

# MORE ABOUT THE "P.W." "POP-VOX"

# Popular Wireless

Every Thursday  
PRICE  
3d.

No. 468. Vol. XIX.

INCORPORATING "WIRELESS"

May 23rd, 1931.

*In this issue*



## OPERATING THE "POP- VOX"

*and*

### SOME OF THE FEATURES

of the

### "P.W." "POP-VOX"

#### EXTENSER TUNING

Radio's Latest Advance.

#### SIMPLIFIED OPERATION

Ideal for Household Use.

#### POWER

Remarkable, even on Foreigners.

#### RANGE

Astounding Variety of Continental Programmes

#### QUALITY

A Revelation in Realism.

### A FINE SELECTION OF RADIO READING

Notes and News of the Week

Captain Eckersley's Query Corner

The Mirror of the B.B.C.

For the Listener

Technical Notes

Radiatorial

What I Think of Television  
By John Scott-Taggart, F.Inst.P.

Tested and Found—?

Stations Worth Hearing

Short-Wave Notes

### ALTERNATIVE PROGRAMME PROBLEMS

—By Capt. P. P. Eckersley, M.I.E.E.—etc., etc.

Simple facts for  
Valve Users

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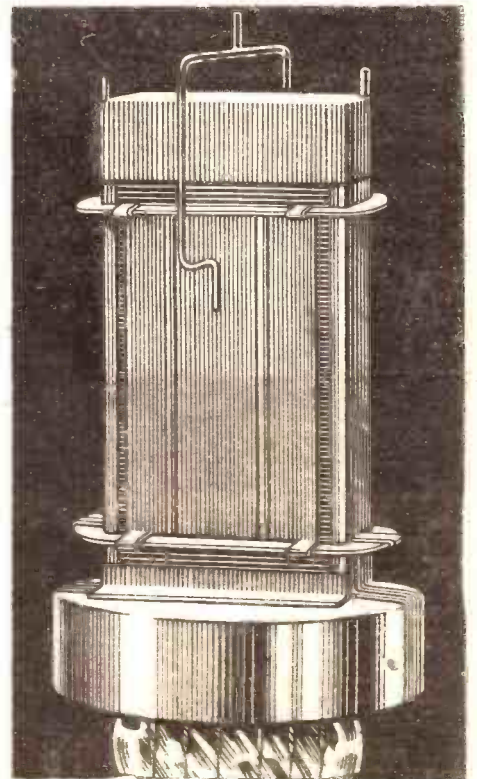
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Impedance 300,000. Amplification  
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1.1 m.a./v. Normal working Anode  
Volts 120. Positive  
Voltage on Screen  
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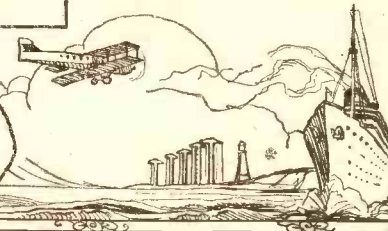


# Popular Wireless

**LARGEST NET SALES**



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 CAPT. P. P. ECKERSLEY, M.I.E.E.  
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**THE EXTENSER.  
 CURE FOR BLUES.  
 TOWER OF BABEL.  
 SALVAGE.**

## RADIO NOTES & NEWS

**SHORT REPLIES.  
 WAVELETS.  
 BETTER THAN CLICKS.  
 MUMPS AND TAXES.**

### Ariel Tilts Back.

**L**ADS, please look at the letter from Mr. W. Werner, on page 264, May 9th. I never thought that I should have to teach an American about business, but it seems that I must. W. W. is surely aware that some forms of advertising are merely protective; if the other fellow would drop it, we should be glad to do so; but he doesn't, because he is scared of us, and so we can't. Radio advertising is like that! Because W. W. knows that some people buy radio-advertised goods he is not entitled to conclude that I am mistaken when I say that radio advertising in America does not pay.

### Evidence from America.

**F**OR in order to learn whether an advertisement pays one must find out whether its cost is more or less than the revenue it produces. That's A B C! As far back as 1928 Wanamakers—no fools!—decided that radio advertising did not pay them and accordingly dropped it. In 1929 Mr. R. Babson, of Cleveland, Ohio, revealed that a newspaper advt. costing £600 brought him 222 times as many inquiries as a £600 half-hour broadcast on the Columbia Radio network.

I understand that the Canadian Pacific Railway values radio advts.—but it owns the radio stations, and is able to advertise under the guise of travel talks and demonstrations of folk-songs peculiar to various districts. Your turn, W. W.!

### An Extenser Suggestion.

**I**R., of Manchester, wants to know why the Extenser isn't given two sets of fixed plates so that there is a steady wave-length increase all round the 360°. He suggests that it would be a simple matter to "take in" either set of fixed plates as the moving ones rotated.

Many thanks, J. R., but yours is no new idea. As a matter of fact our G.V.D. had it well taped right at the beginning. But the mechanically simpler present scheme is vastly preferred for certain pretty obvious reasons.

### Cure for "Blues."

**H**IS name was Horace and he was a wee monkey, black in colour and with a rim of white whiskers right round his face, which gave him the look of a dissenting divine (1850), or of Queen Elizabeth with her biggest ruff on. Horrie was an anti-music crank. The loud speaker was popped inside a cupboard, and Horrie was chewing a piece of bread which had been dipped in jam when the radio was switched on.

How he staggered round the room, trying to find the music-maker, and how he stormed and cursed at that cupboard, are memories which immortalise for me the finest laugh of the century.

### Not Always!

**I** AM advised that the nearest the Hindus can get to "broadcasting" is "sound coming from the heavens," *akashvani*, to be precise. A little bit wide of the mark and pretty flowery, even for Hindus.

Anyway, the notion does not convey an impression of verisimilitude to the minds of Europeans, and if Mr. Gandhi thinks that jazz comes from the heavens, I can guess where he believes we get certain modern Continental music.

### A VOICE FROM THE DEEP



This is Herr Helmuth, a favourite German announcer, on board the "Bremen." He is calling up the sister ship "Europa" by means of the compact transmitter in the suitcase!

### Tower of Babel.

**T**HIS isn't a bad one! W. P. (or D. P.), of a place near Chesterfield, tells me that he heard a "Dutch station," Morocco, Italy, on 7070 kc., call sign P A O I M, and wants to know who it is. Well, if the operator spoke in German with a French-Swiss accent, we could put it down as the League of Nations! However, I believe that P A O I M is allocated to Dutch aircraft, but not yet to any particular machine. I am doubtful about that frequency, though. Isn't it in the amateur waveband?

### Salvage.

**I** SUPPOSE that some people are constitutionally averse from paying for anything which does not have to be put on the counter or paid at the doors, and for that reason the P.O. sleuth vans wear out their tyres, the lawyers grow fat, and the Treasury swells. For it was revealed last month by the P.M.G. that during 1930 there were 1,433 prosecutions for the use of wireless sets without licenses. Out of all the dodged licenses in this country the courts salvaged £1,110 by way of fines.

### "Dead Men" Pay for Radio Set.

**I** FOLLOW up that sad record of lawbreaking by an equally sad revelation. Wives are being  
 (Continued on next page.)



## RADIO NOTES AND NEWS

(Continued from previous page.)

deceived! Hoosh is being consumed in secret and the empties, the "dead men" are secretly conveyed to the trains of the Southern Railway and there left under seats and cushions. This practice is so popular that the S.R. carriage cleaners have recently bought a nice radio set for the S.R. Orphanage Hospital out of the proceeds of the sale of the bottles collected from the carriages. Here, let's pass on to something else!

### Bomb the Blighters.

**T**WO Belgian patriots have shown us the way in which effectively to register our disapproval of any particular B.B.C.-ism. You simply take a common or garden bomb, extract the nails, safety-razor blades, etc., therefrom, and, after pressing the button, lob the thing into the offending radio station. This smashes the windows, panics the staff and, in general, "larns 'em."

The two lads who pioneered this method objected to the omission of the Brussels station to play the National Anthem, and to the occasional introduction of a revolutionary song—all about "workers ob de world—yewnite—up." Hasty lads—but sound at heart!

### Exide's Exide-ing Magazine.

**T**HE Spring Number (complete with baa lambs on cover) of the "Exide Chronicle and Exide News" is one of the most interesting "House" magazines I have seen—and I've seen a "plenty"! The information which is given about accumulators is not only valuable, but has the supreme virtue of being *ex calhedra*. By the way, it is disclosed by Exide's that there are Indian ants which can eat their way through lead! I should like to match 'em against our local rats!

### The Truth About Portables.

**A**ND talking about eating reminds me of pies—and Pye's; Cambridge Pies and Ditto Pye's. Now Pye's have sent me some printed philosophising about radio buying, devoted mainly to elucidating the question of why many people "buy radio" in summertime, and embedded in their reasoning I find the statement that, "The portable type of receiver is not bought to carry about." Doubtless that is why they are made so portable! Joking apart, Pye's mean that portables are really of more use to "the man who stays at home" and potters about the house and garden. He takes his portable to the kitchen, the dining-room and the garden; the bedroom, the greenhouse and the drawing-room. I think Pye's are right! You *don't* see many portables in the holiday zones.

### Short Replies.

**J.** M. (Newbridge).—Quite probably Australia. Write and ask Melbourne station to confirm. H. H. (Leamington Spa). Your bag with "Night Flight" Three magnificent. Other fans please copy. E. L. T. (Bradford). Rome, Paris, and Toulouse on a 1922 crystal set, eh? Remarkable, but not, of course, absolutely unique. F. F. (Fleet, Hants). Mr. Dowding's article about long waves seems to answer you. I am another devotee of the easy long-short-

wave-change; it's a great comfort and convenience. See a local radio mechanic about your set; it may be adaptable.

### Short-Wave Wavelets.

**D**ONOR: Mr. Fred Easter, of Cincinnati. Nuevo Laredo, Mexico, X 2 6 A, now works on 7,300 k.c. relaying X E P, same city, daily from 2400 to 0500 G.M.T. Address, Radio Station, X 2 6 A, Apartado postal 31, Nuevo Laredo, Mexico; and telephony between France and French Indo-China is carried on by St. Assise, F T K on 18.9 metres and F.Z.S. (Saigon) on 24.9 metres.

The transmitter F T N, formerly used for working Saigon, now works Rabat. The

## SHORT WAVES.

Critics are complaining that the B.B.C. broadcasts too much American dance music. You can always identify the stuff. The saxophone bleats through its nose.—"Birmingham Gazette."

**THOSE WIRELESS DANCE TUNES!**  
"The sentimentality of the titles alone was enough to make me feel slightly sick.  
"Here are a few specimens:  
"June Time is Love Time," "I am watching over you, Sweetheart," "Let Love take care of you," "Stuff"  
And nonsense!"—"The Star."

"The Covent Garden Subsidy"—seems to have subsided.

"Does your set 'talk' nicely?" asks a headline in the "Sunday Sun."  
Yes, thank you; but rather too often.

What is that horrible noise—a revolution? No. The first wireless lesson on piano-playing has just begun.—"Sunday Pictorial."

**HARK, HARK, THE DOGS DO 'BACH.'**  
The B.B.C. have a lovely sense of humour... they gave the first alternative programmes to the inevitable Bach cantatas.  
In the alternative London Regional effort, a gentleman sang two songs by Bach—one from a cantata.  
In the Midland Regional alternative an organist played—a selection from Bach.  
The obvious alternative to a Bach cantata would be another Bach cantata.—"The People."

A wireless set has been placed in the Gravesend Police Station, so . . .

If you want to know the time, ask a policeman.  
He'll tell you every time, will a policeman;  
All the members of the Force  
Will have wireless sets, of course;  
So if you want to know the time, ask a policeman. . . .

Chronometers, of course, for every policeman,  
Efficiency's the word for all our policemen;  
Synchronised with Greenwich time,  
They'll catch all the "dabs," of crime,  
And see they all get "time," will our policemen.  
—"Gravesend Reporter."

F T K-F Z S programme (except on Sundays) is from 1400 to 1600 G.M.T. And how, Fred!

### The Concealed Speaker.

**A**T a friend's house I have just seen a simple but effective arrangement for a concealed loud speaker. You know the type of bookcase which has a cupboard underneath it? Well, my friend had simply placed the "speaker" in the cupboard, taken out the panels of the cupboard's two half-doors, and replaced them by gauze of a colour which harmonises with the woodwork. The effect is so good that I was mystified for at least thirty seconds.

### Better than Clicking.

**W.** H. (Dukenfield) has sent us a description of his circuit tester, which he contrived to make at a cost of two shillings, the price of a cubic inch of Camembert in any West-End poor-and-proud restaurant.

It is a device for testing continuity of circuit by means of a tiny lamp and battery, with a valve holder for testing valves, and with terminals to take chokes, transformers, and so on.

No doubt most of you have your pet devices for giving naughty components the "once over." What amused me, however, was W.H.'s reason for preferring the lamp test to the telephone method. "If you don't hear a click you go and click your money on a wireless shop counter for a new component."

### Seen This?

**H**I! What about a one-valver which will bristle with European stations, telephone reception? Or does an All-A.C. Mains Transportable, with built-in loud speaker (a 3-valver), appeal to you as a job worthy of your steel? Or are you thinking of trying a portable this year, say a nice handy "Four"? Or does the idea of a "Two" that can be converted in a few minutes from a L.S. cabinet set to an attaché case portable sound good to you? Chorus of "Yes"! Right! See "Modern Wireless," May number. Lots more besides these constructional articles—and all for twenty-four ha'pence!

### "If I Were Governor."

**W.** P. M. (Bournemouth) lets fly some cheerful shots at one or two of the contributors to our symposium on "If I were Governor of the B.B.C." He does not like Mr. J. H. Squire's idea that the licence fee should be increased for valve sets. Neither do I.

It's a short-sighted notion, and would make more trouble than it is worth. And it is clear that W. P. M. does not admire the "Celeste Octet"; in fact, Mr. Squire and Mr. M. must be kept well apart.

### Mumps and Taxes.

**"MR. PHILIP RIDGEWAY,"** says W. P. M., "plays to the gallery" in stating that he would carry on the B.B.C. allee samee Sir John; and W. P. M. is puzzled because Phil is so obviously by nature on the side of sweetness and light and laughter. Our correspondent finally registers a "kick" because we have left the "talk" cranks alone lately.

Mm! This is true, but I have begun to feel that they and Chambermusicers are by now like mumps and taxes—a part of the Great Plan, and being a philosopher and not an agitator, I bow to the facts like a willow to the wind.

### Welcome, Little Stranger.

**L**OOKING over coming items, I should like to mention that the gentleman who rejoices in the name of J. Verdi Poffle, and who will let fly on Midland on May 30th, made his first stage appearance as a small kid in a school concert. He fell asleep on the stage, and when the audience applauded fell still further—to the floor. That settled his vocation. He has been making people laugh ever since.

ARIEL.



# ALTERNATIVE PROGRAMME PROBLEMS

by  
CAPTAIN  
P.P. ECKERSLEY  
M.I.E.E.

I WROTE last week what might be construed as an attack upon the reactionary forces within the Union Internationale de Radiodiffusion. I showed that in early days the organisation was flexible enough to permit exercise of function; now the organisation is a strait-jacket, giving the wearer an air of apparent dignity, but also a stiffness which denies strength and prevents movement.

### When Technique is Throttled.

The heart is still strong, the spirit is still there, but it's a hard struggle to keep the body truly vital. There is, I am sure, a feeling of revolt among some of the technicians. There is a determination to evolve, to plan against the future, to foresee, not just to please the resolution-mongers in the Council.

But the Council, the intellectuals, might at least try to do some thinking "en principe." Has it, for instance, ever been laid down whether broadcasting aims at giving the listener true service of one programme or a variety of choice among many, or both, and, if so, what technical means exist to implement the ideal?

