop just when you had recognised it! However, it doesn't matter, because it was that serenade by Heykins, "Ständchen" isn't it?—and there's a record of it on the table.

Radio-gram switch over to "gram," volume control to about half-way round, wind up, and there we have it all over again, just as loud and just as clear as it was from the B.B.C. station.

It is worth while having built the "P.W." Radio-gram, isn't it?

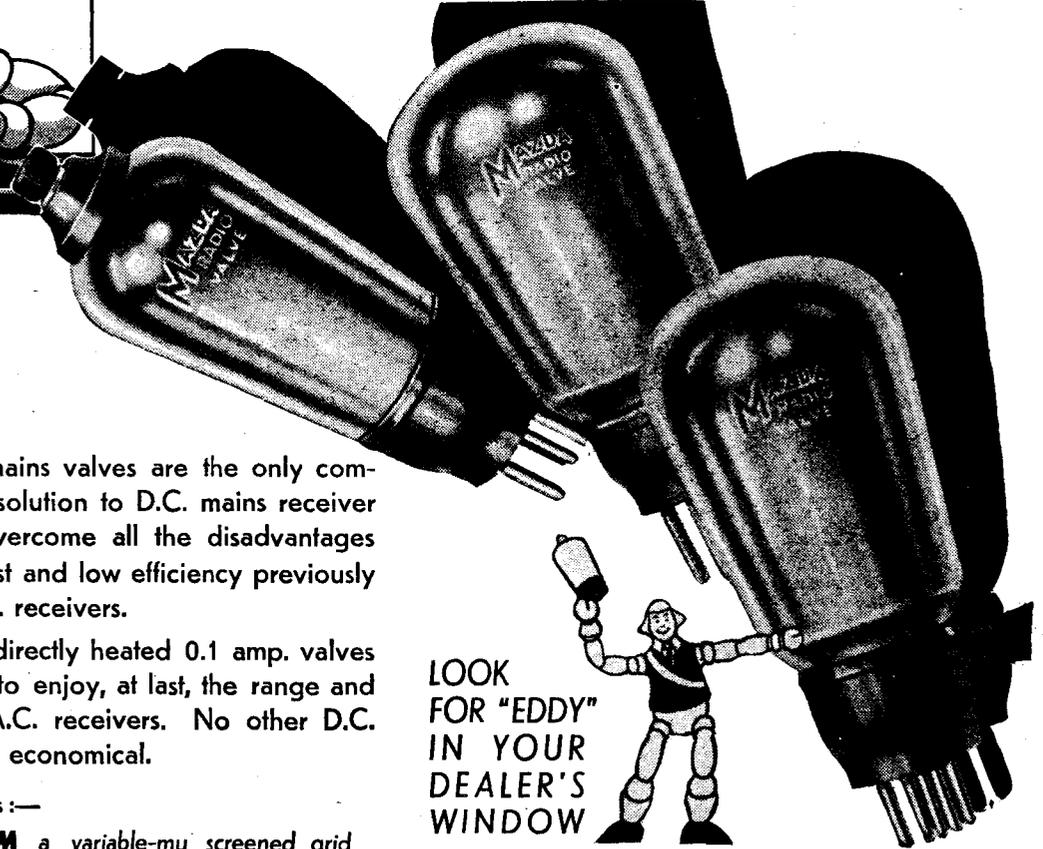
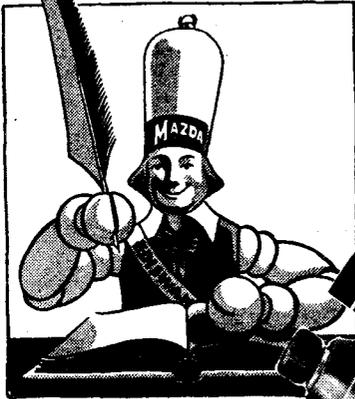
One last word. The volume control is meant for gramophone work only. So if Henry Hall is playing a bit loud, it's no good turning the control to minimum because he won't pay any attention! Try the aerial condenser instead.

## BEHIND THE SCENES



A delightfully clear view of the back-of-panel arrangements of the "P.W." Radio-gram showing how the grid-bias battery is mounted in its own clip on the baseboard.

# FACTS YOU SHOULD KNOW ABOUT THE MAZDA D.C. MAINS RANGE...



The Mazda D.C. mains valves are the only completely satisfactory solution to D.C. mains receiver operation. They overcome all the disadvantages of high running cost and low efficiency previously associated with D.C. receivers.

The new Mazda indirectly heated 0.1 amp. valves enable D.C. users to enjoy, at last, the range and quality given by A.C. receivers. No other D.C. mains valves are so economical.

The Range comprises:—

**THE DC 2/SGVM** a variable- $\mu$  screened grid valve giving results fully equal to its A.C. counterpart.

**THE DC 2/SG** is for those who wish to use an ordinary screened grid valve.

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Full details of these and other useful Mazda types will be found in the Mazda catalogue, sent FREE on request.

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

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The amazing  
**MAZDA**  
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BRITISH  
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100% BRITISH—Designed by British Engineers

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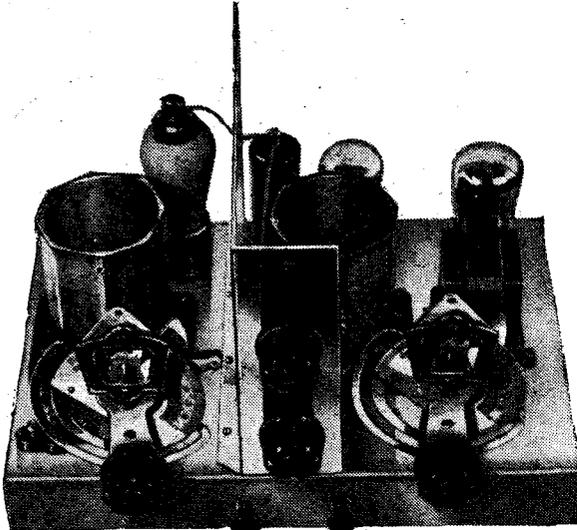
*Mazda Radio Valves are manufactured in Great Britain for*

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V.165

# SUPER SCREENED GRID SELECTIVITY

## 30 STATIONS GUARANTEED



*This is how your Meteor S.G.3 will look when built. Modern metal chassis construction simplifies assembly and avoids all risk of errors. All holes drilled—you simply mount the components and wire up*

### METEOR S.G.3 POWER KIT

*Complete Kit with full instructions.*

**£3-15-3**

Complete Kit of Parts with set of three Mullard Valves (Metallised Screened Grid, Detector and Power) with full instructions.

**£5-7-6**

Or 10 monthly payments of 12/6

### METEOR S.G.3 CABINET MODEL

Complete Kit with set of three Mullard Valves and full instructions with beautiful walnut cabinet fitted with new type moving-coil speaker giving superb reproduction.

**£8-17-6**

Or 12 monthly payments of 17/-

(With Pentode instead of Power Valve 8/9 extra.)

Build the Meteor S.G.3 and you will be sure of at least 30 stations. You will probably get sixty to one hundred, and every station will be clear of interference and free from background noises. You will really enjoy foreign reception with your Meteor. What is more, you will get superb moving-coil quality.

### Your Guarantee of Satisfaction

Wherever you live our guarantee holds good. Mr. G. P. Kendall, B.Sc., the world-famous designer of the Meteor, personally toured the country and tested it in all important centres.

### Save Yourself Pounds

Build the Meteor—or get it built for you—and you have a receiver equal to many costing three and four times as much. Easy to build yet the most interesting receiver you have ever constructed. Complete building and operating instructions with photographs, plans and diagrams (free) with every Kit.

# READY RADIO METEOR S.G.3

# ALL-WORLD ALL-WAVE RADIO

The Meteor S.G.3 possesses all the best features of the most up-to-date design plus a big advantage not obtainable with other sets — ALL-WORLD ALL-WAVE TUNING. In addition to Home and Continental Stations, you will tune in America and other far distant ultra-short wave programmes. The Radio Correspondent of "The People" writes that he tuned in American programmes as easily as home stations with his Meteor. Another user writes: "42 medium-wave stations, 5 long-waves and 13 Americans." Amateur Wireless states: "Even if it were a normal broadcast set I should say it is outstanding. When you remember that good short-wave reception is also provided you have to admit that the Meteor is a great achievement."

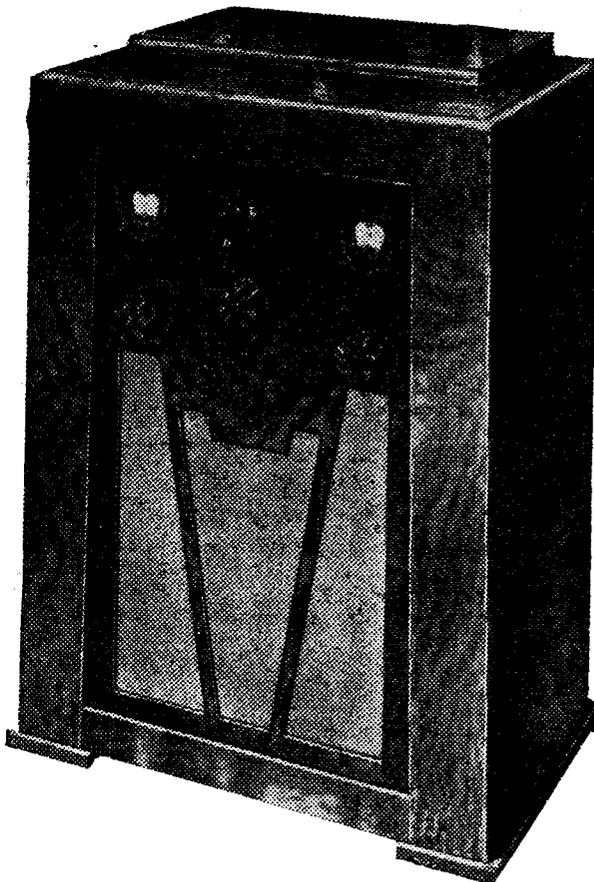
### HUNDREDS OF MARVELLOUS TESTIMONIALS ALREADY RECEIVED.

Wherever you live—at home or abroad—the Meteor is the set which you can depend on for the finest reception. Read these typical reports:

"Best I have handled in 16 years' experience of all types of sets."

"The best S.G.3 I have ever heard. Received 45 stations on first test."