The reason the Council cannot answer the question is because it requires a technician to do it. The reason they do not ask the question is because they are probably more interested in the minutæ of their job than the principles. "They wait, like inverted Micawbers, for something to turn down."

However, the question has got to be answered, and I will dare to try.

It is obvious that in fact the ideal of broadcasting is to extend the powers of hearing of the listener to the infinite, and to give him infinite choice of what he shall hear. The constructive technicians may seek fresh activities and leave the maintenance men in charge when the pressing of one out of a great number of buttons reveals to the listener the sound picture of any event which captures his interest.

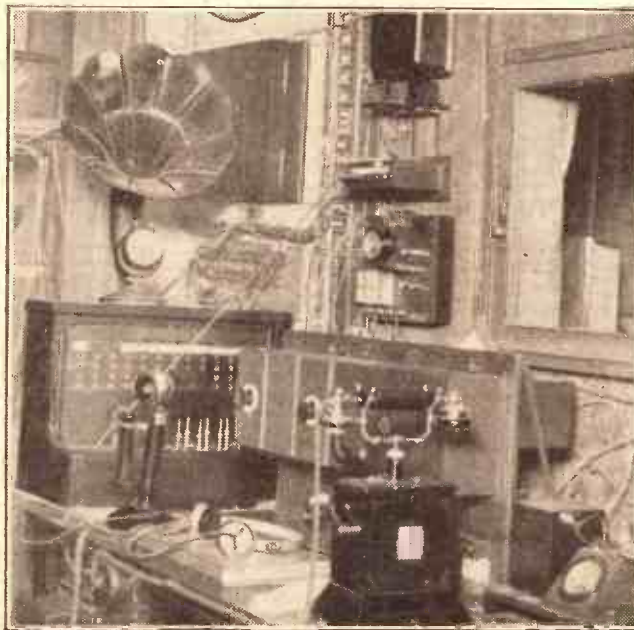
### "No True Variety."

The electrophone system, where one rang up the exchange for this or that theatre or concert-hall or church, and then listened to the picture presented, got far nearer a real service than any broadcasting to-day, except that technical considerations presented such difficulties that "good quality" listening was impossible. Hence the scheme died—R.I.P.

In this article our Chief Radio-Consultant tells you his ideas about International Broadcasting, and makes some characteristically vital suggestions with regard to alternative programmes.

But broadcasting, as we know it, can never give us the choice, in true service conditions, of more than two programmes. In Britain these two programmes are variations of the same thing. There is no true variety.

### DIFFICULTIES OF THE ENGINEERS



It is Capt. Eckersley's opinion that "broadcasting, as we know it, can never give us the choice, in true service conditions, of more than two programmes." But he, nevertheless, suggests an alternative to present conditions.

And while some pleasure may derive from listening to foreign stations, they are really very much the same thing as the local station, except that they come from a long way away. Broadcasting everywhere seems curiously the same.

If we could have variety of choice—Parliament, continuous dance music,

theatres, opera from home or abroad, debating societies, after-dinner speeches, story-tellings, world news direct from the world, all ready *simultaneously* and in their natural state, how much better than this wearisome emasculation and arrangement. We have to wade through so much before we touch reality! And that is because there isn't room for anything but compromise.

### Compromise Programmes.

Suppose there was one cinema company, one theatre, one restaurant with one dish, one newspaper, how dull it would all become. I do not mean by this that some

unity of control and censorship, and certainly one technical control, is not advisable. I do not criticise the principle of the B.B.C.; I deplore the unavoidable limitations of the technical side of broadcasting which imposes the absolute necessity of making up compromise programmes.

### The Ideal.

So what is the ideal? How to answer that question? What is the aim of broadcasting? Why, surely, to give the possibility of great variety of choice to the listener. In Britain my Regional Scheme aims at giving a choice between two programmes, but succeeds only in giving us the opportunity to dodge twice as freely what is dull.

But no Regional Scheme can give us the choice between ten different programmes in the same way we have a choice between ten different (good) cinemas or theatres or restaurants. Ether broadcasting is technically denied, so far as we can see at present, any means to consummate the agreed ideal.

(Continued on next page.)



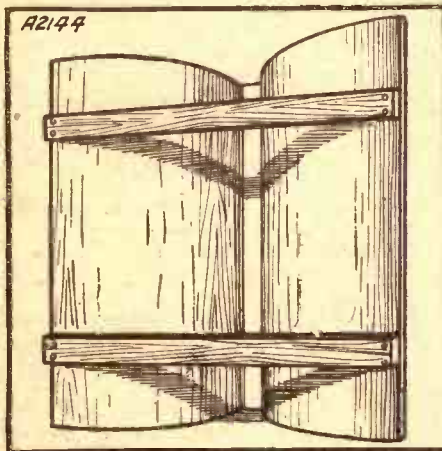
As most of us have discovered, a loud-speaker cabinet should not be boxed in at the back. If this is done, the sound waves from the back of the cone reverberate, and produce a hollow sound which is particularly objectionable when speech is being reproduced.

It is hardly enough, either, to bore a few holes in the back covering-board, as is sometimes done. It is best to leave the back entirely open.

**Wall Effects.**

Even so, a loud-speaker cabinet is gener-

**BEHIND THE BOARDS**



The two bent pieces of plywood are held in shape by two battens passing across the back of them, as shown here.

**A SOUND DEFLECTOR**

A useful device for Cone Loud Speakers.

By H. T. SAVAGE.

ally placed with its back to a wall for convenience sake, and if it is too near the wall some of the resonance effects of a built-in back will be noticed.

The deflector boards here described, which can be fitted to any cabinet type of speaker, utilise in full the vibrations emanating from the back of the cone, deflecting them sideways and outwards, without producing resonance within the cabinet.

The deflectors are made of very thin, easily bent plywood, which is nailed or screwed to each side of a central upright, about 1/4 in. square. This upright is placed just inside the back of the cabinet and screwed top and bottom.

**Pieces of Plywood.**

The plywood is curved outwards in two halves, and held in place by one or more thin battens, say of 1 in. by a 1/4 in., screwed across the backs. For a cabinet two feet square, two pieces of plywood about 23 in. by 17 in. will be required, and the battens at the back may be the same length as the cabinet is wide.

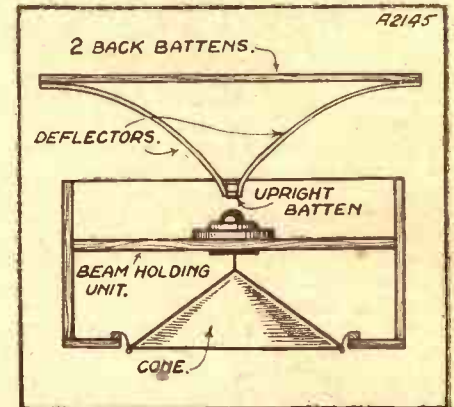
The curves of the boards should be somewhat as indicated in the diagrams.

It is obvious how effective they must be in deflecting the sound waves, and, as a matter of fact, the increase in the total volume of sound from a cabinet to which this arrangement is fitted is very apparent to the ear, and especially so if the speaker is used in the open air.

**Finishing Off.**

The device may, of course, receive the same treatment in regard to staining or polishing as the other part of the loud speaker.

**AS SEEN IN PLAN**



The deflector is arranged behind the speaker, between it and the wall.

It is thus necessary to accept the limitations of ether broadcasting, and to say that, in general, it is an excellent means to allow the percolation of one national programme into every home. We may count ourselves fortunate that, being a relatively small and densely-populated country, we can give a choice of two programmes in service conditions. Most countries can only provide service-area listening to one programme.

**Supplementary Services.**

But suppose it were possible, in terms of the physical conductor, to give a great majority a service of ten alternatives; maybe, then, we might revive the electro-phone idea for, at any rate, a proportion of the population. The world is becoming more and more dependent upon the wire for distribution of electric power, and for individual inter-communication. In general, we might use such networks for home entertainment distribution and leave wireless to broadcast a supplementary single national programme.

Thus I see the future more and more in terms of supplementary services, one wireless, the other wire, the latter possibly now existing for other purposes or even constructed anew. There would be, perhaps, 60 wave-lengths for 30 different programmes, 30 long to fill up the rural areas, 30 shortish to consummate single wave-length groups for selected towns—for those whom long waves would not serve and/or who were outside the ramifications of the network.

**Thirty To Choose From.**

Ether broadcasting would, in using 30 long waves, give the listener a choice

**ALTERNATIVE PROGRAMME PROBLEMS**

(Continued from previous page.)

between different national programmes; wire broadcasting would give the listener a choice between 10 programmes (say) generated in his own country.

**First Things First.**

This scheme uses technical facility to its utmost, and would approach the ideal aimed at. Further evolution must wait further technical invention.

The Council of the International Union ought to be taking full cognisance of possible future development, and while they vaguely recognise the limitations to the art imposed by the technical methods underlying broadcasting, they do not appear to seek to define the philosophy of the whole, and so mislead their technicians into making irrational and insupportable demands for wave-lengths. The Union is asking the forthcoming World Conference for long waves, medium waves, and short waves; far more waves, in fact, than can be granted in view of the justifiable claims of others.

It is, in my view, important to fix upon an ideal first, study the practical means of obtaining that ideal second, and then lay the whole issue rationally before a committee of your peers. It is no good failing to have an ideal, wildly fighting to obtain everything that looks good, without an idea how to use the facility if obtained, and laying an ill-digested demand before authority.

Authority has no course but to say: "Think again and come back when your practical ideals are as clear to you as your unjustifiable demands are clear to us."

**WHAT ABOUT WIRED WIRELESS?**



Systems by which programmes are distributed by wire could form a useful addition to the radio proper programmes, and would enable a large number of "alternatives" to be available.





# OPERATING THE P.W. "POP VOX"

By  
G. V. DOWDING,  
Associate I.E.E.

Our latest receiver is the easiest of sets to tune, but the tips on this page will help you to obtain the utmost results from your own "Pop Vox," operating under your own particular local conditions.

**T**HIS is a particularly easy article to write. Indeed, there is very little to say about the actual operation of this new set of ours, for the simple reason that there is so little to do!

As you will by now know, the controls group themselves into two distinct sections, and these it is fair to style the main tuning adjustment and the subsidiary controls.

The first comprise those two items—the Extenser dial and the on-off switch. These are the only "knobs" that are to be found without peering round corners. For the purposes of purely domestic use, the "Pop Vox" has only the one station selector and a "stop start"!

#### Anybody Can Work It.

You can go to work with the comfortable assurance that the people at home cannot go wrong with the radio in your absence. They can switch about between the National and Regional and 5 X X programmes to their hearts' content, and they might pick up one or two of the more powerful foreigners during their excursions around the dial.

But the more skilful operators who are given freedom of access to the "ears" of the set (those apertures artistically hidden away at the sides) are able to go a-hunting in the ether in real earnest.

Slip a hand round to the right and the reaction is at your ready disposal to ginger things up. A reference to the other "ear" enables you to take advantage of the "P.W." Selector adjustment, the virtues of which are now common knowledge. You do not have to twist this knob with the delicate precision of a tuning or reaction adjustment. All you have to do is to set the control in approximate positions for various bunches of stations.

#### Boosting Foreigners.

Your own ears will soon put you wise to the very easily-acquired knack, as most definite volume changes will accompany the adjustments. But remember, the Selector has little or no effect on the long-wave stations. Its job is concerned almost solely with the medium-wave broadcasters. And you will find it of immense assistance for boosting up the strength of distant stations and for varying the selectivity so that you can cut through interference.

If you should happen to find the reaction just a trifle ploppy, or otherwise not quite satisfactory, it is probable that a slight re-adjustment of H.T. will immediately right matters.

We must not overlook the fact that there

is a probability that a few of you may experience much more serious trouble. But I am sure that if you go the right way to work that state of affairs won't last long.

The most experienced of us are liable to make what seem, after the event, the silliest of mistakes. We metaphorically kick ourselves for such lapses. If I were to say that I haven't made a single wiring error

trying the effect of reversing the connections to either or both of the reaction windings; the ends of these may have got mixed up in the preliminary stages of construction.

A poor valve or a faulty H.T. supply will cause reaction failure, although it is possible largely to compensate for discrepancies of this kind in the "Pop Vox" by increasing the turns of the reaction windings.

On the other hand, a too hefty reaction can be subdued by reducing the turns of wire in the windings of the circuit affected. You may find it rather hard to remember that, although "long wave" and "medium wave" mean little or nothing to the exterior of the "Pop Vox," they still retain all their old significance "behind the panel."

#### Margins for Safety.

However, the provision of separate units for the long and medium-wave coil windings makes it a simple matter to diagnose and rectify faults occurring in either section.

The selectivity of the "Pop Vox" is well above the average for a three-valver, but if there happen to be any of you in such unusually bad areas that still greater selectivity is needed, you can take advantage of some of the "margins" we have allowed. As I said in a previous article, the "Pop Vox" is nothing if not elastic!

On the medium waves you could reduce the primary winding to three-quarters or even half a turn without encroaching much on the sensitivity of the outfit, while the long-wave coil tapping can be taken down to fifteen turns, or even lower.

In the first instance, however, you should question the length of your aerial. This need not exceed 30 ft. or so, especially if it happens to be moderately high.

But I do not anticipate that the vast majority of those who build "Pop Vox" sets will have more than a passing interest in this article.

Providing the recommended components have been used and there are not mistakes in the wiring, instant and complete success can hardly fail to result.

#### "POP VOX" ACCESSORIES.

**LOUD SPEAKERS.**—Amplion, Celestion, Blue Spot, B.T.H., Undy, Mullard, Ormond, Donotone.

**VALVES.**—Mazda, Cossor, Osram, Mullard, Eta, Marconi, Lissen, Six-Sixty.

**DRY BATTERIES (H.T. and G.B.)**—Ever Ready, Drydex, Pertrix, Grosvenor, Lissen, Fuller, Siemens, G.E.C., Oldham, National.

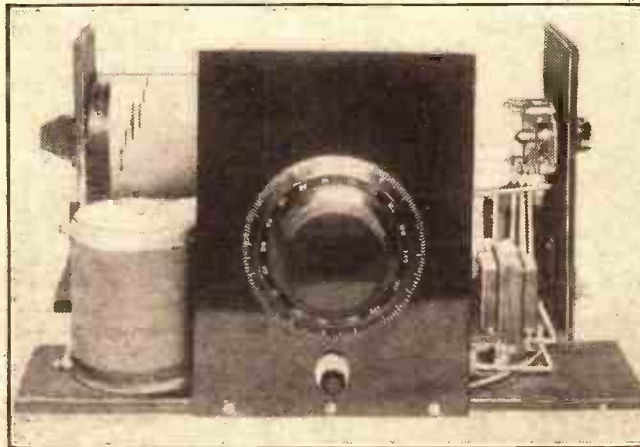
**ACCUMULATORS.**—Fuller, Exide, Ediswan, Lissen, Pertrix, Oldham.

**MAINS UNITS.**—Westinghouse, Regentone, Ekco, Tannoy, Atlas, R.I., Junit.

in any "hook-up" during the past five years, I'd be a ripe candidate for the black book!

So, if any constructor is unable to get reaction on either medium or long waves, I would advise him first to carefully check the connections of the coils. If these seem to be quite O.K., it will still be worth his while

#### WITH THE "BONNET" LIFTED



Here you see the works of the "Pop Vox," which are so neatly concealed by its attractive and unique design of cabinet, a good impression of which is given by the heading photograph above.



## WANTED—AN ETHER BOSS

Some notes on the wavelength situation and the difficulties of using high power and avoiding mutual interference.

By G. B.

IN the course of his recent broadcast talk, Mr. Arthur Burrows, the Secretary-General of the Union Internationale de Radiodiffusion, said that one must admit frankly that, despite the work of the International Union, broadcasting conditions in Europe to-day are not ideal. And then he went on to express shuddering surprise at what would have been the state of affairs had not broadcasting concerns got together in 1925 to discuss their difficulties and to promise mutual support.