"All claims justified."



Your Meteor Cabinet is supplied with Moving-Coil Speaker ready fitted and holes cut and drilled for controls. Ample space in cabinet for batteries.

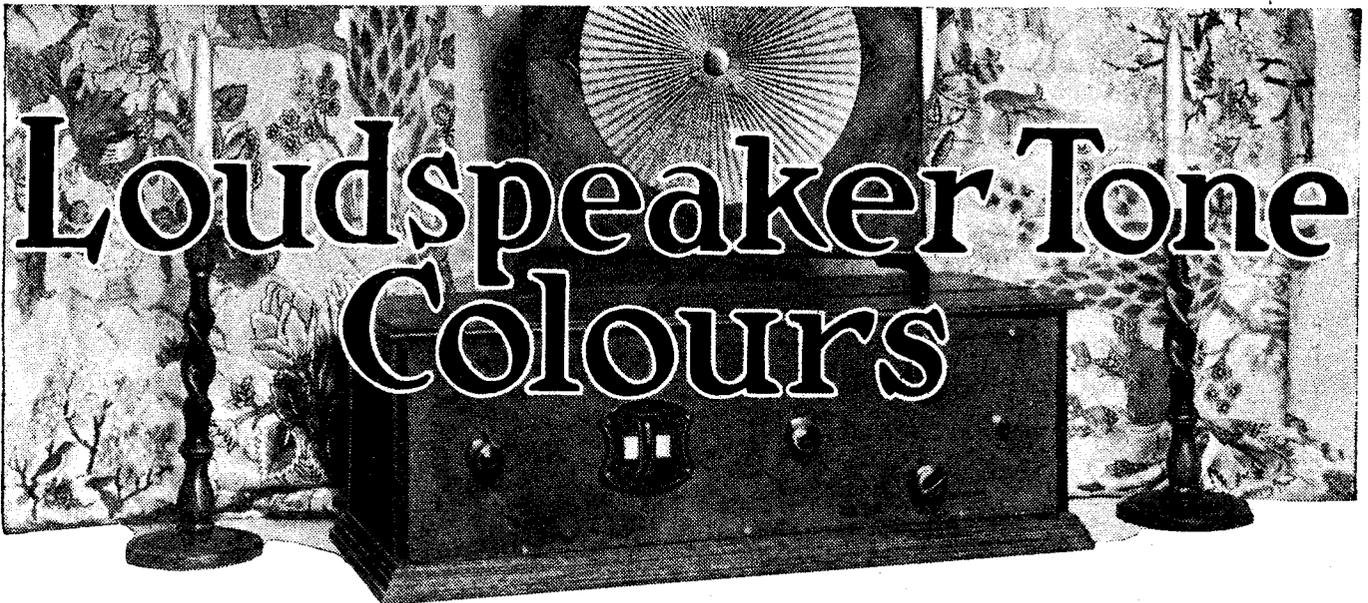


Post coupon and we will send you FREE a sixpenny 20-page Book written by Mr. G. P. Kendall, B.Sc. It tells you all about the Meteor S.G.3, with complete instructions, plans and photographs showing how to build this wonderful set. It also gives you similar details of the '303'—the simplest set in the world to build, and it costs only 70/-.

To: READY RADIO Ltd. (Book Dept.), Eastnor House, Blackheath, S.E.3.  
Please send me free copy of the Meteor S.G.3 and '303' Book and tell me about your REGISTERED USERS' SCHEME.  
I enclose 1½d. stamp to cover postage.

NAME.....  
ADDRESS.....

If you wish to have, with your free book, ten full-sized blue prints, enclose 1/- in stamps with this coupon, P.W.10



SOME years ago, I remember, there was a good deal of talk about devices for controlling the tone of a gramophone, I mean an ordinary acoustic gramophone—this was before the days of electrical reproduction. One or two devices which were brought out at the time seemed to me quite effective. I thought there was a decided improvement obtained by their use.

#### Nearly Perfect.

Of course, it depended on the skill of the operator, as the control could be varied from one moment to another during the actual playing of the record. It was not unlike the method of control of an automatic piano.

Opinions differ a good deal about this question of tone control, particularly as applied to the ordinary gramophone. Some people say that you cannot "improve on nature," so to speak, and that when the record is turned out by the manufacturers it is as nearly perfect as possible, so that any modifications introduced by the user can only have the effect of making it *less* faithful to the original.

#### Back to Normal.

In these days, however, when we are so largely concerned with radio apparatus and electrical reproduction of records, we use various appliances and components which were not considered at the time of which I am speaking, which was a few years back.

Tone control has, therefore, taken on a

\*-----\*  
 \* Some informative details of the \*  
 \* various methods available for \*  
 \* altering the tone of the repro- \*  
 \* duced programme. \*  
 \* By Dr. J. H. T. ROBERTS, F.Inst.P. \*  
 \*-----\*

new meaning, and interpreted in its best sense it means to bring the reproduction back to normal after it has been accidentally modified by the characteristics of the various components which have been used. The loudspeaker, for example, must impress its own particular characteristics upon the reproduction, and what with valves, transformers and other components, the reproduction often departs very sadly from the original by the time it reaches the listener.

#### Extremely Popular.

The purpose of tone control, as we understand it to-day, is to neutralise these effects, so far as may be possible, and to put back into the music or speech what has been taken from it, or to take away what has been accidentally added to it.

To-day tone control as applied to a radio receiver has become extremely popular, and even those who urged objections against what they regarded as unjustifiable interference are rapidly being converted. Tone control, or tone "colouring," as it is sometimes picturesquely called, is, in fact, quite

the rage in the United States, and many manufacturers of radio sets have had great success with sets of which "tone colour" is the outstanding feature.

#### Selective Modification.

It is important to distinguish between *tone* control and *volume* control. Probably the simplest way to appreciate this distinction is to bear in mind that true *volume* control simply means a raising or lowering of the volume *as a whole* without differentiating between high or low notes, whilst *tone* control means a *selective* modifying of the higher or lower parts of the register, so that the balance is definitely altered.

When the *volume* control is used it simply means that the loudness of the reproduction is increased or decreased, but there is no effect upon the general character of the sound. When the *tone* control is operated, however, the character of the sound is definitely modified.

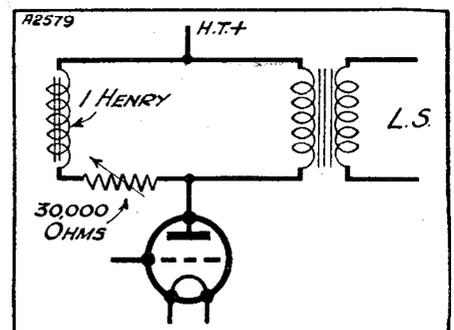
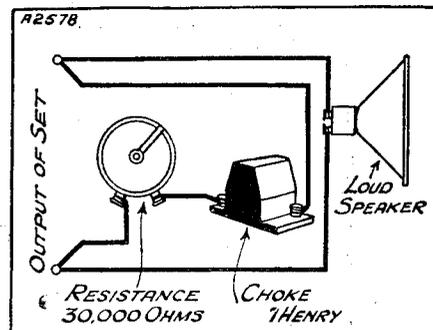
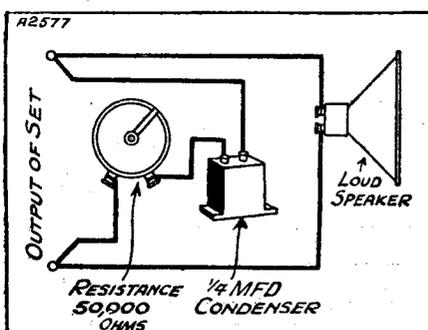
#### Altering Pitch.

On the one hand it may be raised in general pitch, becoming clearer, even possibly shrill, whilst on the other hand it may be lowered in pitch, made rounder and fuller, even to the extent of becoming "woolly" or "boomy."

I should perhaps mention that practically all devices for tone control act by cutting down some part of the register. For instance, if the overall tone is too high-

(Continued on page 430.)

### SOME EASILY-APPLIED METHODS OF IMPROVING TONAL RESPONSE



The first two diagrams are self-explanatory, in the first case a condenser being employed instead of a choke as in the second instance. The principle of the latter method is shown by the third diagram.

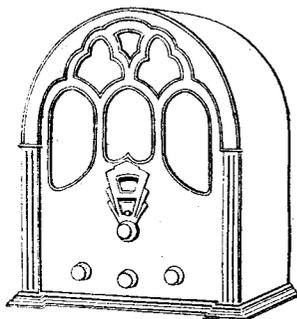
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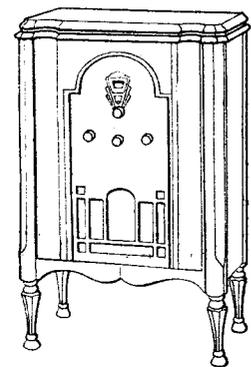
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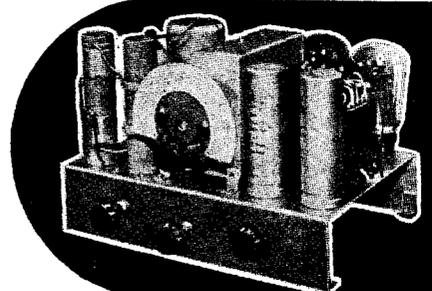
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## LOUDSPEAKER TONE COLOURS

(Continued from page 428.)

pitched, then a high-note "suppressor" may be used, which simply has the effect of cutting down the higher-pitched tones and so rendering the lower register *relatively* (but not *actually*) louder. In the same way, if the overall tone is low and boomy, it can be raised and clarified by the use of a low-note suppressor, which cuts down the lower frequencies and thereby brings the higher frequencies into greater prominence.

There are various types of tone control, but the simplest arrangement is one which is adapted to be connected across the output of the set or across the terminals of the loudspeaker. If this arrangement is intended to suppress or bypass the higher frequencies it makes use of a *condenser*, whilst if it is intended for the lower frequencies it makes use of a *choke*.

### Basic Principles.

You know that the higher the frequency of alternating or intermittent current the more easily it is able to pass through a condenser. The condenser, therefore, is a much easier path for the higher acoustic frequencies than it is for the lower frequencies.

If we take a condenser of sufficient capacity and shunt it across the loudspeaker terminals, clearly it will bypass the higher frequencies, and the extent to which it bypasses the frequencies will become less and less as the frequencies become lower and lower. This, then, is the basic principle of the high-note suppressor.

For general purposes a fixed condenser of about  $\frac{1}{4}$  mfd. will be suitable, and it only remains to introduce some method of regulating the amount of the effect produced by this condenser.

The regulation is easily introduced by connecting a variable resistance in series with the condenser (the pair in series being then connected across the loudspeaker

terminals or output of the set.) A variable resistance of 50,000 ohms is often used, although actually somewhat lower values of resistance will frequently be found suitable.

You will see that this resistance in series with the condenser acts as an obstruction to the bypassing of the loudspeaker current. Let us imagine for the moment that the resistance is enormously high, then clearly no matter how large the capacity of the condenser may be, it will not be possible for very much bypassing to take place. On the other hand, if the resistance is extremely low, the condenser will have full play in bypassing the loudspeaker current.

### Low Frequency "Suppressor."

So you see what we have is a *selective* bypasser in the form of the condenser and a *non-selective* obstructor in the form of the resistance. The condenser does the selecting, allowing a much freer path for the high frequencies than for the low ones, whilst the variable resistance gives us a check on the extent to which the condenser is allowed to rob the loudspeaker of its current.

Now when it comes to low frequencies we make use of a low-frequency choke instead of condenser. Here the position is just the reverse. The choke, as you know, will form an easy path for *low* frequencies, but a difficult path for *high* frequencies. The choke, in fact, acts in precisely the same way as the condenser, except that the choke

favours the frequencies more and more as they become lower, whilst the condenser, as already mentioned, favours them as they become higher and higher.

All we have to do then for the low-note suppressor is to take the low-frequency choke (1 henry) and connect it across the loudspeaker terminals or the output of the set. For the purpose of regulating, as before, we introduce a variable resistance in series with the choke. With the choke the variable resistance may be, say, 30,000 ohms or sometimes less.

There is just one point which I should mention and that is that in a good many modern sets an output transformer is used between the last valve of the set and the loudspeaker. For instance, to take an extreme case, if a low-resistance moving-coil loudspeaker is used a high-ratio step-down transformer will be used between the set and the speaker.

### For Boomy Loudspeakers.

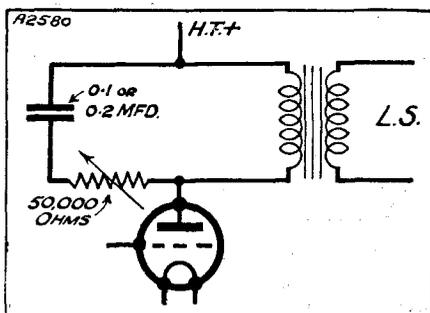
If this transformer is included in the set, the tone-control arrangement cannot conveniently be fitted externally to the set and must be connected across the primary of the transformer. On the other hand, the transformer is sometimes included with the loudspeaker itself, in which case the loudspeaker terminals are, in fact, the input terminals of the primary of this transformer; the tone control can then be connected externally to the set as already described above.

As regards the value of the low-frequency choke, generally about one henry or down to, say, 0.5 henry will be found suitable.

You will find a tone control of this kind very useful in cases where the loudspeaker is apt to give a harsh or tinny tone. In such a case a high-note suppressor is indicated, consisting of condenser and resistance as mentioned above.

For very low or boomy loudspeakers the low-note suppressor (choke and resistance) should be used, and in all cases it is a good plan to try different values of the choke or condenser, as the case may be, until you get the best value suited to your particular requirements. Many people swear by the tone control and would not give you a thank for a set without one.

### AT THE TRANSFORMER



The method applies also to transformer-coupled loudspeakers, and is here shown joined across the primary.

When putting in a new detector valve remember that if a potentiometer is used for the grid-leak return, this will probably need to be reset.

"The Pioneer Broadcasting Station of the World" (KDKA), East Pittsburgh, started life with the call sign 8 Z Z.

The Finns are thinking of increasing the power of Lahti, on 1,796 metres. It is Europe's longest-wave station, and usually closes down its evening programme at about 7.45 p.m.

The actual site of the new and much-talked-of Leipzig station is a small place called Wiederau.

The total number of broadcasting stations in the world is estimated at about 1,500, of which over 600 are in the U.S.A.

One of the biggest radio mistakes ever made was the occasion last year when a great chain of American stations re-broadcast the Pope's station, "Radio Vatican," for the best part of an hour before they learned that it was another station altogether that the engineers had picked up in mistake for Radio Vatican!

## RADIO PRACTICE & PROGRAMMES

Some Useful Reminders.

Each of the American great broadcasting chains, the National and the Columbia, control about 100 stations.

Neuchatel observatory, in the Alps, provides the 5 p.m. time signal which is radiated by Radio Suisse Romande, on 403 metres.

The Brno station, which comes in on 342 metres, just below Brussels No. 2, pronounces its unpronounceable-looking name as "Birno."

The American amateur station W 6 F Z A claims to be the world's "baby" station, its owner and operator being under ten years of age!

The Methuselah of amateur radio is supposed to be W 8 A R J, which is regularly operated by its owner, who is well over eighty.

One of the golden rules for short-wave listeners is "Tune slowly, and investigate everything you hear." What appears at first to be a very faint "chirp" may prove to be a really good, though probably distant, programme.

On medium and long waves it is usual with one- or two-valve sets to search with the receiver almost, but not quite, oscillating. On short waves the rule is different, and it is better to allow the receiver to oscillate GENTLY when searching for stations.

Never let a short-wave set oscillate vigorously, as this affects neighbouring aerials, and incidentally it ruins your own chance of really good long-distance reception.

If you use an S.G. valve in a rather old-fashioned circuit without H.F. grid bias, it will probably pay you to fit a bias cell.

Don't allow the acid in your accumulator to evaporate below the level of the tops of the plates, but keep it topped up with clean or preferably distilled water.

# THERE IS NO SUBSTITUTE FOR ELECTRON 100% COPPER AERIAL BRAIDED AND COMPOUNDED



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# TRUE TONE CONTROL

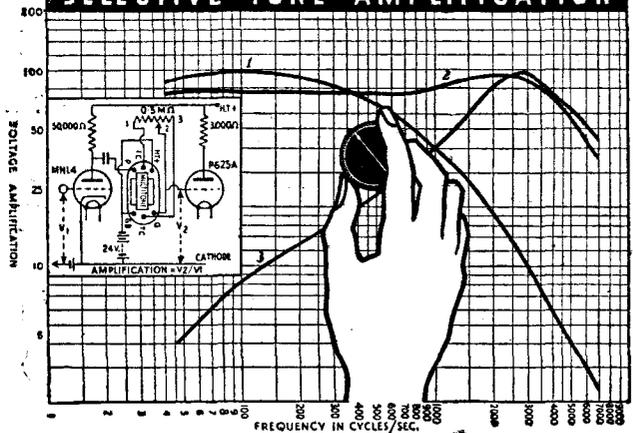
## WHAT IS SELECTIVE TONE AMPLIFICATION

Selective tone amplification is the method of tone control made possible by Multitone. By turning a knob you can AMPLIFY low tones, middle tones, or high tones, just as you wish. NO OTHER TONE CONTROL CAN DO THIS.

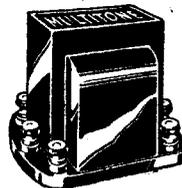
If the tone of your present set is not all it might be, you can easily substitute the Multitone Transformer for your existing L.F. transformer or add it to the Resistance Capacity Coupling. If you are not a constructor, your dealer will do this for you.

Ask for it at any reliable dealer's: if you have any difficulty write direct to us and we will help you.

### SELECTIVE TONE AMPLIFICATION



By changing the setting of a Potentiometer, the response-curve of the Multitone Transformer is progressively altered from a falling (1), through a level (2), to a rising (3) characteristic. The limiting responses and an intermediate level-response are shown by these curves. When the response is level the transformer ratio is 4:1. True Two-way Tone Control is immediately at your disposal on any set. In use all that is necessary is to turn the Potentiometer until the desired overall response is obtained.



Any good Potentiometer exceeding 0.5 megohms can be used with the Tone Control Transformer, but the best results are obtained with the Multitone Graded Potentiometer (price 3s. 6d.) which has been specially designed for this purpose.

**17'6**

Our Booklet on Tone Control will be sent post free on receipt of a postcard.

# MULTITONE TONE CONTROL L.F. TRANSFORMER

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95/98, White Lion St., London, N.1. 'Phone: North 5063.

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REDUCED TO **39/6** Carriage Paid!!!

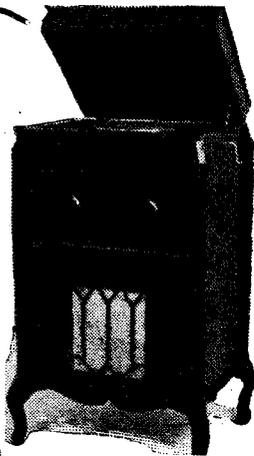
QUALITY GUARANTEED IMPROVED  
Soundly constructed in selected oak, etc., and hand polished.

SPECIFICATION.—3' 3" high, 1' 10" wide, 1' 6" deep. To take panels up to 18" x 7". Panel opening to suit set. These cabinets allow ample room for the following:—Pick-up, Motor, Speaker, Batteries, etc., all for the reduced price of 39/6.

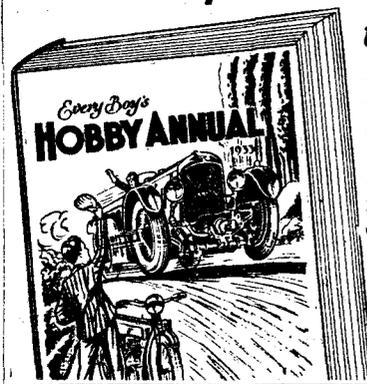
Catalogue Post Free. From one of the Largest Mail Order Works in England.