Mr. Burrows also referred to the fact that many listeners in this country have probably been troubled by interference from the new German station on the border of the Black Forest—a station which, like our Regional stations, had been constructed in order to provide a service over a large area for those who could not afford expensive sets.

### Don't We Know It?

As is well known now—too well known—the strength of this station in certain parts of England is altogether out of proportion to the service it has to give in its own area. But Mr. Burrows went on to say—"Thanks to the good relations between the British and German broadcasting organisations no time was lost in a scientific examination of the trouble. It is true that this examination revealed new facts which may have a considerable part in deciding future policy in respect to the power of stations and their relative positions in the wave bands."

Very true, but this interference business still continues, and it is all very well to talk about the good relations existing between various broadcasting concerns, and to enlarge on the scientific investigations which are being made, but that does not seem to lead us anywhere. For instance, a complete solution of the London-Mühlacker trouble has not yet been found. Mr. Burrows thinks that this is a question of circumstances over which neither the British nor the German broadcasting authorities have control.

### An Ether Law.

Why haven't they? Because circumstances are such to-day that, however amicable the relations between various broadcasting concerns, and however suitable their remedies and decisions, they are not put into practice, nor are they backed up by Government authority. There ought to be, and perhaps there will be one day, an international law regarding the ether. We have an international law for ships, for example; is there any reason why the ether should not be regarded as an "international sea"?

Most countries have a three-mile limit—meaning that once you pass within the limit and get closer to the shore of a country, you are in territorial waters.

There should be an international ether interference limit where: If it can be proved that one particular station—either in this country or in Europe—is causing inter-

ference with another station so that the service to listeners in the country where the interference is pronounced is such as to ruin the pleasure and enjoyment of listening, then the international ether law should come into operation automatically, necessitating immediate reduction of power at the offending station, conformity to specific wave-length, etc., etc.

### Power of Enforcement.

It is understood that as a result of the Mühlacker-London investigations, research is being centralised on the shapes of the areas of service of some thirty European stations. It is hoped—only hoped!—that the diagrams and data thus procured will justify a rearrangement of wave-lengths which will at least enable the big stations to give an untroubled service in their own territories.

Again, all very well; but we know now by bitter experience that, despite all these amicable relations, these meetings of the various broadcasting authorities, and the

## THE SECRETARY SPEAKS OUT!



This is Mr. Arthur Burrows, Secretary of the Union Internationale, which deals with Europe's wavelength problems. He will always be remembered affectionately as "Uncle Arthur," the B.B.C.'s first announcer.

various solutions produced, discussed and tabulated, nothing vital is done to reduce interference from some of these big high-powered European stations. In all likelihood nothing ever will be done until some direct controlling authority is appointed with the unanimous consent of the Government of this country and the Governments of the various States in Europe.

We are convinced that the members of the International Broadcasting Union are, as Mr. Burrows says, conscious of their great responsibilities. They are in charge of a service, the importance of which has become more and more obvious; but, if this importance is so obvious, why, we ask, is not some movement started to insist on an international authority which can enforce the remedies suggested?

Mr. Burrows has been saying that from time to time they receive at Geneva sensational paragraphs suggesting that European nations are building higher and higher powered stations; that, in fact, everybody is preparing for "a war in the ether." Mr. Burrows says these suggestions are false; nevertheless high-powered stations are continuing to spring up.

### A Paris Instance.

Only the other day it was announced that Radio Paris will shortly become one of the most powerful stations in Europe. A new transmitter has been erected at Essarts-le-Roi, a few miles outside Paris, which will have a power of 120 kilowatts. It is anticipated that much greater radiation will be obtained from this new station than when it was situated in the heart of Paris for, as well as the huge increase in power, the new station will have an improved aerial system comprising three unusually lofty masts.

The station will come into operation with its new power on a wave-length of 1725 metres.

Incidentally, a sidelight on this station is that it is run on commercial lines and "sells time" on the ether to British and Continental advertisers. Naturally, the commercial value of any station is going to be enhanced considerably if it can be shown to advertisers that its area of radiation is not limited to the area it should specifically serve. It is not difficult to visualise in the future—unless some

authentic authority is formed—the day when commercially-run stations like Radio Paris will increase their power even more and endeavour to give a world-wide service.

Mr. Burrows says that he wants to reassure us that the European broadcasting organisations are generally opposed to the use of their stations in a manner likely to be offensive to neighbours; and, despite the political tension which has existed from time to time in the past few years between various stations, he maintains that the understanding between the

members of the Union, is what is termed "propaganda inadmissible."

### Problems of the Future.

It is hard to see, however, how this can be so when a station like Radio Paris, using a huge power, is licensed out to advertisers to broadcast in a world-wide sense their goods, etc. Again, there is the question of the Soviet Union and the huge stations, with enormous power, which are in course of erection there.

In short, the situation is not reassuring—and looks like becoming considerably less so in the near future.

We are setting up a Central Traffic Controller—a super "traffic boss." But what about the Ether? Can't we have an Ether Boss as well?







THE MIRROR OF THE B.B.C.

**WHY CUT THE OPERAS ?**  
**ABOUT TALKS—SIR JOHN IN**  
**NEW YORK—BROADCASTING**  
**THE NIGHTINGALE.**

I HAVE been looking into the policy of the B.B.C. in regard to operatic broadcasting. I have no fault to find with the subsidy arrangement or with the abandonment of studio opera, which it seemed to me in the old days must have absorbed an undue proportion of revenue.

But I am amazed to observe how very sparing are the relays from Covent Garden. So far as I can see, no complete operas have been taken, nor is there any apparent intention to do more than the occasional act excerpt right up to the end of the season.

On inquiry I was told that there was no question of refraining because of danger to Covent Garden Box Office. It was pointed out, however, that certain "rigid commitments" made it impossible to run a complete opera either on the National or Regional programme.

This seems to be a very wrong state of affairs. When there were no alternatives one had to accept this argument, although even then with reluctance. Now that there are pretty adequate facilities for alternatives surely the listening public is entitled to the benefits of greater flexibility on at least one of the programmes.

I have not been told where the snag is in detail, but I imagine that it is the Adult Education commitment in the middle of the evening on the Regional. Whatever it is, a bold administration would put the matter right at once. There is still just time to let listeners have two or three full-length operas before the end of the Covent Garden season.

About Talks.

As I said last week, I am now in a better position to say something about the B.B.C. Talks policy, which still seems to be the storm centre of broadcasting. My first impression that "Talks" have improved enormously during the past three years is amply confirmed.

There is more brightness, more showmanship and more signs of intelligent planning. As for allegations about control by a "junta of young intellectuals," there is much less danger in this than in the atrophy of safe and senile reaction.

On the other hand there should be no ground for complaint on either score. There should be catholicity, humanity, and understanding of the widest kind. There should be a common denominator of robust common sense. What is wrong with B.B.C. talks now is not their lack of intellectual distinction (they have lots of that) but the absence of breadth of conception and vitalising humanity.

I think we could do with rather less talks, rather better and more simply presented. I shall pursue this matter further on another occasion.

Sir John in New York.

The Cunard Liner Aquitania is due to dock on Friday, 22nd, at four o'clock

precisely, and in less than two hours Sir John Reith has to begin his address to the General Assembly of the National Advisory Council of the United States on Education in Radio Broadcasting.

Extraordinary interest is taken in Sir John's visit. This has already provided reams of copy for the reporters, although Sir John has given no press interviews. I am getting first-hand accounts of his visit, and shall pass these on week by week.

Broadcasting the Nightingale.

There is no need to write much about the broadcasting of the song of the nightingale. For many years these relays have been carried out very successfully, and preparations are already in hand to enable listeners to hear this wonderful songster on several occasions towards the end of May and the beginning of June.

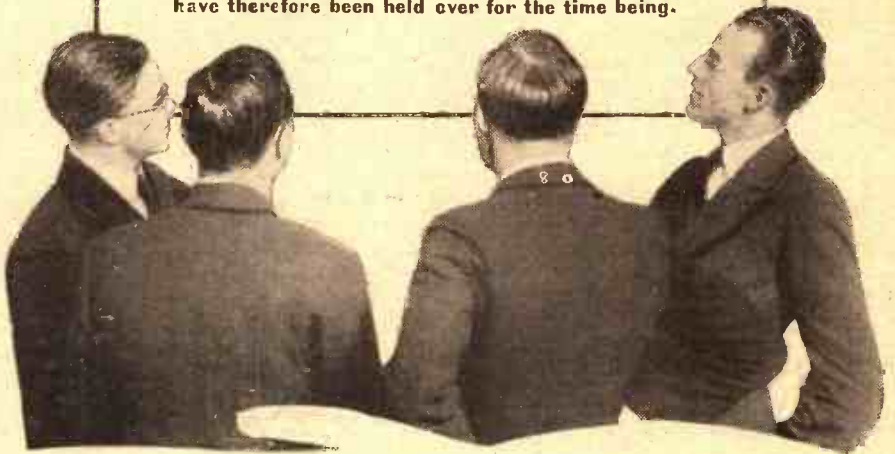
The King's birthday, which is celebrated

on June 6th by Trooping the Colour on the Horse Guards Parade, provides a broadcast of distinct possibilities for rediffusion in our Dominions and Colonies, as well as an interesting morning programme for home listeners.

This year June 6th falls on a Saturday, when the wireless audience is naturally larger than on other days of the week, and the broadcast will include a running commentary on the proceedings by Major J. B. S. Bourne-May, who will describe the scene from a nearby window.

The ceremony opens with the arrival of the Royal procession and the Royal Salute, and includes music by the massed bands and drums of the Brigade of Guards as the King inspects the troops, and much other military procedure, about which listeners will hear during the time between 10.45 and noon, when the King and the bands at the head of the Guards march off to Buckingham Palace.

Owing to the enormous interest created by  
**THE P.W. "POP VOX"**  
 it has been necessary to devote further space  
 to this wonderful "P.W." receiver.  
**THE CONSTRUCTIONAL DETAILS OF**  
**THE P.W. "ALL-MAINS" TWO**  
 have therefore been held over for the time being.



**FOR THE LISTENER**

By "PHILEMON."

Other people's views are not always very interesting, but our popular contributor certainly knocks the nail on the head more often than most critics of the broadcast programmes.

**M**R. HAROLD NICOLSON has gone from the microphone. I, for one, am sorry. His weekly talk on "People and Things" was unique in the programmes.

It was the sort of talk in which personality and an individual point of view counted for everything; and it was this that ultimately brought his talks to an end, for you cannot go on quietly developing a point of view for a year or more without gradually approaching those inner depths where your most cherished convictions lie; and it is here that the rough edges and the angular points of a man's personality are found.

I know all about it. I broadcasted for three years. That was in the antediluvian days.

My little talks were of the same kind as Nicolson's, though of vastly inferior quality.

They expressed my personal outlook on life. I entitled them "From My Window." I, too, was looking out on people and things.

It was not difficult to begin with. Quite smooth going, for naturally a large part of one's own view is a common view. But as time went on there was a tendency, indeed a necessity, to go deeper into one's self, to become more and more personal.

People Have Corns!

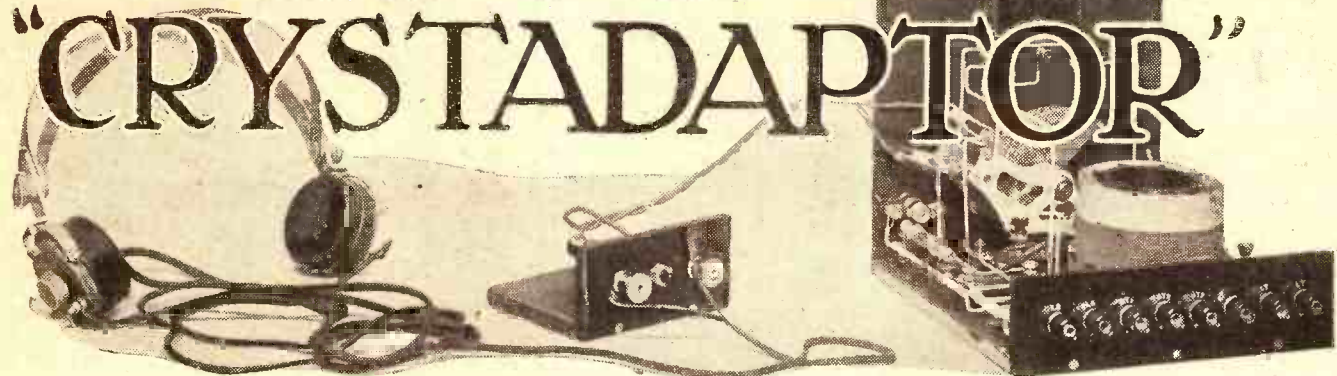
One's deeper convictions began to thrust themselves forward—the less convenient and agreeable side of one's philosophy. It was then that the difficulties began. One became aware that people had corns.

Mr. Harold Nicolson came to a stop, as

(Continued on page 360.)



# The "P.W." "CRYSTADAPTOR"



At one time a man who had a valve set was the envy of his neighbours. But in those days valve sets were regarded as intricate instruments, expensive to install and operate. But simplicity and inexpensiveness have followed the inevitable mass production of components and sets, so that now valve receivers are the rule rather than the exception.

Nevertheless, the crystal detector still has its uses. In fact, the "Crystadaptor," the main part of which is a crystal detector, is a particularly useful little gadget. You can use it as a stand-by against valve, battery, or other troubles, or as a testing device. It is, indeed, a little gadget that every constructor should find of distinct service.

Apart from the crystal detector, it includes only a flexible lead having crocodile clips at the one end, and two terminals to which telephone receivers can be connected. It comprises a complete detector circuit, and by means of the crocodiles it can be joined across any kind of suitably sized coil to constitute a complete receiver. It costs only a shilling or two to make, and its construction is so simple that the photographs on this and the next page should tell you all you want to know.

## Simple and Small.

The layout is almost immaterial, and if you so desire the whole thing can be enclosed in a small box. The size of the little baseboard can be varied if needed. We would advise the use of a semi-permanent type of crystal detector, one that does not need frequent adjustment, and we suggest that either the Radio Instruments or the Jewel Pen make will be found completely satisfactory.

About a foot of flexible wire should be employed. If you want a greater length than this, there are strong arguments in favour of a flexible of low self-capacity, although, in practice, as much as a yard of ordinary flex seems to be quite O.K.

The wiring is perfectly straightforward. One of the telephone terminals is joined to one side of the crystal detector, while the remaining terminal of the crystal detector and the other telephone terminal are connected to the flexible lead.

Some of you may be tempted to dispense with the crocodile clips, but these cost but a penny or two each, and they really are worth while, for they enable the "Cryst-

Here is an invaluable little gadget that can act either as a standby against battery, valve, or other breakdowns, or as an easy-to-use testing device.

adaptor" to be hooked up in a second, efficiently and without fiddling about.

The "Crystadaptor" without telephone receivers fixed to its terminals is incomplete, and if you have a spare pair of 'phones it is a good plan permanently to hook these on. If you are not so fortunately placed, you will find that telephone receivers can be picked up very cheaply these days. We have seen quite good instruments offered at as low as 4s. 6d.

## A Stand-by "Set".

The most important job of the "Crystadaptor" is to act as a stand-by to a valve set. It enables you to receive the local station at good strength, provided it is not too far away, during those periods when, through battery failure, valve faults, etc., the valve set is temporarily out of action.

And if you have a "Crystadaptor" you are safeguarded against a sudden set breakdown cutting you off right in the middle of something you particularly want uninterruptedly to hear. In many cases all that is necessary is to join the "Crystadaptor" by means of its crocodile clips across the aerial and earth terminals, but in some instances it will be found necessary to clip in somewhere in the interior of the set.

Invariably, however, the one clip of the "Crystadaptor" can be joined to the earth terminal, so that you have only the one connection with which to experiment. Probably you will have no great difficulty in locating a bare lead that runs from the grid end or first grid tuning coil to which this clip can be attached.

In any case, you can do no harm whatever with the "Crystadaptor," and can try this or that point until the reception of speech or music indicates you have located a suitable point. It is not likely that the tuning of the set will be affected appreciably by the "Crystadaptor," so that the dials can be turned to the readings for the local as usual.

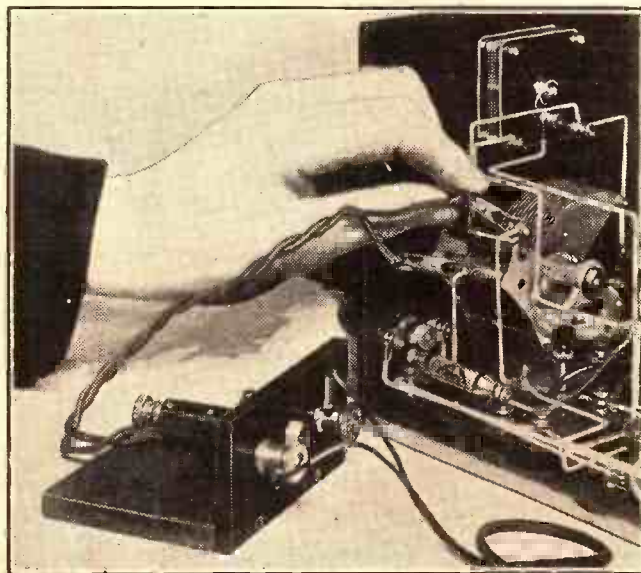
The "Crystadaptor" provides a ready means for testing H.F. stages. It can be tapped across the grid and filament of any H.F. or detector valve to test whether or not the preceding valves are functioning.

## Permanent.

By the way, you can, if you so desire, leave the little gadget connected permanently to a valve set, throwing it out of use when not required merely by disconnecting the telephone receivers; but if you do this there is some slight risk that in the case of sets employing H.F. amplification, a long flex will impose some slight loss. In such an instance, the flex should be cut down to a matter of a

(Continued on next page.)

## READY IN A JIFFY



The "Crystadaptor" can be connected across the aerial tuning circuit of a valve set in a matter of seconds. It guards you against losing an item through a valve failure.



## USES FOR OLD VALVE BASES

Some tips for the "economist."  
By W. R. FLOWER.

**M**OST experimenters have one or two old valves reposing in the junk box which, although they are no longer of any use, have not been thrown away. The bases of these can be put to good use in one or two ways which I am going to describe in this article.

First of all, I will tell you how you can make an efficient earthing device with one. Commence by breaking the glass envelope of the valve and removing the electrodes and remaining glass from the base.

Next cut off the filament pins with a hack saw and remove the wires which led to the electrodes. Drill two holes size 4 B.A. clearance in the base, one at the sides of each of the remaining pins.

### Earthing the Aerial.

Thread the end of the down lead from the aerial through the hole alongside the grid pin, and the end of the earth wire through the hole next the anode pin. Solder these two wires to their respective pins and fill up the base with melted pitch taken from the top of an old H.T. battery.

You will now require a scrap of ebonite about two inches square, and an old valve holder, both of these are usually to be found in the junk box. Mount the valve holder on the piece of ebonite and join the two filament sockets with a piece of stout wire.

Solder the lead from aerial terminal on the set to the grid socket, and the earth lead to the anode socket. You can then mount the device on the window frame or wall outside the window through which the leads to the set are taken.

When the pins on the base are set in their appropriate sockets the aerial and earth are connected up to the set, and when the plug is withdrawn and the pins inserted in the filament sockets the aerial is shorted to earth and the set is completely isolated from either.

### Loud-Speaker Extensions.

A similar idea can be made use of for making loud-speaker extensions to various rooms in the house.

Break the valve and clean out the glass and the electrodes as before, but leave the four pins in place. Connect the leads from the speaker direct to the grid and anode

pins, positive to grid and negative to anode, and fill in with pitch.

### Parallel and Series.

Mount a valve holder on a scrap of ebonite, as was done previously (one for each room), and fix the whole to a convenient spot on the wall.

Wire the extension leads to the grid and anode sockets, positive to grid and negative to anode.

This puts the speakers in use in parallel, and insertion or withdrawal of any one plug will not affect any other speaker that may be in use.

Should it be desired to join the speakers in use *in series* a somewhat different scheme must be employed.

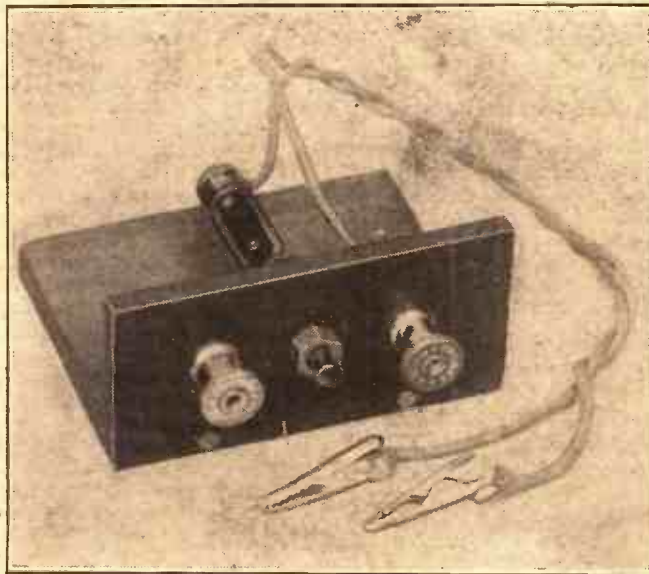
For this purpose you will have to obtain some old-type valve sockets, the sort that stand up above the ebonite on which they are mounted, and you will require two for each room you intend wiring. These are mounted in twos on pieces of ebonite, and the whole is fixed to the wall of the room as before.

### A Little More Complicated.

The positive lead of the extension wires is taken to the grid socket of the first holder, the anode socket going to grid socket of the next, and so on. The negative wire goes to the anode socket of the last holder in circuit.

The plug is prepared as before, but the

## NO RUNNING COST!



The only cost of the "P.W." "Crystadaptor" is its trifling initial one. After you've made it, it will last indefinitely, provided it is handled moderately carefully.

filament pins are now joined together with a wire. When the grid and anode pins are inserted into their appropriate sockets the speaker is in use, and withdrawing the plug and inserting the filament pins into the sockets puts the speaker out of circuit, leaving the other speakers in use still in circuit except for a momentary break whilst the plug is withdrawn and re-inserted.

To use this scheme a plug must be in use in each holder, and if sufficient speakers to ensure this being so are not used a separate plug for shorting each holder must be provided.

## THE "P.W." "CRYSTADAPTOR"

(Continued from previous page.)

mere inch or two. With simple detector and one or two L.F. stages, you need not be so scrupulous in this regard. By the way, do not forget that a crystal detector needs slight readjustment from time to time, especially if it is vibrated or moved. This is a fact that you may forget if your experience of radio has been confined entirely to valve sets.

### Adjust Carefully.

On the other hand, it does not do a crystal detector any good to be adjusted over frequently; and, above all, it requires delicate manipulation or the crystal surfaces may be ground smooth and the rectification efficiency impaired.

There are, no doubt, many of you who have seldom, if ever, listened with a crystal receiver, but if you make a "Crystadaptor" you will find the change from loud-speaker listening to reception on telephones very interesting.

You do not get much bass through a crystal detector, but there is generally an almost entire absence of middle frequency distortion, and the term "crystal clear" assumes reality. You will find that broadcast talkers seem to come closer, be more confidential, and the absence of extraneous noises is almost startling.

### Distinct Advantages.

In fact, it is such a change from loud-speaker listening that we think that just as an alternative method of reception, at least, for the local station, you will find the "Crystadaptor" a very well-worth-while proposition.

In conclusion, we must make it clear that we do not claim that the "Crystadaptor" is an entirely new idea. In actual fact it is an elaboration of an idea that was very popular two or three years ago, and about which a "P.W." correspondent reminded us recently in a published letter. In its original form the "Crystadaptor" was not an adaptor, that's all!

## WEAKER RECEPTION

Points to remember if volume and quality "fall off."

**D**OES your set now give a mere whisper where it before roared and rattled the loud speaker? And is its quality poor compared to the rich and brilliant tones that once came from it? If you are experiencing these symptoms, the points to watch are these:

Leaking aerial insulators (which are probably covered with soot and dust), a dry earth (if you use an earthing plate or tube), a run-down accumulator, H.T. or G.B. battery, and, finally, a source that is not often suspected—the valves.

Valves normally last a long time, but their emissive properties tend to decrease with use. The result is a falling off of amplification. When the emission of a power valve drops, then overloading is likely to occur, since it will not have the input-handling capacity that it had before, and is therefore not working at its maximum efficiency.

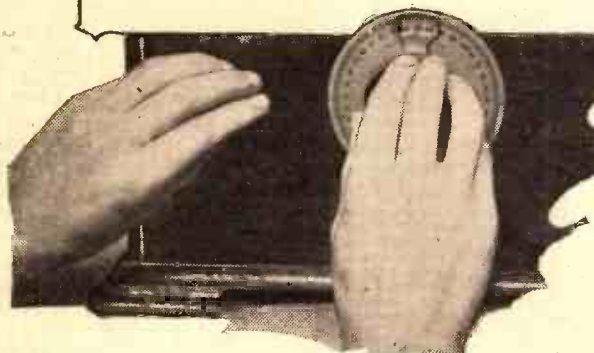
S. G.



# NOTES FROM THE NORTH

BY OUR NORTHERN CORRESPONDENT.

An article of topical interest regarding the B.B.C.'s recent re-shuffle of wavelengths.



will have even a smaller range. Interference, by still further reducing the effective range of Moorside Edge, would strike at the fundamental purpose of this station which is, of course, to give alternative programmes to as large a part of the North of England as possible.

As is well known, Moorside Edge fades badly in the Newcastle area. I found

similar conditions in the opposite corner of the North of England, round about Carlisle.

### A Good Old Stand-by!

This is one of those few unlucky areas that are apparently to be denied alternative programmes unless some new scheme is devised. At Carlisle, I was told, Daventry 5XX is the only consistently satisfactory British station.

Going north, to Edinburgh, my portable picked up Moorside Edge at good strength, but fading was fairly bad. North of Edinburgh reception improved, and at Dundee Moorside Edge was received quite well.

In fact, I placed the set on a wall immediately beneath the Dundee aerial and had no difficulty in receiving Moorside Edge clearly and also free from local interference. At Aberdeen (240 miles from Moorside Edge) reception was better still, and I was told that North Regional has been heard there on a crystal set.

This fact, that at perhaps 200 miles reception is better than at 100, was also

noticed in connection with Brookman's Park. Both London Regional and London National (especially the latter) are received with less fading in Scotland than they are in Yorkshire and Lancashire.

At the time of writing no decision has been made as to the future wave-length and programme of Newcastle, but tests are being carried out to determine the feasibility of synchronising this transmitter and North Regional on the same wave-length of 479 metres.

The transference of 301 metres wave-length from Aberdeen to North National means that Aberdeen has to go on the 288 metres common wave-length. Transmitters working on a common wave have to maintain extreme accuracy of wave-length, and this is obtained by the ingenious tuning fork control.

The "fork" apparatus for Aberdeen is, I understand, being sent up from one of the North of England transmitters which has been on 288 metres and is closing down.

### A Difficult Question.

It will be interesting to see how the coming into full operation of Moorside Edge will affect (if at all) the numerous "communal relay systems" which are springing up in the North of England. These systems are operated by private companies and consist of a central receiving station from which lines radiate to the houses of subscribers, who pay a small sum for the hire of a loud speaker.

The system is in use at Leeds, Beverley, Hull, and many other places, and the Hull Corporation appears to be going in for it on municipal housing estates. The B.B.C. and the Post Office must be concerned at the growth of the idea, as only one licence is necessary—that for the central receiving station.

But, perhaps, the authorities are waiting to see whether the fact that Moorside Edge will give two programmes affects the popularity of the communal systems, which, of course, give their subscribers only one programme—and that is not selected by the individual subscriber.

NO sooner is the North Regional station getting well into swing than a menace to its effectiveness looms on the horizon. The power of Langenberg is to be enormously increased.

The separation between North Regional (479.2 metres) and Langenberg (473 metres) is nine kilocycles. We have had a taste—especially those who live in the South of England—of what high power on two wave-lengths only nine kilocycles apart means.

### More Interference?

The interference between London Regional and Muhlacker has shown that this separation is insufficient when both transmitters are on power of the order of 70 kilowatts. Is there going to be a repetition of the London Regional-Muhlacker trouble in the North?

It would be rash to say for certain, for wireless transmission is an uncertain and often illogical business, but it certainly seems likely that trouble is in store unless the powers that be can devise means of preventing it. Fortunately, Langenberg's power will not be increased just yet, and this gives the British and German broadcast engineers time to act.

I have had a word with Mr. Noel Ashbridge, Chief Engineer of the B.B.C., on this subject. He admitted that there is some risk of interference on the outer limit of the service area of Moorside Edge, but apparently there are prospects of the whole problem of interference between European stations being cleared up before the Langenberg power increase comes.

Mr. Ashbridge said that a long series of measurements of indirect ray from distant stations has just been completed, and the results will be considered by British and foreign experts when the International Broadcasting Union meets in June.

### Shifting the Stations.

"It is hoped," said Mr. Ashbridge, "that use may be made of this data to avoid interference by arranging stations which interfere so that they are not on neighbouring channels."

The North Regional transmitter at Moorside Edge is not covering the whole of what the B.B.C. calls its North Regional area, and the North National transmitter on the shorter wave-length of 301 metres

## RADIO IN CHURCH



This is the Vicar of St. Matthew's Church, Camp Road, Leeds, adjusting the set fitted into the pulpit. By means of this receiver parishioners without sets of their own listen to broadcast services and music in the church.

## A "COMET" THREE IN EGYPT

The Editor, POPULAR WIRELESS.

Dear Sir,—I suppose by this time you will be getting rather fed up of hearing the fans singing the praises of the "Comet" Three, but I just had to write and add my small voice to the multitude and I'm going to make another D.X. claim for the "Comet" Three. Here in Egypt, approximately 3,000 miles from England, I'm receiving all the home stations on the loud speaker, consistently, night after night, not once now and again. The stations I do get are too numerous to mention. It's certainly a wonderful set. I think I can claim to be the first to use the "Comet" out here.

Thanking you again for such a wonderful circuit.  
L. D. NOETH,  
Alexandria, Egypt.



FROM THE TECHNICAL EDITOR'S NOTE BOOK.

# Tested and Found—?



**HIGH-GRADE MEASURING INSTRUMENTS.**

THE term "moving iron" as applied to measuring instruments should not necessarily be interpreted as meaning low grade. The new range of Ferranti radio meters for A.C. and D.C. are of the moving-iron variety, but are also of a very high standard of quality.

The ammeters are available in ranges from 0 to 100 milliamps up to 0 to 30 amperes



Here is a Ferranti Moving-Iron measuring instrument.

at £1 8s. 6d. each, while the voltmeters range from 0 to 7.5 volts up to 0 to 500 volts, although in this case different prices obtain—from £1 8s. 6d. to £2 15s.

These Ferranti meters, samples of which I have recently examined and tested, have fine wide open scales and alert knife-edge needles enabling close readings to be obtained.

Tested against our specially calibrated instruments, I found them accurate, which in view of the reputation of the makers for this kind of work, is hardly surprising! They are beautifully made meters, and are built into handsomely moulded cases.

I would certainly advise those amateurs who are looking for not-too-high-priced measuring instruments in a class definitely above the usual small ones, to bear the Ferranti high-grade moving-iron, radio measuring instruments well in mind.

**A FINE DETECTOR.**

Yet another two-volter, this time a Mullard, the P.M.I.H.L. It takes the now almost universal filament current of 0.1 ampere, and has an amplification factor of

28 against an anode impedance of 18,500 ohms.