W. S. WILKIN, Cabinet Manufacturer, 12-26 Nelson Mews, Southend-on-Sea, Essex.

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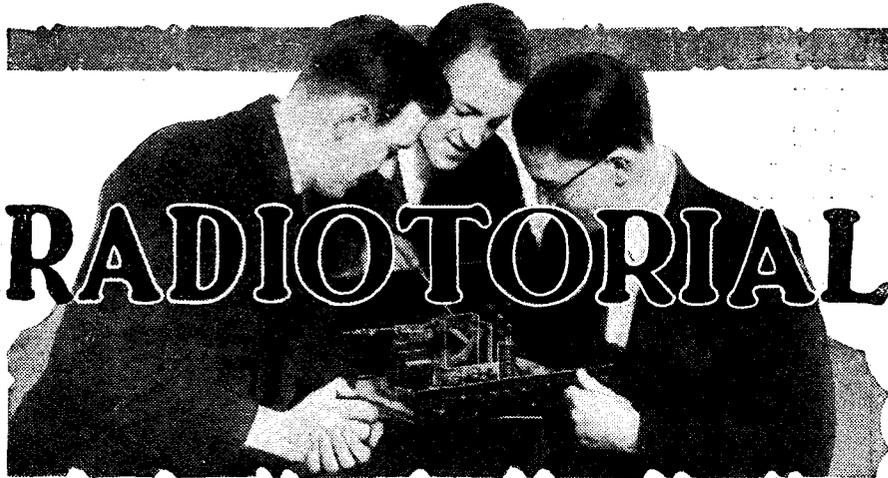
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# RADIOTORIAL

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

## QUESTIONS AND ANSWERS

### REVIVING AN OLD-TIMER.

"REVIVING THE OLD" (Attercliffe, near Sheffield).—"I have a few component parts of an old three-valve set in my possession. I should be very pleased if you would tell me of

the circuit I could get to build it up again. The coil is of a type I know nothing of. In the centre of it there is a valve holder, and adjoining the base of the coil there are two separate R.C. coupling units, with grid leaks, etc., attached."

The details you give are insufficient for us to supply a complete wiring description. And in any case we think that coil would be of little use nowadays when the standard of selectivity is necessarily so much higher than that of a few years ago.

By disregarding the coil and connecting the rest of the apparatus up as an R.C. amplifier you might get a bit of fun and some measure of success, but you will probably strike some nasty snags.

For one thing, the values of resistances are likely to be wrong for modern valves; and you are sure to want an awful lot of H.T.

However, assuming the valve holder takes the valve you wish to use for first L.F. with R.C. coupling, you will find its plate connected to one side of a resistance. The other side of this must go to as much H.T. as you can give it.

There will also be "G" and "G.B." terminals associated with this circuit, and they must go to the

(Continued on page 434.)

## DO YOU KNOW—

The Answers to the following Questions ?

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

- (1) What are generally considered to be the best three indications that an accumulator charge has gone on long enough ?
- (2) If a 10,000-ohm resistance is passing a current of one milliamp., what is the voltage drop across the resistance ?
- (3) About what frequencies are covered by (a) man speaking; (b) woman speaking ?
- (4) About what value should the impedance of an output valve's load be ?

## "NEW RADIO FOR OLD"—FOR CHRISTMAS

**WE BUY YOUR OLD SET AND SUPPLY YOU WITH A NEW SEASON'S MODEL**

*Liberal Allowances and Balance Payable by Cash or Hire Purchase*

HUNDREDS OF TESTIMONIALS FROM SATISFIED CLIENTS

● **EVERY MAKE OF SET, KIT OR RADIOGRAM SUPPLIED**

It will pay you to write for particulars of our amazing exchange offer, enclosing 1½d. stamp, naming your old set and the new model you fancy. A FREE QUOTATION WILL FOLLOW.

Complete transactions executed by mail.

**FREE WIRELESS SET** to introduce the Radialaddin Club.

Please forward this INQUIRY FORM (without obligation): Please quote me free your allowance for the new set:

Make..... Model and List Price.....

My Present Set is: Make..... Batteries or Mains.....

Date of purchase..... Original cost of Set.....

Balance of purchase price would be payable by me as follows:

Plan A. Whole of balance in cash.

Plan B. Whole of balance over Six, Nine, Twelve\* months.

\*Delete unwanted words.

NAME, in Full (Block Letters).....

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# A WIRE-LESS AERIAL THAT WHEN FITTED IS INVISIBLE

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**NO WIRES.** No danger from lightning, reduces static interferences and increases selectivity.

**WHAT AN AERIAL!** Just a 30 ft. roll of narrow adhesive tape

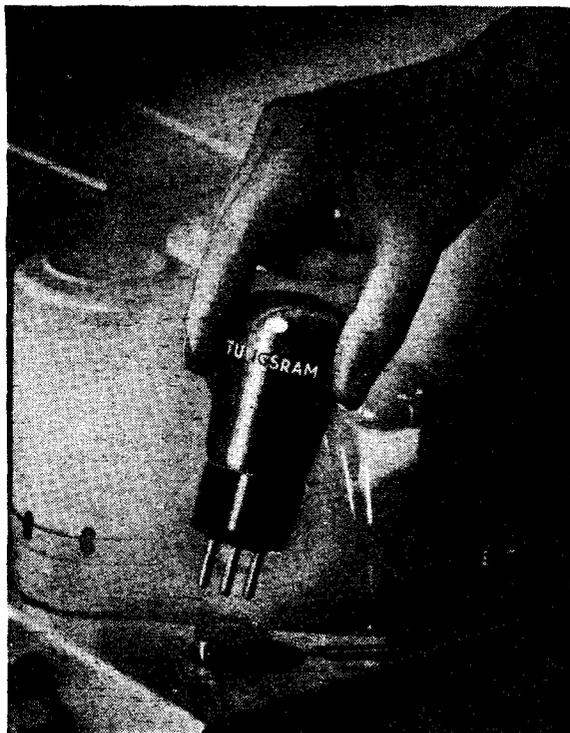
—just press it round the room beneath the picture rail, wainscoting, carpet or up the staircase—in fact, anywhere. Pull the end, and it's down, leaves no mark. Ideal for use in Flats.



**2/-** post free or from your local dealer.

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## BARIUM VALVES

## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 432.)

"G" terminal on the following valve holder and to the requisite bias.

The other G.B. terminal will go to a lower value of grid bias, and the other resistance will have a "plus" and an anode or plate terminal, possibly marked A or P.

The plus terminal goes to as much H.T. as you can give it, while the A (or P) terminal goes to the detector's plate.

If now the apparatus itself and your description are all right you will have two stages resistance-capacity coupled.

But remember that few people use this method to-day, that the modern valve is quite a different proposition from those for which your apparatus

### THE ANSWERS

THE ANSWERS TO THE QUESTIONS ON PAGE 432 ARE GIVEN BELOW.

- (1) (a) When the specific gravity is 1.25 or more; (b) the voltage up to 2.5 or more; (c) when the electrolyte presents a milky appearance caused by gassing (this indication is not truly reliable).
- (2) Ten volts (From  $R \times I = V$  where R and I are respectively in ohms and amps., and  $V =$  voltage.)
- (3) (a) 100 to 8,000, approximately; (b) 200 to 10,000, approximately.
- (4) About twice or one and a half times the A.C. resistance of the valve in question.

DID YOU KNOW THEM ALL?

was designed, and that whatever advantages resistance capacity coupling does possess are admittedly obtainable only when the associated valves and voltages, etc., are carefully chosen to suit the apparatus concerned.

#### MORE ABOUT TRUE-VIEWS.

A large number of readers have written appreciatively about the realistic results obtained from true-view illustrations, and the

following notes will be of interest to all who have dabbled in this fascinating subject.

First, as regards viewing the pictures, it is frequently suggested that better than removing them from the page is the "collapsible back" idea used in some commercial stereoscopes, whereby the viewer is placed on or against the book without the need to damage it. This is certainly a good scheme, and those who can carry it out on their own models are recommended to do so.

Another point brought forward concerns the "trueview" itself, as printed in "P.W." some readers querying whether it is possible

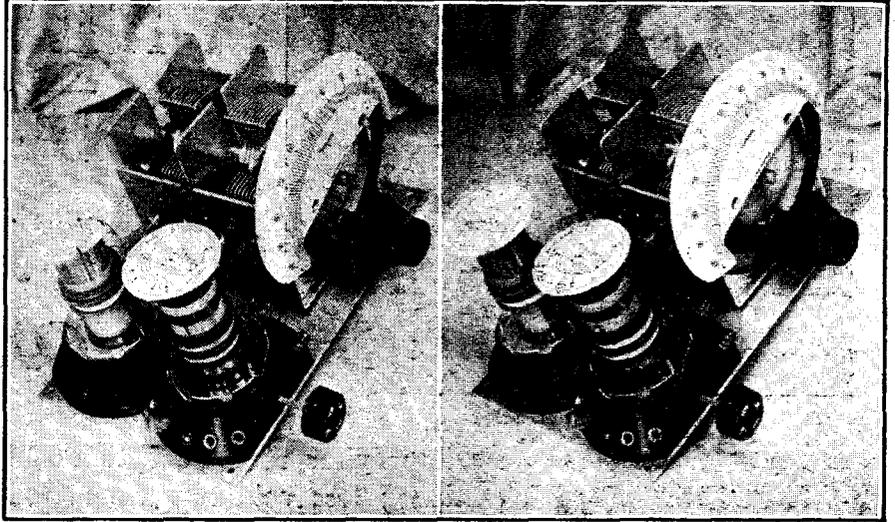
to improve it by altering the spacing between the two halves of the picture, i.e., by cutting out and repasting on card with altered measurement between the two halves.

This is not advisable. The correct distance is fixed before printing and cannot be improved upon afterwards.

The "hot-stuff" experimenters" will be interested to know that one of the most difficult types of stereoscopic photos are those taken from the air. But they can be obtained, and very successfully, too. An exaggeration of these by wide-separation exposures gives the

(Continued on page 436.)

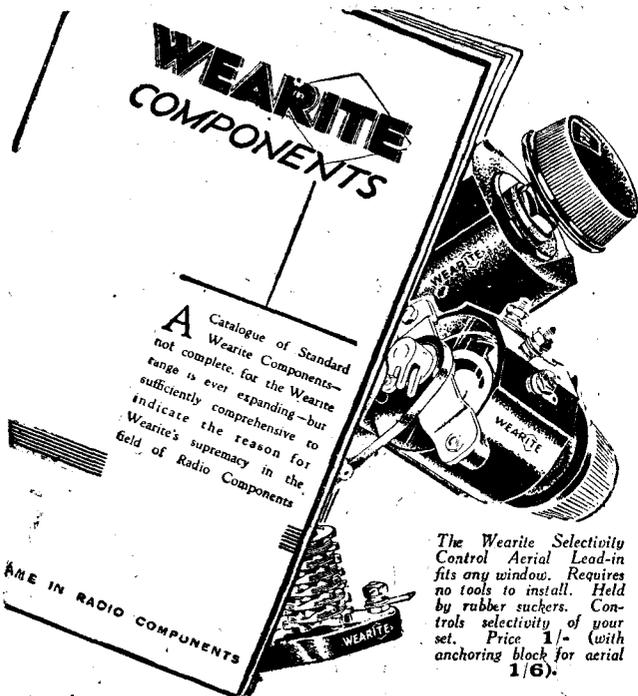
### A BAND-PASS UNIT IN PERSPECTIVE



You can appreciate the niceties of its construction if you look at this Formo Band-Pass Unit through a "P.W." Stereoscopic True-viewer.

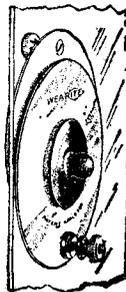
# Have You Sent for Your Copy of

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*Player's  
please*

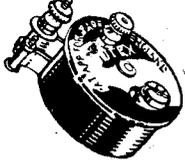


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With full instructions, Battery Model 2/6 Mains Model 5/6 Mounted on guaranteed alarm clocks, 7/6 and 10/6 respectively, post free.

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**PRICE 39/6**



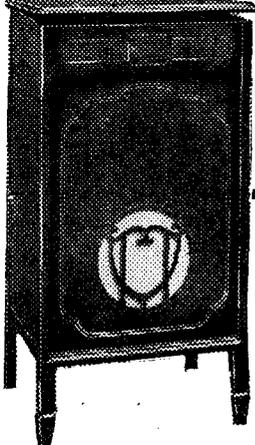
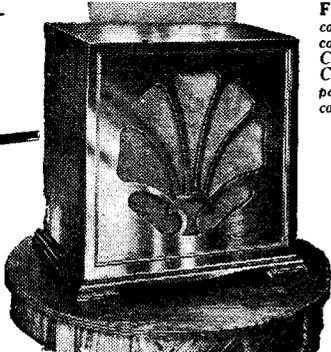
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1. Only 2½ in. deep.
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The famous Simpson Electric Turntable can be fitted in any Gramophone at little cost and no trouble. Starts and stops at the touch of the finger. Ask your dealer for particulars. If any difficulty write for illustrated leaflet.

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Are only two from the extensive Camco range of Cabinets—a range which includes a variety of types and sizes.  
The Camco "Popular" is especially suitable for converting your Set into a Radio-Gram. It is supplied finished in Shaded Walnut, and costs only 75/- complete.  
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No. 1. Oak, 22/-; Mahogany and Walnut, 24/-.  
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See them at our showrooms. Open 9.15 to 5.45. (Sat. 12.30.)  
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Showrooms: 24, Hatton Garden, London, E.C.1.  
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Post in 1d. envelope.

Name.....  
Address.....  
T.P.W.....

## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 434.)

curious effect of making the buildings, etc., appear to be floating in the air above the ground.

Later on, we may consider the possibility of publishing some freak "True-Views" on the lines of the above, just by way of novelty.

Probably our most difficult work is taking "ghosted" views of interesting radio components. Some of these have necessitated no less than four exposures. First two photos of the article with its case on, then two further photos with the case removed. By means of this double exposing you see the case as a transparency.

### RATTLING BAD.

"MOVING COIL" (Bangor).—"It was a bit of an extravagance at the time, I thought, but having made up my mind for a moving coil, a moving coil it had to be. And it more than came up to my highest hopes. It was rattling good, in fact. But now it is *rattling bad*...."

"That last bit is really true. On certain occasions there is a nasty edgy rattle on music,

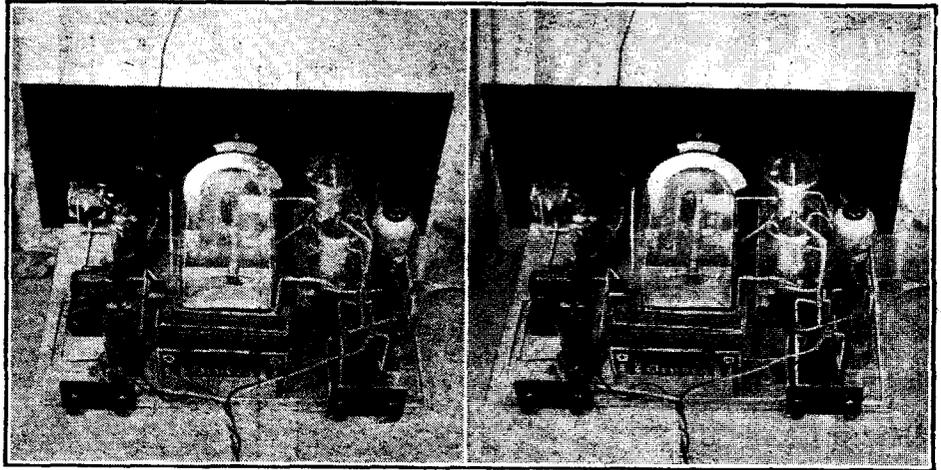
and sometimes on speech as well. An awful thing to put up with after all I have boasted about this speaker.

"All voltages are absolutely O.K. I can swear to that.

"Replacing the valves made no difference, and the only thing I can prove seems to point to the loudspeaker being wrong, as another does not show a trace of the rattle.

"Another funny thing is that if I lay the loudspeaker on two chairs, to face the ceiling, there is far less rattle than when standing upright. Yet all the nuts are tight, no loose connections, nothing wrong with the cone itself—in fact, no accounting for the rattle. Can you suggest anything?"

What about the metal gauze stuff covering the aperture? If this gets a little loose in places it may be moving slightly, and this sets up an "edgy rattle" just as you describe. The freedom when lying down also points to this, so you should try what a good pastepot will do.



The "P.W." Radiogram, for stereoscopic reproduction in a True-viewer.

### "P.W." PANELS, No. 95.—BRESLAU

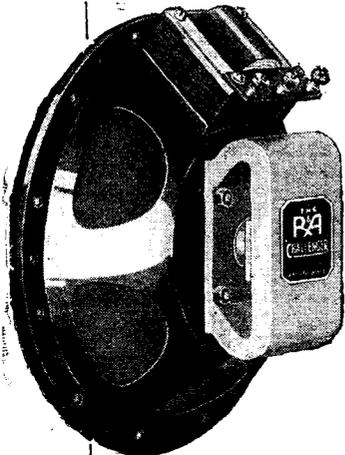
Breslau works on 325 metres, which is the wavelength immediately below Poste Parisien's.

Until a few months ago the power was only 1.5 kilowatts, but now Breslau has a new station rated at 60 k.w.

It works in conjunction with Gleiwitz (253 metres), and announces "Achtung. Hier Breslau und Gleiwitz."

Distance from London 743 miles. Interval signal, metronome.

# The Pinnacle of Perfection



The excellence of R & A products is the result of specialisation by experts in the design and engineering of moving coil and moving iron reproducers. They are offered to a discriminating public to whom perfect production is a sine qua non, and are available in chassis form or complete in cabinet.

### R & A "VICTOR" Permanent Magnet Moving Coil Reproducer de Luxe

An instrument for the connoisseur, representing the highest achievement possible in the present stage of P.M.M.C. design and performance. The forged cobalt steel magnet has a flux density of 8,000 lines per square centimetre, thus ensuring amazing sensitivity. The cadmium plated grille is a distinctive feature and the 6-ratio Ferranti transformer, permitting extremely accurate matching, is completely enclosed, as also are the magnet and speech coil. Chassis finished black enamelled. Dimensions, 10 3/4 in. dia. by 5 3/4 in. deep, weight 12 1/2 lbs. Speech coil impedance 5.5 ohms.

INCLUDING 6-ratio Ferranti Transformer **70/-**



### R & A "CHALLENGER" Permanent Magnet Moving Coil Reproducer

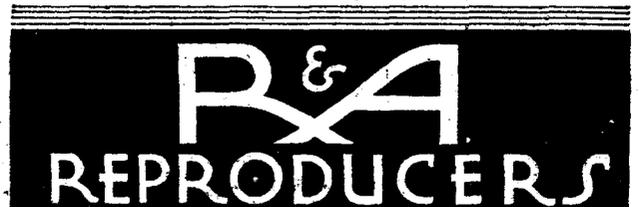
Unequalled in its price class for quality of reproduction. "The Wireless World" Test Report, 1st June, 1932, states: "Performance . . . is such that it merits discussion from an absolute standpoint and without regard to the very reasonable price asked . . . overall sensitivity . . . slightly better than average of its class . . . the reproduction in the bass below 100 cycles quite definitely above average . . . full-bodied bass without boom . . . speech natural . . . balance in music exceptionally good."

**35/-**

The CHALLENGER is complete with 3-ratio Ferranti Transformer.

Write for fullest particulars.

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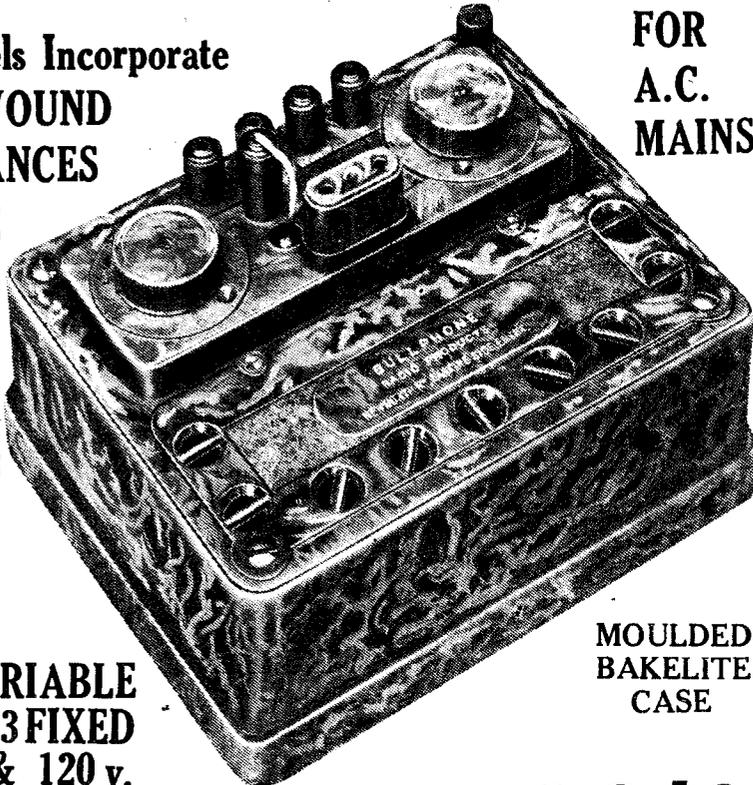


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A.C.2. Same as A.C.1 but with Trickle Charger. **60/-**

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A.C.5. 120 v. 40MA 4 v. Raw A.C. - **65/-**

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## THE NIGHTINGALE PARALLEL FEED

### TRANSFORMER UNIT

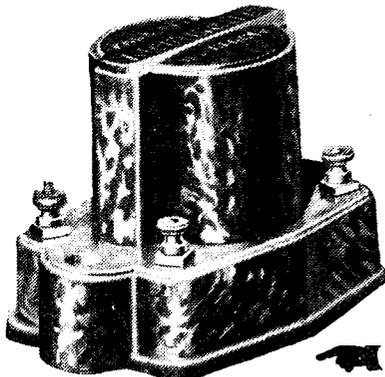
The results obtainable from this Transformer Unit will astound you when compared with any other of double the price.