These figures are excellent for a valve of this kind. It means that although the amplification factor has been taken up to the impressive figure of 28, the impedance has been kept so comparatively low that the mutual conductance of 1.5 has

been achieved. I like this Mullard P.M.I.H.L. particularly as a detector, in which position I find it very pleasing indeed. But it also has its very excellent uses in H.F. stages.

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 guarantee their safe return undamaged, as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

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.

**AN INTERESTING SET.**

Messrs. R.I. Ltd. have issued a brochure describing the Stenode Radiostat receiver as designed and produced by them. It is an all-mains model and sells at £75.

**STAL L.F. TRANSFORMER.**

The Stal nickel alloy transformer which retails at 9s.6d. has a ratio of 1 to 3 and is an excellent little component. Although it is one of the smallest and lightest L.F. transformers that has been made, its characteristics compare quite well with any similar component selling at round about the same figure.

It is a frequent criticism against small nickel-iron transformers that they are unable to handle much in the way of direct current, but we gave the Stal

up to 6-milliamps and this did not seem to worry it at all.

It is built into a brown crystalline finished metal case and, though I can well imagine that as a crystalline finish the expert craftsman would consider it rather poor, I find the effect attractively "different." It resembles a dull over-crinkled crocodile leather.

There is, however, one point about this Stal transformer that certainly does not appeal to me. The terminal markings are on the bottom so that once the component is screwed to the baseboard one is left in the dark as to the identities of the terminals. I can assure the manufacturers that they will find their product much more popular with amateurs if they mark the terminals where the markings can plainly be seen.

**A POLAR DRUM CONDENSER.**

The Polar drum two-gang condenser is a very interesting component. It is completely screened, and the capacity value is guaranteed to fine limits. An easily fitted drum-drive is available.

There is also a four-gang assembly which comprises two of the two-gangs having a Polar drum drive in the centre.

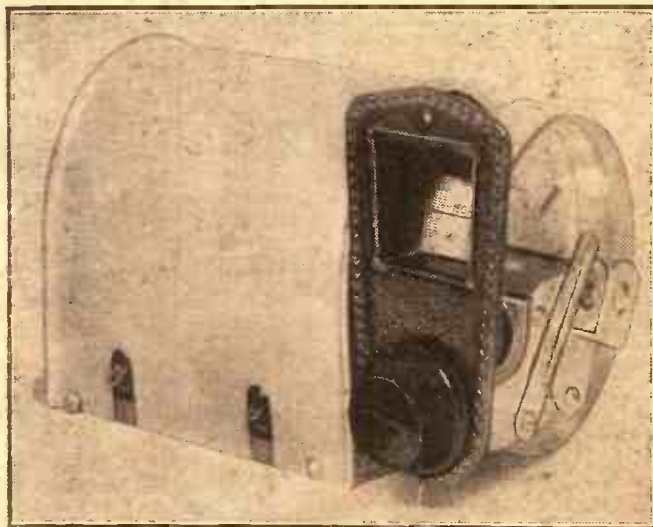
Each section is fitted with a balancing device for trimming purposes. It is a well-made component, and the action is smooth.

In that it calls for "matched" coils it is, of course, more a set maker's job than a home-constructor's device. But as such I have no doubt it will be widely employed.

**NEW BELLING & LEE PRODUCTIONS.**

Messrs. Belling & Lee, Ltd. are manufacturing a new spade terminal which is almost identical with their old 4d. model but which is to retail at 2d. These new terminals embody that effective Belling-Lee scheme for making them tidily grip the fray of leads and the prongs are fashioned from springy brass. They instantly slip on to any terminal stem of normal dimensions and can certainly be numbered amongst the most useful gadgets available to-day.

Experimenters particularly should welcome them as they enable battery and other connections to be made or changed over with great facility.



The Polar Drum Two-Gang Variable Condenser. It is a fine piece of engineering and should prove popular among set manufacturers and constructors of outfits for which such a device is suitable.



# THIS BATTERY WILL TRANSFORM YOUR SET

Experts will tell you that no set can give perfect, undistorted reproduction unless equipped with the right H.T. Battery, supplying adequate voltage and unwavering power. That is why they recommend EVER READY Batteries for all sets. For an EVER READY Battery does not vary in power. It is always reliable, always efficient. A special and exclusive process of manufacture ensures a strong, even flow of current which lasts for months

and gives to the very end the same clear, undistorted tones. EVER READY Batteries are entirely British made and are guaranteed by a company which has been making batteries for 28 years. The EVER READY Company were the pioneers in dry batteries to give a constant low milliamp emission. And now they make

the battery which will bring out the very best that is in your set. Fit one to-day.



*The EVER READY 108 volt, double-capacity battery is recommended by the designer of the set for use with the 'POP VOX' receiver described in this issue.*

**BRITISH MADE  
HIGH  
TENSION  
BATTERIES**

The Batteries that give unwavering power

THE EVER READY CO., LTD., HERCULES PLACE, HOLLOWAY, N.7.



# WE CAN SUPPLY!

THE LONG AND SHORT  
WAVE COILS AS  
SPECIFIED IN THE  
"POPULAR WIRELESS"  
"POP-VOX"

OUR PRICE **7/6** PER PAIR

WRIGHT & WEAIRE LTD.,  
740, High Road, Tottenham, N.17.  
Phone: Tottenham 3847.

# IMMEDIATE DELIVERY!

# A PERFECT EARTH AT THE TOUCH OF A MATCH

Cup containing solder and flux.  
Twist earth wire round here.  
Then fill this cup with methylated spirit  
and apply match—that's all!  
Every listener who has at-  
tempted to make a good sol-  
dered earth connection  
out of doors will ap-  
preciate this  
Wearite Earth  
Tube.

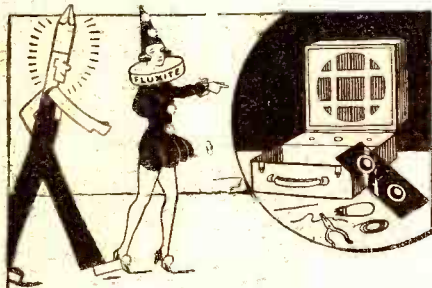


The new  
Wearite  
Earth Tube is  
provided with an  
ingenious device by  
which a perfect and last-  
ing soldered joint is ob-  
tained just by striking a  
match. Made of solid drawn  
copper of substantial thickness and  
fitted with turned brass driving head.  
PRICE 3/6.

Send for descriptive leaflet and  
list of other Wearite Components.

# WEARITE COMPONENTS

WRIGHT & WEAIRE, LTD., 740, High Road, Tottenham, N.17  
Phone: Tottenham 3847.



"We're Fluxite and Solder—  
The reliable pair,  
Famous for Soldering,  
Known everywhere!  
If your Set is in trouble,  
There's no need to  
moan,  
Let US come and help  
you  
Restore it to 'tone'!"

See that Fluxite and Solder are always by you—in the house, work-

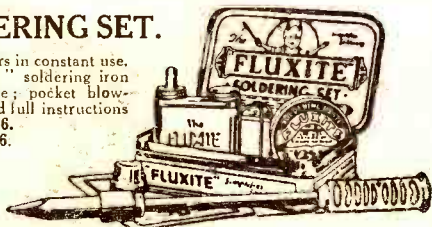
shop, garage—anywhere where simple, speedy soldering is needed. They cost so little, but will make scores of everyday articles last years longer! For Pots, Pans, Silver and Brassware; Radio; odd jobs in the GARAGE—there's always something useful for Fluxite and Solder to do.

ANOTHER USE FOR FLUXITE.  
Hardening Tools and Case Harden-  
ing. Ask for Leaflet on improved  
method.

All Hardware and Ironmongery  
Stores sell Fluxite in tins.  
8d., 1/4 and 2/8.  
NEW "JUNIOR" SIZE, 4d. per tin.

## FLUXITE SOLDERING SET.

Simple to use and lasts for years in constant use. Contains special "small space" soldering iron with non-heating metal handle; pocket blow-lamp, Fluxite, Solder, etc.; and full instructions.  
COMPLETE 7/6.  
or LAMP only 2/6.



FLUXITE LTD.  
(Dept. 324.)  
ROTHERHITHE, S.E.16

ALL MECHANICS WILL HAVE

# FLUXITE

IT SIMPLIFIES ALL SOLDERING

## 2 GNS. NOW BUYS A HANDSOME 2!!!! RADIO GRAM CABINET OF EXCELLENT DESIGN & QUALITY

These Cabinets are soundly constructed in selected OAK, etc., and polished a rich Jacobean shade.

SIZES: 3' 3" HIGH 22" WIDE 17" DEEP  
Gramophone 3 3/4" CLEAR FOR PICK-UP  
Compartment 3 3/4" MOTOR  
Wireless For PANEL up to 18" x 7"  
Compartment BASEBOARD 14 1/2" deep.  
Speaker 20" x 15" x 14" allowing ample  
Compartment room for speaker and batteries.

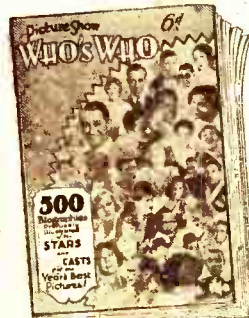
AND AT THE ASTOUNDING PRICE OF  
2 GNS.!! PACKED FREE. CARR. PAID

Sole Manufacturer and Distributor: W. S. WILKIN,  
Cabinet Manufacturer, 129, WESTBURY ROAD,  
SOUTHEND, ESSEX. *Traders Invited*

FREE OFFER:  
With every 12th  
order we are pre-  
sents and fitting,  
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charge, a Collaro  
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Scenes and Casts of this  
Year's Best Pictures, etc.

Ask for—  
PICTURE SHOW  
**WHO'S WHO**  
ON THE SCREEN

On Sale Everywhere

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**T**HE problem of imparting instruction and amusement to millions of listeners at a time from one broadcasting centre has found a remarkable solution in Hamburg's new Radio House.

Its Grand Studio is one of the most perfect and up to date in the world. The soloist or orchestra is situated on the platform of a powerful lifting gear that can be raised to any level, thus producing the illusion of voices either coming from the skies or from underground depths.

**An Optical Illusion.**

The walls of the studio either absorb or reflect the sound more or less according to the announcer's bidding, who has only to press a button in order to drop or lift felt or wooden wall linings.

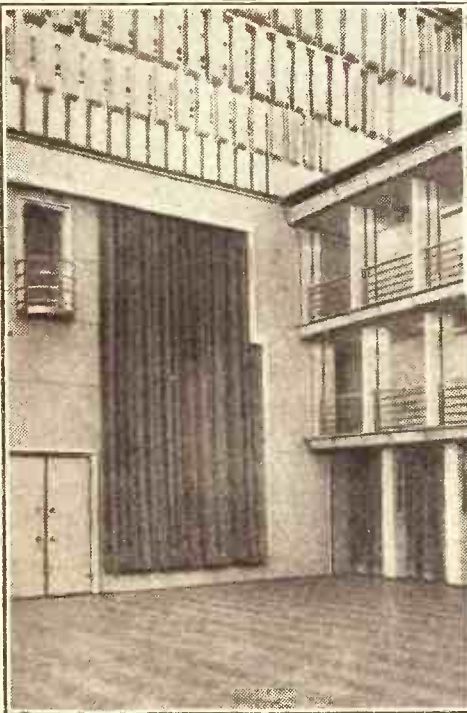
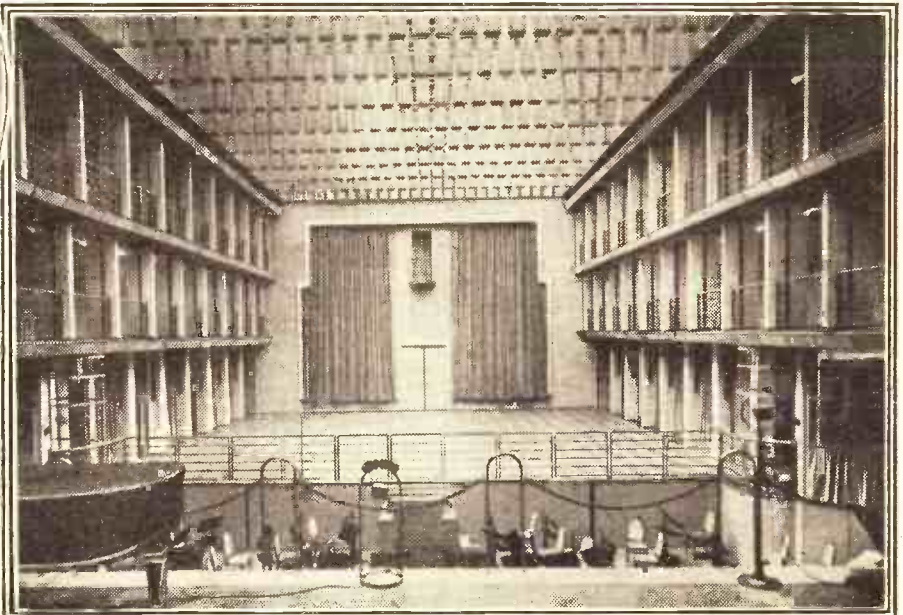
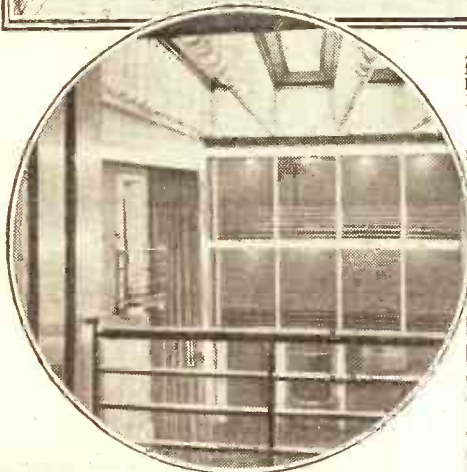
The ceiling allows an abundance of light—coloured whenever the artists' minds need any stimulation—to radiate through a hanging maze of stalactites, thus creating the illusion of a hall filled with people.

**Quite Elastic!**

The studio has the dimensions of a church, but can—whenever the announcer thinks fit—be reduced to the dimensions of a simple sitting-room; the front wall, with the announcer, travelling through the studio and converting it to any size suited to the actual scene.

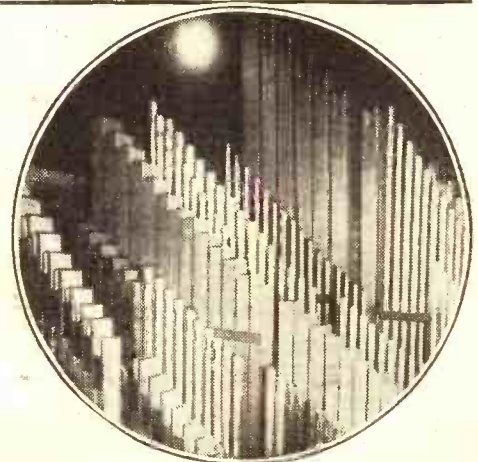
# A UNIQUE RADIO STUDIO

Around the Grand Studio run "resounding" galleries, from one of which the photograph in the circle to the left was taken. A general view of Hamburg's new Radio House is given in the heading photograph, which, incidentally, was taken after a fall of snow.



**A SLIDING WALL**

A good idea of the general "layout" of the studio can be obtained from the large photograph above. The wall at the far end, on which the curtains are hung, is the one which is moved backwards and forwards to alter the size of the actual studio. On the left is a close-up of this wall, from which you can see how it fits closely round the floors of the various galleries. It can be stopped next to any one of the partitions in these galleries. A massive organ of the Welte pattern is part of the studio equipment, and on the right, in the circle, a few of its hundreds of pipes are visible.





THE "P.W." "Pop Vox" has been our star exhibit at Tallis House during the past week or two, and it has been standing in our reception-room for all visitors to examine. These have included the wireless correspondents of all the important daily and evening newspapers and responsible representatives of most of the leading radio concerns.

And I can say without hesitation that the receiver has caused more enthusiastic comment than anything else we have done. The newspaper people seemed to be very greatly attracted by its artistic appearance

"I advise all those who have an interest in the design of radio receiving sets to make use of the Extenser."

Capt. P. P. ECKERSLEY.

That is what the originator of the B.B.C. Regional Scheme has to say about one of the main features of the "P.W." "Pop Vox."

and its simplicity of control. (Possibly you have read some of their published reports that have appeared.)

On the other hand, the "trade," as was only to be expected, were more interested in the "innards" and in the actual results given. All sorts of congratulatory things were said, and some of them can only be described as "pæans of praise."

**Super Critic's Opinion.**

But I do not think anything pleased us more than the simple "It's all right" that was contributed by the engineer who also made the remark that appears at the foot of the first photograph on this page.

He happens to be one of the sternest critics of radio design and technique that

we know, and it is fitting that he should be in view of the fact that he holds down one of the most responsible jobs in the world.

He doesn't hand out polite compliments, but has a habit that many find disconcerting of always saying exactly what he thinks. And, I might mention in passing, he has said some very severe things about some sets!

By the way, the only remark about the "Pop Vox" that can, by the greatest stretch of the imagination, be styled adverse criticism was passed at one of the several technical demonstrations that have been given. However, I feel that I must refer to the point raised in case it has occurred to the minds of any "P.W." readers.

**Only Three Valves.**

It happened this way. After trying the instrument "on aerial" one of our expert visitors ventured the same kind of appreciative remarks as many of the others. He said he thought it was undoubtedly the best "three" he had ever handled, that he was completely fascinated by the Extenser and its "swoop" from medium to long wavers, etc., etc. Further, he admitted that the layout, the appearance and general "presence" of the "Pop Vox" all struck him as admirable. "But," he added, "why only three valves? Why not go the whole hog and make it a super-het?"

I then carefully explained why only three valves, in the fundamentally simple formation of Det. 2 L.F., figured in our latest star set. I have already hinted at the reason in a previous article, but I think I will take this opportunity of slightly elaborating the point.

Every additional valve above the three used, whether they were employed in a "straight" or "super" manner, would have added both to the cost and the complexity of the apparatus.

The great majority of constructors are unable to spend more than a few pounds on their sets. However much a big multi-valver might appeal to them it would be impossible for them to find the cash to purchase the necessary parts.

None of us has much money to spare these days, and it has always seemed to me that our best course is to concentrate on trying to get the utmost possible from inexpensive receivers rather than to "fling open the door of the bank" and achieve all the desired results irrespective of the costs incurred.

**The Reason.**

The higher the results/costs ratio is pushed up the more value you get for your

money. Only the very rich can afford to ignore the price of things.

Then again, the "bigger" the set the more difficult it is to build successfully. With every additional valve and every additional component part, the difficulties and probabilities of faults and troubles occurring are magnified enormously.

The average constructor is not a skilled engineer, and, believe me, you have to be a moderately skilled engineer before you can build, with any certainty of success, some of the multi-valve designs that exist.

Also you have to be a skilled engineer to operate the things if you want to get as many stations as moderately experienced amateurs manage to rake out of the ether with quite simple sets.

Further, there is the question of maintenance. Many of us have to use dry H.T. batteries. These are expensive to replace, so the longer they can be made to last the better. A hefty multi-valver will simply eat H.T.!

**"Every Ounce."**

Well, I need hardly pursue the subject, for I am sure most "P.W." readers will already see exactly why the "Pop Vox" is a "three" designed to give every ounce of "punch" that is possible. In-expensiveness, freedom

MO  
"P."



Some further notes set that constitutes stone in the development and better radio re

By G. V. DOWD I.E.

from trouble in construction, power, selectivity, simplicity of assembly, They are the qualities achieved.

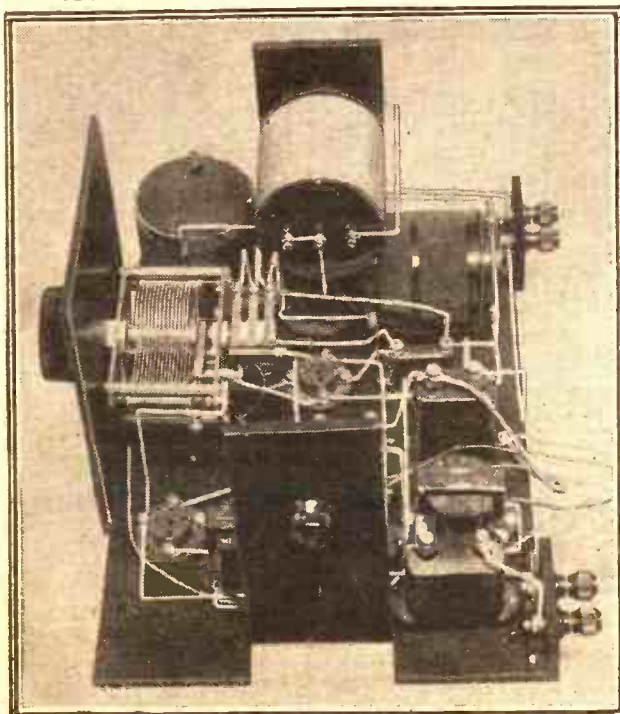
And you'll get the same the "P.W." "Pop Vox"

IT'S SO



One station selector—no multi-programmes available by

**THE ADMIRATION OF ENGINEERS**



"Thank goodness, someone has at last created a real 'break-away' in set design," is what one completely case-hardened radio engineer said. If you knew this man you'd realise that hardly any greater tribute could have been paid.

**THE SET THAT INAUGURATES**



# ...RE ABOUT THE ...W." "POP VOX"



...s concerning the  
...a definite mile-  
...ment of simpler  
...ceiver technique.  
...ING, Associate  
...EJ

...ction and operation,  
...mplicity in handling,  
...good appearance.  
...s we aimed at—and  
...tations all right with  
...ox." No doubt you

**SIMPLE!**



...dial juggling—your alternative  
...y two-fingered control!

will appreciate some facts concerning this claim. Well, next week Mr. P. R. Bird is contributing to "P.W." an article entitled "Round The Stations With the "P.W." "Pop Vox." He has taken the set home and is putting it through its paces under conditions similar to those experienced by most listeners. I believe he will place the receiver at the free disposal of his family (who, I am told, know nothing of the technicalities of radio), with the idea of recording their impressions and criticisms.

And I do know that a wireless man's family generally comprise extremely keen critics of the performance of a set. They expect me to work miracles in my own home and will not tolerate any limitations at all!

It is not our usual practice to ask for reports from readers concerning "P.W." sets—the letters that we publish are quite spontaneously written by satisfied constructors—but on this occasion I am going to break the rule.

### A P.C. Will Do.

I'd very much like to know how constructors get on with the "Pop Vox"; which of its various special features appeals to them most, and how they regard the Extenser in practice. Postcards will do, and the more that we get

the more we shall be indebted to our correspondents.

And in view of the unusual circumstances (it is not often that sets of the calibre of the "Pop Vox" can be evolved) I am prepared personally to deal with any questions that any of you might like to ask about the set.

However, in view of your enormous numbers and the big proportion of you who, I feel sure, will be "Pop Voxing," I must set a time limit to this offer. I'll make it a week from the day this issue of "P.W." reaches your hands. That will enable you to get well under way with the construction and testing.

### A Sporting Offer.

So any letters posted to reach me at Tallis House, Tallis Street, London, E.C.4, by the first post on May 30th asking "Pop Vox" questions will be dealt with by me personally and without any of the usual "Query Dept." formalities. It will be as well for you to mark your envelope "Pop Vox" at the top left-hand corner so that the correspondence clerks can recognise them and pass them straight on to me.

Don't forget to enclose a stamped and addressed envelope and please do not expect a reply by return. I will deal with the letters as expeditiously as possible, but my "output" is limited, and I shall have to deal with such correspondence additionally to quite a lot of other special work I have at present on hand.

Candidly, I must admit I do not anticipate an immense postbag, for the "Pop Vox" is as snag-free as anything we have ever pushed along the Test Bench for the Art Editor to collect.

However, if there is any little point that puzzles you, don't hesitate to ask about it. I won't mind answering your query. (We don't expect every reader to know as much about radio as we ourselves do, and we don't "look down" on them any more than you skilled plumbers, architects, medical men, dentists, railway engineers, clerks, gardeners, cabinet makers and building operatives would look down on us because we can't match your knowledge and cunning at your own particular trade.)

Many of you will want to make your own "Selector" coils even though the job is a trifle more difficult than making the simple solenoids that figure in the design.

Therefore, I am repeating the details of construction that were given some time ago in a "P.W." which is now, I believe, out of print.

The winding itself is extremely simple, although a number of tappings have to be made. The mechanical

details, however, require to be carried out with some care if a satisfactory unit is to be produced, and reliable action of the Selector switch.

The reader with a fair amount of experience of constructional and coil winding work need not hesitate to tackle the job, for it is not really difficult. It is just a matter of a little painstaking work in fitting up the stud switch and assembling the unit.

There is nothing critical about it electrically, and slight variations in the winding, method of assembly, and so on, make no difference to its working. In this respect it is much simpler and more straightforward than a dual-range coil, where the

"The Extenser will be used on every receiver of distinction during the coming autumn."

Wireless Correspondent "Daily Sketch."

The "P.W." "Pop Vox" is a "receiver of distinction" in which the Extenser already is in use!

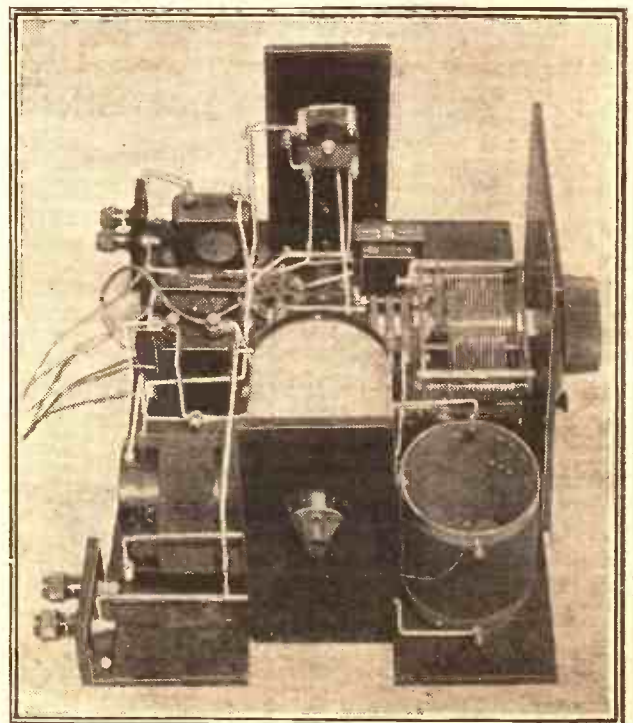
various windings must be correctly proportioned and positioned in relation to each other.

Essentially, the unit consists of a tapped single-layer winding of 84 turns in all, on the usual tube, with a stud switch to vary the amount of coil in circuit in steps of four turns at a time. This is found, in practice, to give quite sufficiently close tuning for an aerial circuit.

### Making the Selector Coil.

The basis, then, is a piece of tubing of some good insulating material, such as  
(Continued on next page.)

## THE DELIGHT OF LISTENERS



The fortunate listeners who have already had a chance to handle the "Pop Vox" have been delighted with its absolute freedom from control complications.

# ...TES A NEW ERA IN DESIGN



**MORE ABOUT THE  
"P.W." "POP VOX."**

(Continued from previous page.)

"Pirtoid," with a diameter of 3 in., length 3½ or 4 in. In each end of this a wooden cross-piece is fitted, one to provide a means of mounting to the panel (two screws) and the other to form the attachment for a disc of ebonite of about 2½ in. diameter, on which the studs and arm of the Selector switch are mounted.

The switch has 18 studs, and the arm is fixed on the end of a brass spindle running right up the centre of the coil and out through a hole in the panel. Holes for this spindle are required in the wooden cross-pieces, of course, and a knob is placed on the end to enable the switch to be rotated. Some simple kind of pointer is desirable on the knob, to indicate roughly where the switch arm is at any given moment.

The tube carries three small terminals, marked A, B and C, and a convenient position for these is at the end furthest from the panel. The actual positions do not matter much, but it is best to see that they read A, B, C from right to left as you look at the coil from the back of the set in which it is mounted.

**How to Wind It.**

The winding comprises 84 turns of No. 24-gauge wire (either double cotton- or double silk-covered will serve) in a single layer. Begin at the end of the tube nearest the panel and wind on 20 turns.

From this point take a tapping to No. 1 stud on the switch. This is the stud on which the arm rests, when the knob is turned fully to the left.

Now put on 4 turns, tap out to No. 2 stud, 4 more turns, tap to No. 3, and so on, until 84 turns are on. Take the finishing

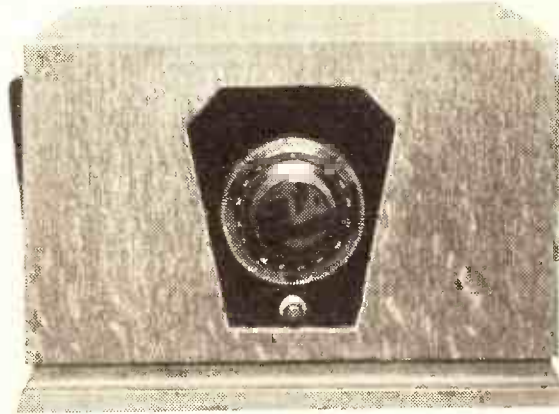
end to No. 17 stud, leaving No. 18 blank for another purpose.

Now the internal connections of the unit. Terminal A is to be wired to the arm of the switch, and C to the start of the winding. The 18th stud, blank until now, is to be wired to terminal B.

**Some Final Hints.**

That really completes the job, but there remain one or two details to be discussed. The appearance of the unit, for example, would be improved by a covering of Empire cloth over the winding. It is easily stuck in place with a few little dabs of molten Chatterton's compound.

**A SET OF DISTINCTION**



The "P.W." "Pop Vox" adds artistic "lines" to its many other advantages.

By the by, it may be a help to you in picking the winding on the tube to know the actual length which it occupies. Well, with No. 24 double silk-covered wire, wound reasonably carefully, the 84 turns should cover approximately two inches of the tube.

If you bear this in mind when starting the coil you will be able to get your winding nicely in the middle of the former. It doesn't matter electrically, of course, but it looks neater this way.

As you will have realised by now, the length of 3½ in. given for the tube is somewhat longer than you need, but we chose this size for two reasons. In the first place it is a standard size in the "Pirtoid" range of tubes, and secondly it just allows room for double cotton-covered wire to be used, if desired.

The length of the winding in this case would be approximately 2½ in. Of course, the winding length will vary a little according to the neatness with which you make the tappings and the closeness of the turns to each other, which in turn depends on your skill in winding. If it is your first attempt, therefore, it is wise to expect the winding to run perhaps an eighth of an inch over the figures we have given.

**The Tappings.**

The tappings, by the way, are quite easily made in the following fashion: As you reach each point, push a hole in the tube with a sharp-pointed scriber or other tool which will not injure the adjacent turn of the winding, and take a loop of the wire through and so to the appropriate stud of the Selector switch.

Well, so much for the construction of the Selector coil. If you do build it yourself you will effect quite an economy and make your P.W. "Pop Vox" a still greater value-for-money proposition. And that, I am sure, will prove to be one of its most popular assets.