It has a greater primary inductance (150 henries) than any other Nickel Alloy Core Transformer in general use, and reproduces with perfect realism all frequencies from those of the Bass drum to the highest overtones of the violin.

Incorporating 35,000 ohm Wire Wound Resistance and Non-Inductive Coupling Condenser which are mounted in the base of the Unit.

**150 HENRIES**

**10/-**



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NEW NORTH ROAD BARKINGSIDE ESSEX

PHONE CHIGWELL 162

**New Times Sales Co.**  
EST. 1924

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- **BLUE SPOT SPEAKER, TYPE 100U**  
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- PETO-SCOTT 183 WALNUT ADAPTAPRAM**  
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Please send me (a) your 1933 Catalogue

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P.W. 29/10/32

**SAFEST FOR EASY TERMS**

**WHAT HAPPENED AFTER THE SHOW!**

THE old adage of early to bed, etc., was never more true than of Manchester, and during the city's recent Radio Exhibition it came as something of a shock to many of the well-known Trade personalities from "down South" to discover that after the Show closed at 10 o'clock there was nothing left to do but "to do as the Mancunians do" and go to bed!

But not so on two notable occasions! For by way of providing an interesting diversion of social and educational value, "P.W." made arrangements for two comprehensive parties of exhibitors to visit Allied House, and they had the novel experience of seeing produced in the early hours of the morning the "Daily Dispatch" which, a few hours later, was placed on the breakfast table at their hotel.

**A Pleasant Evening.**

The visitors were received by Mr. E. W. Cheadle, Allied Newspapers, Ltd., who conducted them through the various

**DEMONSTRATION FOR DEMONSTRATORS**



A visit for exhibitors at the Manchester Radio Exhibition was arranged by "Popular Wireless" to the "Evening Chronicle" printing works. Some of the party are here seen in the Telegraph Department receiving a message of greeting from the paper's London Office.

departments—from the editorial to the linotype department, then to the machine cellar and the publishing rooms.

In the telegraph room the guests sent a greeting of good wishes to the London office of Allied Newspapers, and it was only a matter of seconds before the reply came back from London expressing the hope that the visitors were having a pleasant evening.

Flashlight photographs were taken in the linotype department where the visitors were keenly interested in the "type setting" processes. They saw sheet after sheet of copy—some of it, appropriately enough, referring to the success of the Radio Exhibition—being transformed into type.

They saw the pages made up and the "moulds" taken. Then, most interesting of all, they saw the huge printing presses pouring out thousands and thousands of copies of the "Daily Dispatch" and "Daily Sketch." Thus they saw the complete newspaper produced from the "raw" copy.

**TESTED AND FOUND**

(Continued from page 416.)

Finally, I come to the Telsen Intervolve Coupling Unit.

This is, to use Telsen's own words, "a modern development of the one-time deservedly popular R.C. units. It incorporates a low pass filter feed in its anode circuit, thus effectively preventing 'motor-boating,' 'threshold howl,' and other forms of instability arising out of common couplings in eliminator and battery circuits."

It is, in short, an up-to-date R.C.C. unit incorporating well-arranged decoupling.

One of these units, in conjunction with a transformer, makes a fine two-valve amplifier which is both powerful and stable.

And the price of the Telsen Coupling Unit is only 7/6; I don't think separate elements of equivalent effectiveness could be purchased at anything under that.

**AN AERIAL TUNER**

The Exact "Indupas" Aerial Tuner, made by The Exact Manufacturing Co., reverts to "swinging coil" reaction and employs a second variable condenser in order to operate the second of two tuned circuits.

Not a bad plan, that. It is true there is no gain in the matter of the mere number of controls, but the fact remains only three components figure in the scheme.

In the ordinary way, the simplest of sets requires a coil unit and two variable condensers, one for reaction and one for tuning.

With the Exact Tuner and its two tuned circuits really good selectivity is given.

The reaction is quite smooth, and its tuning upset not at all serious.

The two condensers needed can be ganged if desired.

I would advise all constructors to write to Priory Street, Coventry, for details of this inexpensive and interesting component.

**SCREENING WIRING**

Remax Cables are supplying, at 1/- each, useful screened wiring kits. Each kit includes a 3 ft. length of closely braided copper sleeving, which is both flexible and strong, a 3 ft. 6 in. length of tinned copper flexible connecting wire, and twelve specially designed combination soldering tags and earthing clips.

These kits ought to prove popular among constructors, for the necessity of screening leads is often encountered these days.

**TRADE JOTTINGS**

By G. T. KELSEY.

**R.I.'s Latest.**

As one would rather expect from a firm of such repute as R.I., their new season's catalogue is a really first-class production.

It contains details of the famous Madrigal receivers for 1932, the new six-valve super-het (which is a handsome-looking job), the Antinodal short-wave amplifier adapter, and all the other components for which the name R.I. has become famous.

This new catalogue, which is a forty-page effort, is packed full of interesting things, not the least of which are the N.P.L. curves for the various R.I. transformers.

I am of the opinion that it is a catalogue that should be in the hands of all "P.W." readers, and I advise you to make early application for a copy to R.I., Ltd., Purley Way, Croydon, Surrey.

**Star Gang Condensers.**

I have just examined a copy of the new Polar catalogue, and their range for the 1932/1933 season includes condensers for every conceivable circuit arrangement. The new Star Gang Condensers are most impressive-looking instruments, and they are matched to one-half of one per cent plus or minus one micro-microfarad, at any position of the angular rotation of the shaft.

The new catalogue is a production that is well worth having, and a free copy will be sent to all "P.W." readers who apply to Messrs. Wingrove & Rogers, Ltd., Arundel Chambers, 188/9, Strand, London, W.C.2.

**Manufacturing Precision.**

Radio has indeed been brought down to a fine art in this year of grace, nineteen hundred and thirty-two.

The other day I had an opportunity of going all over the new Mitcham home of Philips, and I was amazed at the fine limit of tolerance permitted in the manufacture of some of the parts that are used in this firm's famous "Super-Inductance" receivers.

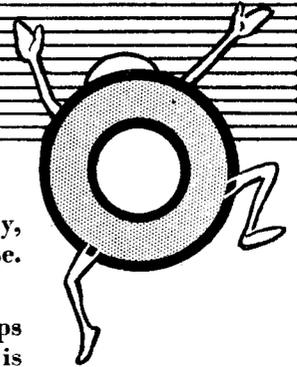
The condenser used, for example, is of the air dielectric type, and the required value of capacity is obtained by making use of an air gap of only one-fifth of a millimeter. This involves a tolerance in the condenser spindle of one-thousandth of a millimeter!

There was no doubt in my mind concerning the efficiency of the new all-British Philips sets when my tour of the works was completed!

**Addition to R & A Range.**

When I stop to think of the prices that were in vogue for moving-coil loudspeakers, even this time last year, I can hardly believe my eyes when I read it is now possible to obtain a permanent magnet moving-coil reproducer in the famous R & A range for the extremely low price of 17s. 6d., which includes a 3-radio transformer.

The new "Bantam," as it is called, is only one of several fine reproducers that are the subject of a new R & A leaflet, and you can obtain a copy free for the asking from Messrs. Reproducers and Amplifiers, Ltd., Wolverhampton.



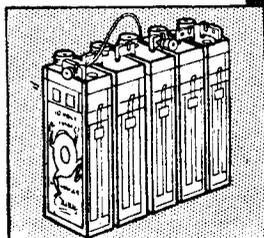
When you throw away an old H.T. Battery, you throw away voltage you cannot use. You are wasting money.

The Lively 'O' H.T. Accumulator stops waste—definitely! From the moment it is charged, up to the time it needs recharging, it is full of power-giving life—full of powerful energy—full of punch! No self-discharge—no leakage—its "Air-Spaced" cells are leakage-proof. The Lively 'O' H.T. Accumulator gives you constant voltage. Smooth, silent current—power that never varies. Isn't that the kind of H.T. supply you've always wanted? Your dealer stocks the Lively 'O' H.T. Accumulator.

*Oldham & Son Ltd., Denton, Manchester. Estd. 1865, and at London, Glasgow, Belfast & Dublin*

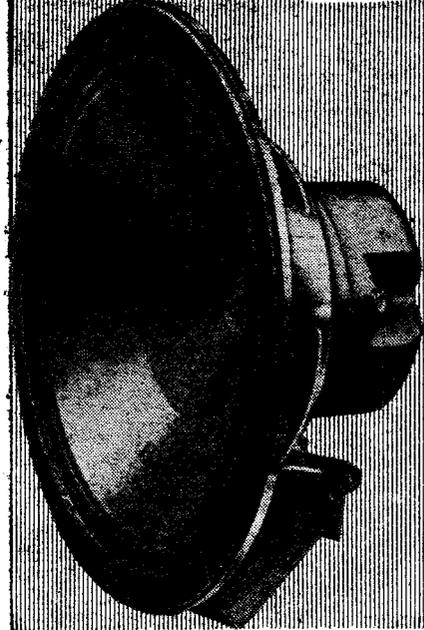
**TWO TYPES**

Standard 10 volt unit capacity 2,750 milliams - **5/6**  
 Extra large capacity 5,500 milliams (10 volt unit) - **6/9**



# P.P.M.

## 19



# 47/6

**INCLUDING TRANSFORMER**

There has been every year a steady improvement in the transmission and reception of Broadcast programmes—greater range, finer selectivity has placed more and better programmes within the reach of listeners. It has, however, been left to Celestion to supply the all-important link in the chain of Broadcasting—the loud-speaker—for the loud-speaker must take the responsibility of reproducing music and speech with life-like fidelity. Celestion's latest achievement, the P.P.M.19, exercises this duty with remarkable success, the tonal quality and sensitivity being amazing. Hear this wonderful speaker at your local dealer's.

Price **47/6** including transformer.

# CELESTION

*The Very Soul of Music*

CELESTION LTD., London Rd., Kingston-on-Thames  
London Showrooms: 106, Victoria Street, S.W.1.

## THE LISTENER'S NOTEBOOK

(Continued from page 408.)

much; it lacked the warmth and intimacy of Mlle. Chouvy's talk.

I'm afraid I began to fidget. I let my thoughts wander and, I confess it with shame, I found myself again in those crystallised fruit works at Clermont-Ferrand in Auvergne. By this time Sir John had finished, and I felt I had been very rude to him by not listening as attentively as I ought.

The next lesson was the one I had been looking forward to—Sir Walford Davies' music lesson. It started gloriously with the Overture from the Nutcracker Suite by Tchaikovsky.

### I Was Pleased.

It was a record, of course. Sir Walford explained it briefly before it was played. I knew then what to look out for, and this made the record doubly enjoyable. This was followed by the Air on the G. String (Bach).

Of course I had heard this scores of times already, but Sir Walford made me as enthusiastic as ever over it.

After a sea shanty sort of song, we had the March from the Nutcracker Suite. It lasted only a minute and a half, but Sir Walford insisted on another minute and a half of this exhilarating piece. I was pleased.

### No Playtime.

Then we had a superb piece of picture music by Sir Edward Elgar from the Nursery Suite—"The Waggon Passes." I loved those snatches of the fiddle bows. I probably wouldn't have realised what they meant if Sir Walford hadn't called our attention to them beforehand.

The last period followed almost immediately. There's no playtime, apparently, with this new education. Mr. Frank Roscoe told us a story about the Kaliph of Bagdad. It was a good story, but he made me very impatient.

He just wouldn't get on with it. He weighed every word with the calm deliberation of an after-dinner speech.

Now I don't think stories should be told like this, particularly to children with imagination. Such children are always good listeners and quick withal to grasp a situation.

### Poor Understanding.

On the whole I was pleased with the afternoon. The new education has much to commend it.

But if there are schools that listen to all the lessons, I think the B.B.C. ought to consider giving them a playtime. This could easily be arranged.

The present system indicates a poor understanding of the child mind and of its capabilities. Two hours' solid listening requires an effort, in some cases almost superhuman.

### THE TELSEN VALVEHOLDER.

Owing to a printer's error on page 352 of last week's POPULAR WIRELESS, a wrong photograph of the Telsen Valveholder was published. The photograph showed one of the old type valveholders, and not the new model which was described on the same page.

## TECHNICAL NOTES

Some diverse and informative jottings about interesting aspects of radio technique.

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

### Motor-Boating.

MANY people who are troubled with motor-boating and have no difficulty in recognising it do not know what it is that causes it. It is generally due to reaction or regeneration being excessive, and this is itself sometimes brought about by using too large a voltage on the plate of the detector. If this is the case, the remedy is obvious.

On the other hand, you may find it necessary to alter the value of the grid leak; generally reducing the value of the grid leak will tend to overcome the difficulty.

Another well-known dodge is to try changing the connections to the secondary of the L.F. transformer.

### Decoupling.

But the broad cure for motor-boating troubles is decoupling the stages, and this can be done by means of a resistance in series with the primary of the L.F. transformer and a condenser connected between the terminal of the transformer to which the resistance is connected and the negative low tension. The value of the resistance may be, say, 25,000 ohms, whilst the condenser may be a couple of mfd. capacity.

### Effect of Resistance.

Whilst on the subject of low-frequency oscillations, I should also perhaps mention that the high-tension battery is very often responsible for instability being set up in the receiver, owing to the battery becoming old and developing a relatively high resistance. Contrary to popular impression, the internal resistance of a fresh H.T. dry battery is remarkably low; that is why you get quite a large current if you short-circuit a fresh H.T. battery (I am not recommending you to try this, but you can take my word for it).

Now, when the internal resistance of the H.T. battery is very low, as it should be, there is little or no coupling brought about, but when some of the cells get dried up, then the resistance increases enormously and you get coupling which causes instability in the low-frequency amplifier.

### A Queer Remedy.

Some people try to overcome this by connecting another H.T. dry battery in series with the first one. This will have the effect of bringing up the fallen voltage, but it will not overcome the instability trouble, because it does not remove the resistance.

I have heard of a fresh H.T. battery being connected in parallel with the old one, but although this gets over the resistance difficulty it is bad—for the new battery—because the voltage of the old battery will almost certainly have fallen, and the new battery will be feeding current into the old one.

The really proper thing to do, of course, is to replace the battery by a new one, but

(Continued on next page.)

## TECHNICAL NOTES

(Continued from previous page.)

if the internal resistance has not become very bad you can often get over the trouble by connecting a fairly hefty condenser, say 2 or 4 mfd., across its terminals.

### Fading.

When you are listening to distant stations you expect a certain amount of fading, because the transmission has to pass over all kinds of country and through all sorts of conditions before it reaches your receiver. But when you are listening to your local station, a matter of a few miles away, you hardly expect to be troubled with fading.

Nevertheless, a good many people are troubled with fading in these circumstances and it is generally due to some other receiver in the vicinity. If a receiver in the neighbourhood is oscillating it may heterodyne with the transmission which you want to get.

On the other hand, a very powerful receiver sometimes has the curious effect of "absorbing" or "smothering" the reception; it seems as though it "mops up" all or nearly all of the transmission in the immediate vicinity, thereby robbing other less powerful receivers.

### Absorption.

One thing which you can do to get over this trouble is to use a more receptive aerial, and this can be achieved by increasing the height of your present aerial. This will go a long way to enabling you to get your fair share of the transmission in the local ether, and to prevent you from being robbed by other receivers which are taking too much.

Another dodge which is sometimes useful is to employ a counterpoise earth instead of the ordinary ground earth.

The action of a counterpoise earth is rather peculiar, and you never know precisely how it will work in given conditions until you try it. Sometimes it is little or no improvement on the ground earth, but you do come across cases where it makes a remarkable difference.

A counterpoise earth can be made very simply by running a wire to and fro, in grid-iron fashion, a foot or so above the ground (or laid upon the floor of a room), the wire being reasonably insulated so that it is not connected to earth in the ordinary way.

### A Counterpoise Earth.

Sometimes very simple little tricks will get you out of a difficulty of this kind, and it is worth while to try the simpler ones first. I have known of more than one instance where merely changing the direction of the receiver, or changing the receiver about from one part of a room to another, or from one room to another room, has made a remarkable difference in the reception, and especially in the liability to this fading effect.

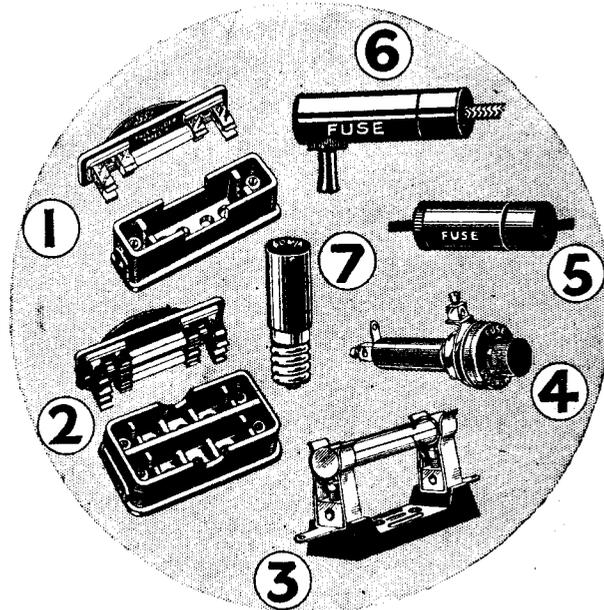
So if you have any difficulty of this kind, you might try all the simple dodges first, and if they do not work, then you can go to more elaborate things, such as increasing the height of your aerial or using a counterpoise earth.

### Pentode Control.

I mentioned in these Notes a little time back the importance of using some form of tone control when you employ a pentode

(Continued on next page.)

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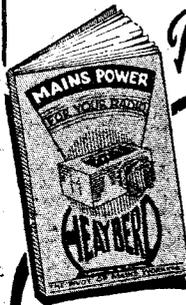
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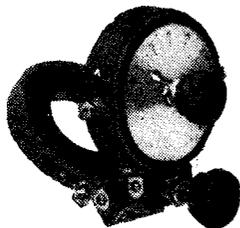
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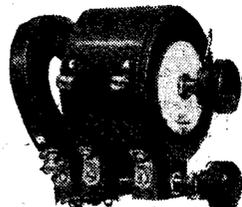


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## TECHNICAL NOTES

(Continued from previous page.)

output stage. As everybody knows, the pentode valve rather has a tendency to favour the higher notes, and it is a good thing to have some means of counteracting this effect so as to produce a rounder "balance" of tone.

### By-Passing for Balance.

One of the commonest arrangements, of course, is to use a resistance and capacity, in series with one another, connected across the primary of the output transformer. Due to the diminishing "resistance" of the condenser with increasing frequency, the arrangement tends to by-pass the notes as they become higher and higher, and the purpose of the resistance is to give some means of controlling the effect.

If you use a choke output circuit, you can connect this arrangement of resistance and condenser across the choke; or, of course, alternatively, it can be connected across the terminals of the loudspeaker, whether you use an output circuit or not.

A convenient value for the resistance for regulating the tone control is, say, 50,000 ohms, and the condenser may have a capacity of .01 microfarad.

### A Simple Condenser Arrangement.

If the pentode is used with a choke capacity coupling to the speaker, you can introduce a variable condenser between the anode of the pentode and the speaker, and this will enable you to control the tone.