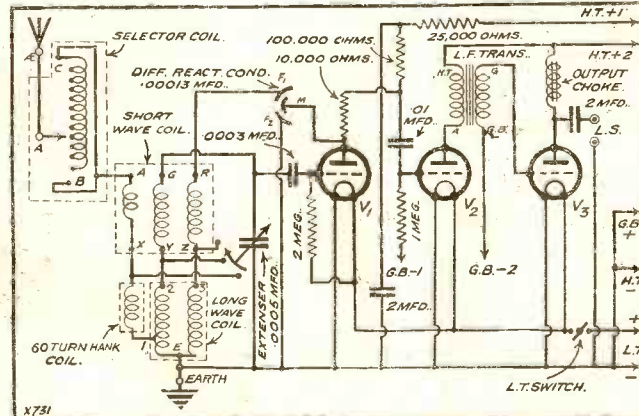
**YOUR GUIDE TO THE PARTS NEEDED FOR THE "P.W." "POP-VOX"**

- 1 Panel, 6 in. x 8 in. (Keystone, or Permol, Goltone, Parex, etc.).
- 1 Cabinet and baseboard (Peto-Scott, or Ready Radio, etc.).
- 1 .0005 mfd. Extenser and full-scale dial (Cylidon).
- 1 Selector coil (Ready Radio, or R.I., Wearite, Goltone, Parex, Magnum, Keystone, etc.).
- 1 .00013-mfd. diff. reac. cond. (Lotus, or Telsen, Formo, Burton, Parex, Magnum, Wearite, J.B., Dubilier, Lissen, Ready Radio, Igranice, Ormond, Polar, Wave-master, etc.).
- Long and short-wave coils—two 3 in. x 3½ in. coil formers (Parex, or Paxolin, Keystone, etc.); or can be obtained ready-made from Ready Radio, Keystone, Goltone, Magnum, Parex, R.I. Wearite, etc. Also for winding coils you require 3 oz. of 24 D.S.C. and 2 oz. of 30 D.S.C.
- 3 Valve holders (Telsen, or Bulgin, Clix., W.B., Igranice, Wearite, Benjamin, Junit, Magnum, Dario, Lissen, Lotus, Formo, etc.).
- 1 L.F. transformer (R.I. Hyper-mite, or Telsen, Igranice, Varley,

- Ferranti, Lotus, Mullard, Lew-cos, etc.).
- 1 Output choke (Igranice "Midget," or Bulgin, Ferranti, Lissen, Varley, Atlas, Wearite, R.I., Magnum, etc.).
- 1 100,000-ohm anode resistance and holder (Ferranti, or Varley,

- Ready Radio, Igranice, Graham-Farish, Lissen, Dubilier, Mullard)
- 1 1.0-megohm grid leak and holder (Ferranti, or Graham-Farish, Telsen, Ediswan, Dubilier, Mullard, Igranice, Lissen).
- 1 2-meg. grid leak and holder (Dubilier or as above).

- 1 .0003-mfd. fixed condenser (T.C.C., or Telsen, Mullard, Formo, Watmel, Ready Radio, Igranice, Dubilier, Ediswan, Graham-Farish, Ferranti, etc.).
- 1 .01-mfd. fixed condenser (Lissen, etc.).
- 2 2-mfd. fixed condensers (Dubilier and Lissen, or T.C.C., Ferranti, Formo, Hydra, Igranice, Mullard, etc.).
- 1 10,000-ohm spaghetti resistance (Magnum, or Bulgin, Ready Radio, Keystone, Graham-Farish, Sovereign, Lewcos, etc.).
- 1 25,000-ohm spaghetti resistance (Bulgin or as above).
- 2 Two-terminal blocks (Junit, or Eelex, Belling & Lee, Igranice, etc.).
- 2 Terminals (Belling & Lee, Clix, etc.).
- 1 On-off switch (W.B., or Bulgin, Red Diamond, Ready Radio, Goltone, Lissen, Igranice, Lotus, Benjamin, Keystone, Junit, Ormond, Wearite, Magnum, etc.).
- Wire (Glazite or Lacoline).
- Screws, flex, etc.
- H.T., G.B. and L.T. plugs and spade terminals (Clix, or Eelex, Belling & Lee, Igranice, etc.).

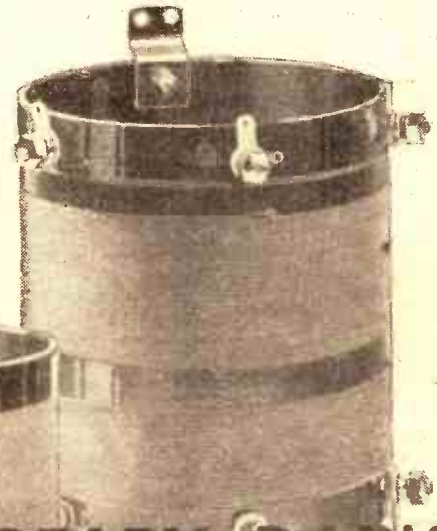


This is the circuit of the "P.W." "Pop Vox"—it provides for power and selectivity plus quality.



# "POPULAR WIRELESS" VOICES PUBLIC OPINION BY CHOOSING READY RADIO COILS FOR THE "P.W." "POP-VOX"

Every Ready Radio "POP-VOX" Kit contains the famous Ready Radio "Star Turn" Selector Coil and the special Ready Radio short and long wave coils. The amazing sensitivity and selectivity obtained by the "P.W." "POP-VOX" is entirely due to the specified Ready Radio Selector Coil while performance is still further improved by the Ready Radio short and long wave coils which are specially suitable for use with the new "Extenser System."



**READY RADIO  
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WAVE COILS**

**READY RADIO  
'STAR TURN'  
SELECTOR COIL**

*Specially made for the original receiver at the request of "Popular Wireless" and on account of their adaptability to the "Extenser System" specifically recommended by the designer.*  
PRICE, pair **8/6**

*Gives a remarkably high degree of selectivity combined with sensitivity. Positive contact. Electrical connections are prevented from corroding by a special process. Robust construction one-hole fixing.* PRICE, each **12/6**

*Price Lists and Order Form on Page 353*

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# CAPT. ECKERSLEY'S — QUERY CORNER

Some questions and answers of general radio interest that will aid you in your radio reception.

PERMISSIBLE DISTORTION—A QUESTION OF SMOOTHING—200-VOLT MAINS AND 220-VOLT TRANSFORMER.

Under the above title, week by week, our chief Radio Consultant comments upon radio queries submitted by "P.W." readers. Don't address your questions to Captain Eckersley, however, a selection of those received by the Query Department in the ordinary way will be answered by him.

## Permissible Distortion.

S. C. (Cambridge).—"I have been supplementing the information given by Capt. Eckersley in his fine articles 'Concerning Valve Amplifiers,' by consulting other sources of information.

"I find that, in using the anode volts, anode current curves of a power valve to ascertain the correct load for the valve, it is permissible to allow of a certain amount of distortion so that the intercepts on either side of the steady grid-bias value are not exactly equal.

"Can this tolerance be allowed in arriving at the correct value of an anode resistance in an R.C. coupled valve? I am uncertain whether, if the R.C. valve is in the first stage, the distortion so introduced will be magnified by succeeding stages."

No; it's merely a matter of proportion. Thus if you have a *perfect* last stage and get say 5 per cent distortion in your penultimate stage, the result is 5 per cent distortion only.

I am glad my articles helped you to take an interest in the subject. You cannot, without understanding this matter, design a good amplifier. But I must have failed to point out that the intercepts were not invariably equal, although I thought I explained "bottom bend" distortion by showing that they could be.

May I be any further help by saying that 5 per cent difference in intercepts is usually allowable, but this must be 5 per cent overall?

\* \* \*

## A Question of Smoothing.

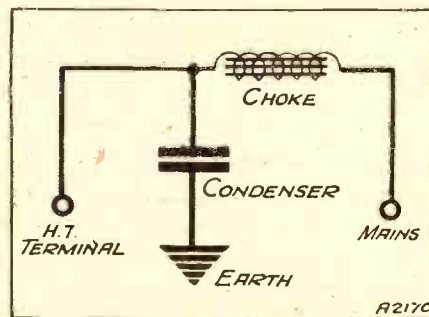
W. R. (Dartford).—"I intend to obtain the H.T. supply for my receiver from the household D.C. mains.

"The last valve of the receiver is a super-power, requiring as much H.T. as I can give it, and takes, of course, a large amount of anode current. The loud speaker is fed via the conventional choke and condenser output filter.

"Will the components of this filter, in addition to performing their intended purpose of keeping H.T. current out of the loud-speaker windings, also smooth the ripple in the D.C. mains supply to the valve? In other words, will I be reasonably safe in preventing loss of voltage on the valve's anode by dispensing with any additional smoothing circuit associated with the power valve?"

If you work this out you will see that in effect you have a resistance (the valve) in series with a choke (the anode inductance), and you want to know if you apply an A.C. current (the ripple on the D.C.) to the choke of this series circuit whether your loud speaker will register the A.C. "drop" across the valve.

## REDUCING RIPPLE



These are the connections recommended to a Dartford reader.

We have 250-volt mains—the ripple is, say, 5 per cent or 12.5 volts of A.C. The frequency is, say, 200 cycles.

The choke has a value of, say, 10 henries. Its impedance at 200 cycles is  $6 \times 200 \times 10$  ohms = 12,000 ohms.

The impedance of the valve is, say,

5000 ohms. The proportion of volts across the valve (and hence the loud speaker) is about 0.4 of the 12.5 volts we assumed. This means 5 volts of "hum" across the loud speaker.

A normal loud speaker works with about 50 volts of "programme" volts across it. This means that the hum is 20 decibels less than the modulation.

To be inaudible it should be 50 decibels less. Thus the smoothing effect of the choke is probably insufficient. I should advise a choke and condenser as shown to get rid of all trouble, unless the choke has a greater value and the ripple less value than I have allowed for. Why not try it?

## 200-Volt Mains and 220-Volt Transformer.

M. D. (Dulwich).—"I recently purchased a transformer giving an output on the H.T. secondary side of 300-0-300. This transformer, however, is intended for use with 220-volt mains, whereas my mains are 200 volts. Is it possible to obtain a rough approximation of the output secondary voltage from the above details with only 200 volts input?"

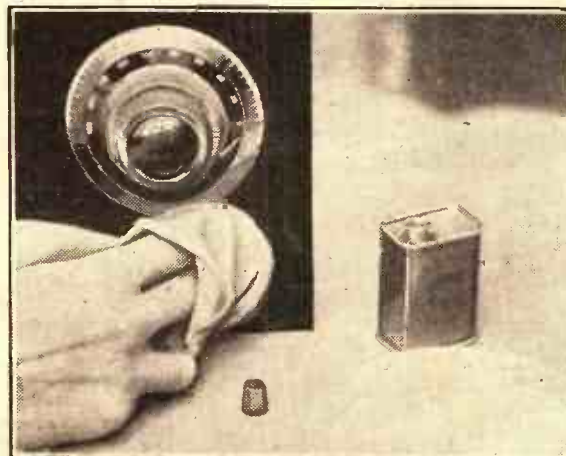
The output secondary volts are on reasonable loads proportional to the input primary volts. Thus if in given conditions you have an A.C. transformer giving 600 volts between outers with an input of 220 on the primary it could give  $\frac{600 \times 200}{220}$  volts be-

tween outers with an input of 200 on the primary.

Remember the volts of D.C. derived after rectification are dependent upon the load that is used to light the rectifiers from the same transformer as that which supplies the H.T., and that therefore in reducing the input primary volts you reduce load amount and so raise volts a little (depending upon the amount of load); *but*, and this is important, you dull the filament of your rectifier by applying 2.0 times less volts.

The simple plan is to get a little transformer to raise your 200 volts to 220 volts, and then you will know just where you are.

## "POSHING" THE PANEL



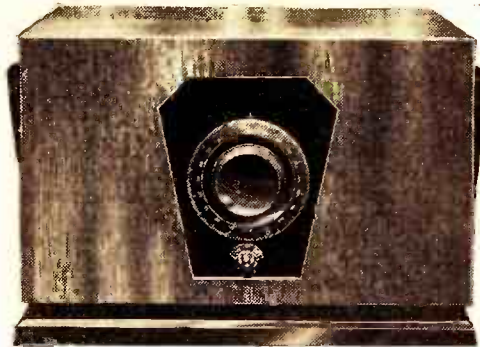
Just a little oil and a light rub will restore that nice lustre once again.



# BUILD YOUR "POP-VOX" WITH A READY RADIO GUARANTEED KIT

## THE "P.W." "POP-VOX"

	£	s.	d.
1 Ebonite panel, 8×6× $\frac{1}{16}$ ins. drilled to specification		2	6
1 Cabinet and baseboard to specification	1	5	0
1 Cyldon 0005-mfd. Extenser condenser		15	0
1 ReadiRad Star Turn Selector coil		12	6
1 ReadiRad 00015-mfd. Differential reaction condenser		5	0
2 ReadiRad Coils, long and short wave		8	6
3 Telsen valve holders		3	0
1 Telsen L.F. Transformer, "Radiogrand" ratio 5-1.		12	6
1 Igranic L.F. Choke, "Midget" type		10	6
1 Varley 100,000-ohm resistance and holder		7	0
1 ReadiRad 1-megohm Grid Leak and holder		1	4
1 ReadiRad 2-megohm Grid Leak and holder		1	4
1 ReadiRad 0003-mfd. fixed condenser		10	
1 T.C.C. 01-mfd. fixed condenser		2	6
2 T.C.C. 2-mfd. fixed condensers		7	8
1 ReadiRad 10,000-ohm Link resistance		1	3
1 ReadiRad 25,000-ohm Link resistance		1	6
2 Junit terminal blocks		1	4
4 Belling-Lee "R" Terminals		1	0
1 ReadiRad L.T. switch		10	
1 Packet ReadiRad "Jiffilix" for wiring		2	6
3 Valves to specification, Det., L.F. and Power	1	7	6
Screws, flex, H.T. and G.B. wander plugs, spades, etc.		1	5
<b>Total (including Valves and Cabinet)</b>	<b>£7</b>	<b>12</b>	<b>6</b>



## THE "P.W." "POP-VOX"

Completely assembled with valves and cabinet, ready for use and aerial tested.

**PRICE (including royalties) £9 : 5 : 0**  
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**CASH, C.O.D.**  
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(with valves and cabinet) **£5 : 0 : 0**  
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(with valves less cabinet) **£6 : 7 : 6**  
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## KIT C

(With valves and cabinet) **£7 : 12 : 6**  
or twelve equalmonthly instalments of 14/-

### Recommended

#### Accessories:—

1 Fuller "Sparta" 120-volt H.T. battery	-	-	15	10	
1 Fuller "Sparta" S.IV.X.2			11	0	
1 Fuller "Sparta" 9-volt G.B. Battery	-	-	1	6	
1 Amplion Cone Loud Speaker, A.C.21	-	-	1	18	6

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To  
READY RADIO (R.R. Ltd.), 159, Borough High Street, London Bridge, S.E. 1.

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**C.O.D. ORDER FORM.** Please despatch to me at once the goods specified for which I will pay in full the sum of £.....

**HIRE PURCHASE ORDER FORM.** Please despatch my Hire Purchase order for the goods specified for which I enclose first deposit of £.....

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# STATIONS WORTH HEARING

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

By R. W. H.

SO far as it has gone, this summer has turned out to be one of the worst as regards atmospheric conditions that we have had for a good many years. This is curious, since long periods of atmospheric conditions are generally associated with violent sunspot outbreaks, and sunspots are at present declining both in size and number.

To give an example, though, of the recent prevalence of atmospheric conditions, my record shows that of the first eight days in May five were classed as "atmosphericky." Since then things show signs of improvement and I have hopes that we are approaching a more settled period for wireless reception.

## Long-Wave Interference.

The worst of it is that atmospheric conditions, when about, are always at their worst on the long waves and the long wave-band contains some of the best summer-time stations. Luckily it is only at certain times, during the day that atmospheric conditions are troublesome as a rule, so that one can usually manage to obtain entertainment from long-wave foreigners during periods of peacefulness.