Instead of using a variable condenser, which is not really necessary, you can use a selection of, say, two or three fixed condensers, and try different values until you get one which gives you the best results. As a guide, I may say that you will generally find the value to be between about .1 and .25 microfarads, or perhaps a little more.

If you do not wish to use a fixed tone control, but you want to vary it from time to time, you can arrange for two or three fixed condensers to be connected so that they each have one of their terminals permanently connected to the circuit, whilst a selector switch chooses one or other of the remaining terminals, so that any one of the condensers can be connected in circuit at will.

If you have a blade switch, you can connect the different condensers in parallel, but I do not think this is really necessary, and an ordinary selector switch is generally quite sufficient.

### Transformer Breakdown.

I think a good many people, when using small power transformers, are apt to forget that overloading the output of the transformer may cause a breakdown not only in the secondary, but also in the primary. I had a particular case of this the other day.

I have a special transformer, which I had made to order for some particular experimental purpose three or four years ago, which works on 240 volts input into the primary, and has a number of secondary windings, 0, 10, 25, 50, 75, and 100 volts.

This transformer has been in use, of course, on innumerable occasions and for all sorts of duties, and I have found it

(Continued on next page.)

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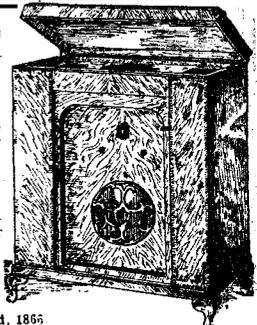
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**TECHNICAL NOTES**

(Continued from previous page.)

exceedingly useful. A few days ago it was delivering current on the 10 to 25 terminals—that is, 15 volts—when it suddenly went out of action. Some rapid tests soon showed that the *primary*, not the secondary, was broken down.

It was found out afterwards that a very heavy load had been thrown on the output, due to accidental conditions, and this had caused the breakdown in the primary. When a transformer has no load on the secondary at all, it should, if properly designed, take what is sometimes called “wattless” current; that is to say, it should consume scarcely any energy from the mains.

But as soon as you put a load on the secondary, you get a corresponding input into the primary, and if the secondary load becomes excessive, it is quite possible, as actually happened in the above case, for the *secondary* to stand up to the load, but for the *primary* to break down.

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lighted on a nice-looking little transformer with centre-tapped secondary which I imagine must have been used with a full-wave tantalum rectifier originally.

I found that using the whole voltage gave me far too much, and eventually I had to use half the secondary with a resistance in series with it. Incidentally, if many more manufacturers send me components and apparatus, I shall have to get a new house shortly especially to put them all in!

**Very Short Waves.**

A reader sends me a letter with reference to a newly reported American system of transmitting television by modulating ether waves of approximately the frequency of light waves.

My correspondent rather picks holes in this suggestion; he says that if the short radio waves have anything like the same frequency as light waves they will obey the same laws, the most characteristic of which is what is known as “rectilinear propagation,” that is to say, travelling along a straight line.

Assuming this to be the case, he points out that it would be necessary for the waves

(Continued on next page.)

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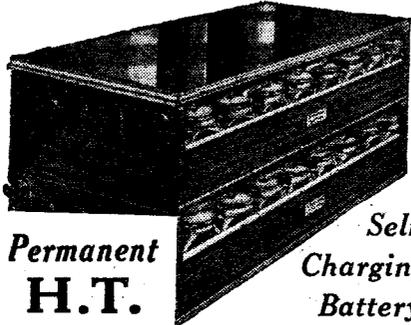
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## TECHNICAL NOTES

(Continued from previous page.)

to travel without interruption from the transmitter to the receiving aerial, since presumably ordinary obstacles would be opaque to waves of this frequency.

If the radio beam becomes in effect a light beam, my correspondent considers that it would be much simpler to do away with the radio beam altogether and use the ordinary optical signalling system. He compares it to sending water from one place to another by the elaborate process of boiling the water and producing super-heated steam, passing this through pipes, and eventually condensing it at the other end.

### High-Frequency Oscillators.

I am afraid my correspondent is a little bit hard on the American system. So far as I am aware, that system does not propose to use radio waves really anything like as short as light waves, and it is important to bear in mind that even a relatively small difference in frequency at this region makes an enormous difference in the characteristics of the waves.

Heat waves, for instance, which are only about an octave below the visible light waves, are in many ways entirely different from light waves in their properties. I cannot see how radio waves really approaching the frequency of light waves could be produced by any artificial oscillatory system, as the light waves themselves are produced by oscillatory systems which it would seem to be utterly beyond our power to reproduce.

I think the real secret of the thing lies in the fact that the short waves proposed to be used are, in fact, much longer than light waves.

### A Super-Beam System.

At any rate it seems fairly obvious that, even if a radio system could be set up which acted in precisely the same way as a light system, it would have no advantages over the latter and would be much more complicated. It appears to be essential for any practical utility that the radio beam should at any rate be able to travel over considerable distances and to pass through ordinary objects in much the same fashion as radio waves of longer wavelengths.

### Changing to A.C.

Several readers who happen to be on D.C. electric supply have asked me at various times whether they should avoid installing an all-electric set or a mains unit until such time as their supply is changed over to A.C. Obviously an all-electric receiver and a mains unit, as well as various other apparatus, have to be specially designed. In view of the fact that D.C. supplies are being gradually changed over to A.C. this is a very natural question to ask and I am hoping to deal with this important topic in the near future.

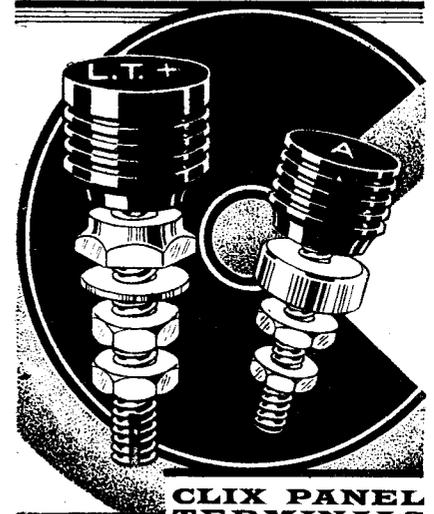
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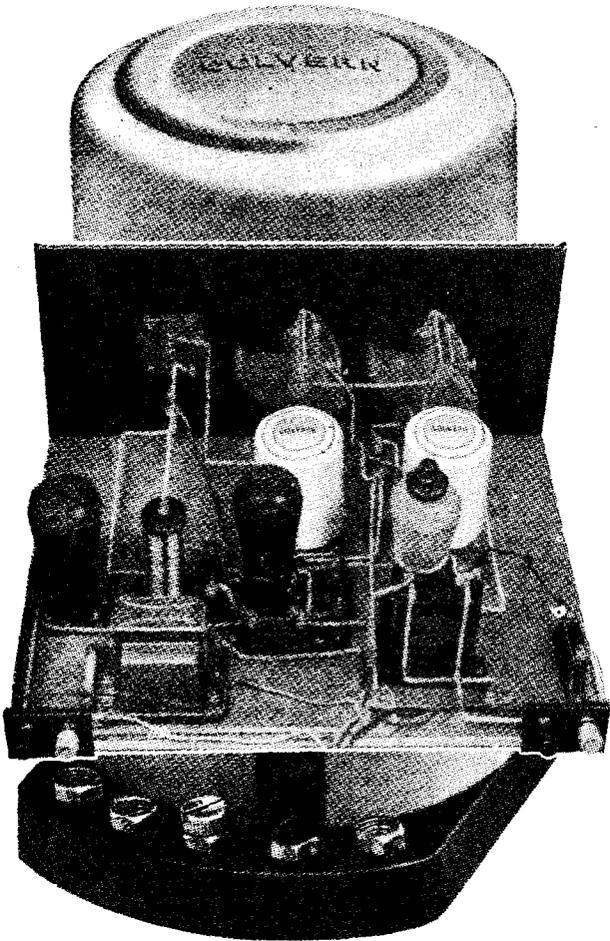
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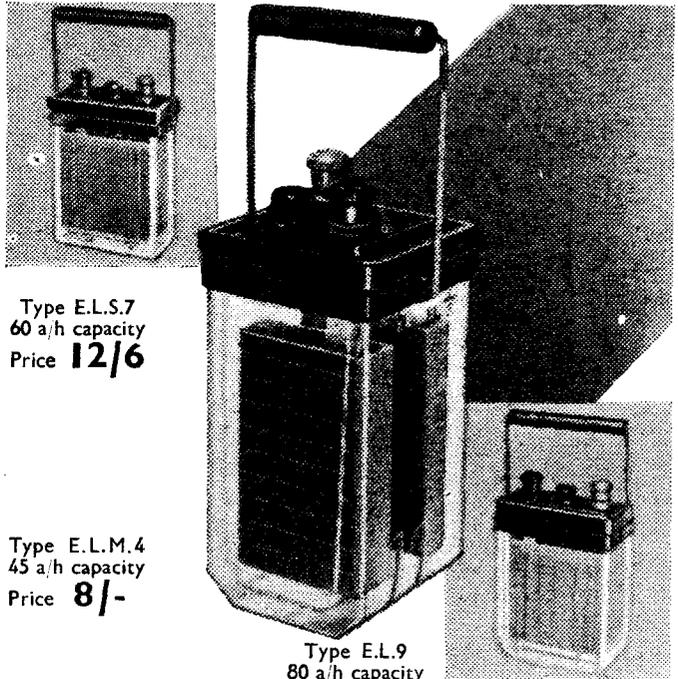
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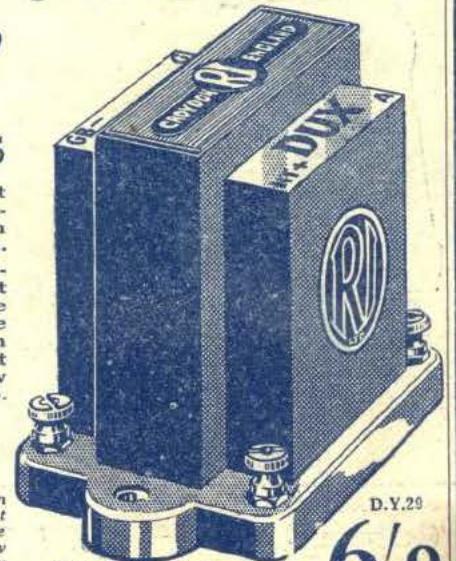
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