And aren't the long-wave stations coming in well at present? Even on a four-valve portable I can obtain reception at

full loud-speaker strength at any time from eight of them, and I could also bring in Moscow, though one can rarely describe his programme as entertainment—except when he is unconsciously funny.

The seven top-notchers are Huiizen, Radio-Paris, Zeesen, the Eiffel Tower, Warsaw, Motala, Kalundborg and Oslo.

## Tracking the 'Planes.

There is another form of daylight reception which readers, whose sets will tune down to 900 metres, will find extraordinarily interesting. This is to pick up the air stations which work on this wavelength. Almost any set will bring in Croydon at pretty long range, and if you have respectable H.F. amplification you will be able to hear Le Bourget, St. Inglevert, and a whole host of Continentals.

The real test of the sensitive set, though, is to pick up the reply from a pilot who has been called by one of the ground stations. Try it and see.

You can spend a very interesting time by tracing with a map the progress of a plane between Croydon and Paris or Amsterdam, for the ground stations always repeat the position reports as received from the pilot.

On the medium wave-band reception, apart from atmospheric conditions, continues to be extraordinarily good. On the evening before these notes were written, for example, I had full loud-speaker reception from twenty medium-wave stations on a four-valver using a simple indoor aerial. No one can say, then, that there are not plenty of alternative programmes awaiting the man who cares to indulge in wireless trips abroad.

## Some Summer Stand-Bys.

To come to details, stations at the very top of the band, including Budapest, Munich and Vienna, are not quite up to form and one notices a good deal of spark interference. Immediately below these, though, we come to a most excellent station in the shape of Brussels No. 1.

He is always to be relied upon in the evening and he will often provide first-rate loud-speaker reception, even in the early afternoon. Milan is also a good station, though not, perhaps, quite so reliable.

Langenberg is always there, unless he happens to be interfered with, and Rome is going to be one of our summer stand-bys. Stockholm seems to have lost some of his strength and only on certain good evenings does he come in really well.

## Stations Galore!

You will find Sottens about as good a station as you could desire. In fact, you may find that he blots out his next-door neighbour, Katowice, unless your set is more than ordinarily selective. Frankfurt has been rather badly sparked, but Toulouse is generally a good transmission.

Lwow is a little below form at the moment, but Hamburg is generally good. Others worth your attention are Strasbourg, Breslau and Brussels No. 2.

THE correspondence concerning the youngest reader of these notes appears to have abated for a while. "C. A. S.," of Southampton, age 16, was the "holder," but was challenged by "D. E. B.," of Edgware, aged 14.

We now have "prior claims" by the following: "J. P. S.," Glasgow, 15; "G. A.," Mill Hill, 15; "R. E. K.," Barnes, 15; "L. R.," Colwyn Bay, and "W. T.," Tottenham, both 16; and finally the undisputed champion, "L. F.," of Liverpool, aged 13.

## A Good Dodge.

It makes me quite nervous to appear each week before a tribunal of such enthusiasts as all these who have written and expressed their disapproval of being called "short-wave infants-in-arms"! Incidentally, the final holder of the title sends in a really good list of stations heard.

Yes, "L. F.," that ripple on going into reaction is annoying, but it can easily be cured. Try winding a piece of flex round the bulb of your detector valve about six times, and earthing one end of it. If that doesn't cure it, I can probably suggest something else.

Others might note this cure for ripple or hum caused by proximity to the mains, when on a battery-operated set.

Interest in the "H. A. C." is awakening, and two more claim to have Heard All Continents. They are "R. W. E.," of Putney, and "L. R.," of Colwyn Bay. Admitted.

## SHORT-WAVE NOTES

Here are some useful remarks on happenings down on the short-waves by W. L. S., a very well-known amateur transmitter and a leading expert on the subject.

Undoubtedly, however, conditions are very good just now, and the long-awaited event is just due, by which I mean the period over which all the West-Coast U.S.A. stations come across in the early morning on 20 metres.

Unfortunately, it may only happen on one morning out of three, so that one has to be either sleepless or very energetic to "bag" them every time. This morning was certainly very, very blank, and yet yesterday is reported as having been one of the best ever!

## Budding "Hams"!

My quotations from a letter from "J. K. H." a fortnight ago have brought forth further inquiries into the possibility of amateur transmission for those of limited means and space. There is far too much to be said on the subject to squeeze into one set of "notes," so that I will write up the whole business separately.

And now for a few words on the competition coming this week-end. Please log everything you hear between midnight on

Saturday and midnight on Sunday, and send in to me as much as you think interesting.

Remember that there are two classes, those who go for broadcast only, and those who take in the "hams" as well. The latter are only expected to send in the call and particulars of one "ham" from each country that they hear. From the others I want a full log of the broadcast stations, times, wave-lengths, type of programme, etc.

The results should make very interesting reading, if it is a good week-end. I have, however, every hope that it will be.

## A New Society.

Incidentally, I shall be "on the air" myself during Sunday morning, using telephony on about 42.25 metres.

South London readers of these notes, who do not already know about it, may be interested in the new society that has been formed under the title of the "South London and District Radio Transmitters' Society." The society has some thirty-five active members (all transmitters or very keen receiving stations), and meets on the first Thursday of every month. The annual subscription is 5s., and "Field Days" are to be held in addition to the usual meetings.

If anyone interested cares to write to me, I will put him in touch with the secretary (or the treasurer!).

And now I will leave you to put that final polish on the receiver for the week-end tests. May you figure high up in the list!



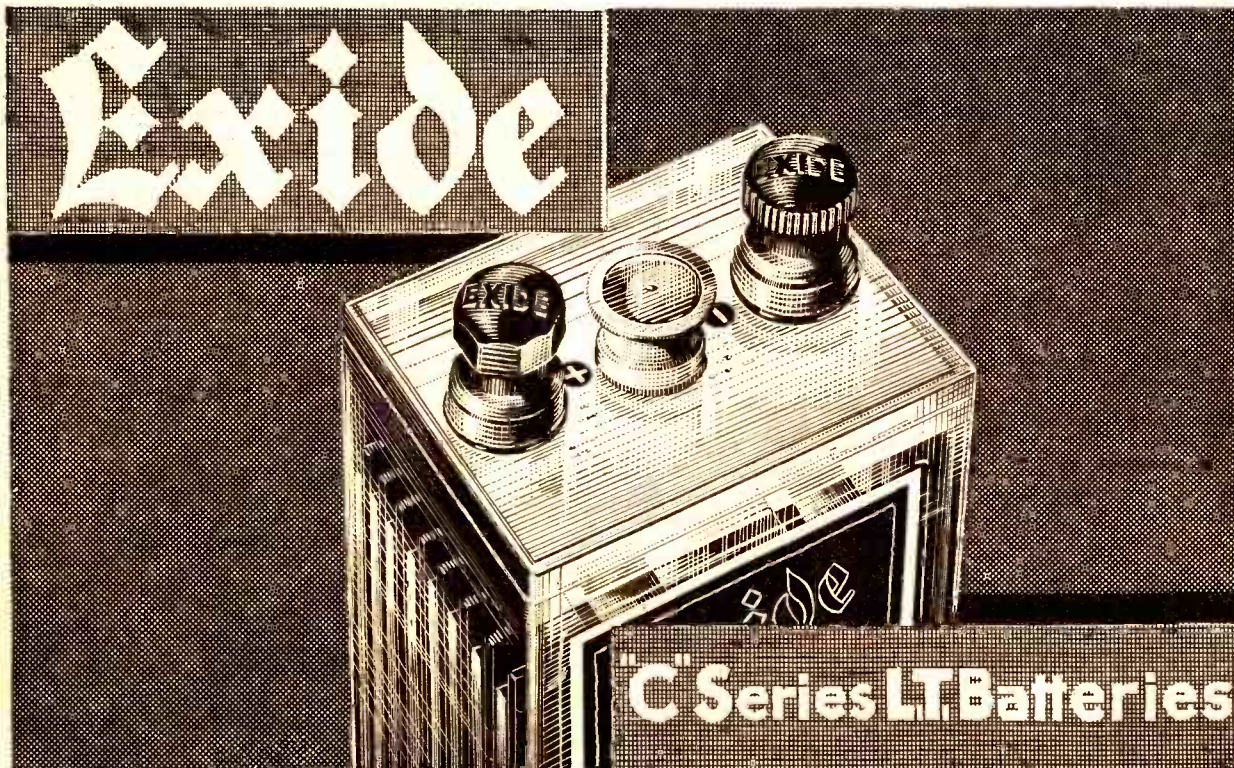
## The battery for big sets

If you have a set that drinks heavily from the low tension battery then let that battery be one of the Exide "C" Series. They are built for such sets. They supply the heavy demand easily without a grumble or a groan.

Like it in fact. For into them are built **Exide Long Life Plates**, world-famous for their strength and stamina. And many other improvements that give greater convenience and a longer life. For instance, **patented separators** that preserve the plates and prevent shorting.

Strong leak-proof celluloid or glass containers. Terminals, differently shaped and coloured, that can be distinguished even in dark corners.

With sets that need so much current you must be sure to take no risks. Insist every time on an Exide "C" Battery.



Prices per 2-volt cell : C.Z.2, 20 amp. hrs. 9/6 C.Z.4, 40 amp. hours 13/6 C.Z.6, 60 amp. hrs. 17/6 Other sizes up to 120 ampere hours. From Exide Service Stations or any reputable dealer. Exide Service Stations give service on every make of battery.

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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 page concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

## QUESTIONS AND ANSWERS

### HANDLING A NEW SET.

N. R. E. (Northampton).—"My set ought to be capable of bringing in lots of stations, according to other people's results. But when I try to tune-in it howls and whistles and makes such a noise that I am afraid to go on. It is deafening. Do you think there is anything wrong with it?"

Probably most of the trouble will disappear if the knob which is marked "Reaction" is turned anticlockwise, and kept set well back, instead of being advanced.

You appear to be handling the set with more ardour than knowledge—if you will forgive us saying so—and in this way you will not only fail to get full satisfaction from it, but your neighbour's reception also may be suffering.

This would be an offence against the terms of your licence, so we recommend you to get the B.B.C.'s booklet on "Oscillation," which is obtainable free on application to any B.B.C. station; and also to watch the tuning hints which appear from time to time in "P.W."

been received in connection with the recent reference to this topic in the Technical Notes by Dr. J. H. T. Roberts.

Many of these letters contain very helpful information. And one of them—from Mr. J. M. Sellors, a Purley reader of "P.W."—is so full of practical hints that we feel sure other readers will welcome this opportunity of reading it. He says:

"Referring to the notes on Screws in April 4th issue of 'P.W.,' it is quite unnecessary to go to the trouble of making up the messy mixture of plumbago and melted paraffin wax referred to, as 'Graphite Grease' can be obtained in convenient squeeze-out tubes for a few pence from any dealer in cycle or motor accessories. And it is excellent stuff to smear on screws to prevent them rusting and sticking in metal or wood.

"The dodge of loosening a badly rusted-in screw by applying a hot iron to its head, and so making it expand, is as old as the hills, and I have certainly employed it as occasion has arisen for over forty years! With reasonable care there is no need to char the surrounding wood, even if the screw head is only flush with, or slightly under, its surface.

"Another method of easing a rusted screw is to apply a few drops of paraffin or strong vinegar to its head and allow it some hours to soak down the screw. A second or third application may be necessary. Both paraffin and vinegar have uncanny penetrating properties, and have a knack of insinuating themselves into almost impenetrable crevices—sometimes where they are not wanted.

"Another method of dealing with a really hopeless screw, the slot in which is jagged out of all recognition by attempts to get it out, is to apply the point of a centre punch to the jagged slot at a point near the circumference of the screw head. By tapping the other end of the centre punch with a hammer the screw can generally be rotated and caused to rise sufficiently to be got hold of with pincers or pliers and so screwed out.

"In some cases where no purchase for the punch point can be obtained on the screw slot it is necessary to drill a small recess in the screw head. A pointed cold chisel or any

piece of suitably shaped steel may be used instead of a centre punch. The jarring action on the screw caused by hitting the centre punch has a much more potent effect in loosening the screw than the steady pressure applied by a screwdriver."

### SIMPLE SWITCHING WITH X COILS.

D. R. H. (London; N.).—"Having all the necessary parts left over and in good working order, I have decided to make up a detector and two low-frequency stages, using plug-in coils and a throw-over double-pole double-throw switch for changing from long to short wave-lengths.

"I have seen this done with plug-in coils in 'P.W.' by means of placing the reaction coil half-way between the other two coils. The D.P. D.T. switch then throws the tuning condenser to either the long- or the short-wave coils and at the same time alters the aerial coupling as well. But my efforts to work

## "WHY DOES IT CRACKLE TO-DAY?"

Perhaps the switching doesn't work properly? Or some mysterious noise has appeared and is spoiling your radio reception?—Or one of the batteries seems to run down much faster than formerly?

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

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

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

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

this out for myself have been unsuccessful and I should be glad if you could give the wiring in words."

The switching is really quite easy, and usually the most difficult thing about this scheme is to find the most suitable coil numbers. Normally a No. 100 coil for reaction is O.K., the X coils being a 60 for the lower wave and a 250 for the higher band.

It will not do, however, merely to place them side by side, but correct positions will have to be chosen, and this is the most troublesome part of the procedure.

Once spaced correctly the coil holders can be screwed down, and all that has to be done is to operate the switch for long or short waves as required. The switch connections will be as follows.

The lead from the aerial (or from the retractor if one is used) goes to one of the centre contacts on the double-pole double-throw switch. The other centre contact on this switch goes to the tuning condenser and to the grid condenser.

One side of the coil holders and the moving vanes of the tuning condenser will all be joined to earth as usual. The other side of the long-wave coil holder should be joined to one of the outer contacts on the switch which joins that centre contact which is connected to the tuning and the grid condenser.

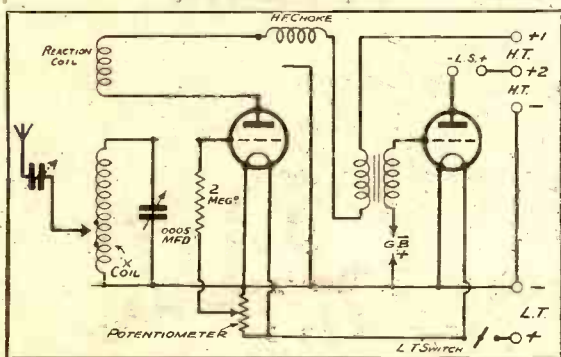
The other coil holder's external leads should be joined to the corresponding contact on the other side of the switch, so that in the one position the tuning condenser, etc., is joined to one end of the long-wave coil and when the switch is thrown over it is joined to the other coil.

Now connect the two coils' tapping points by flexible leads to their respective outer terminals on the switch, and you will see that when this tuning condenser is thrown over to long-waves the aerial is at the same time joined to the long-wave tapping. By throwing the switch over, the aerial is taken to the tapping on the long-wave coil at the same time as the tuning condenser and grid condenser are joined to the end of it.

The actual wiring and operation are very easy, but as previously stated, you must get the coils in their correct relative positions so that the single reaction coil works for both long and ordinary waves, without any tendency to instability.

(Continued on page 358.)

## MISSING LINKS—No. 8. A SIMPLE DET., L.F.



Here is a simple but not very selective circuit for use in districts which are not near to a powerful station. Two of the "components" have been omitted. Can you insert them correctly? Look out for the answering diagram next week.

### SCREWS THAT WILL NOT COME OUT.

The question of screws that refuse to budge when an attempt is made to undo them seems to have excited considerable interest, and a number of letters have



# The P.W. "POP VOX"

**MAZDA  
P.240**

**POWER**  
The "Pop Vox" is exceptionally powerful & will give a number of programmes at first-class loud-speaker strength.

**PRICE 13/6**

**MAZDA  
L.210**

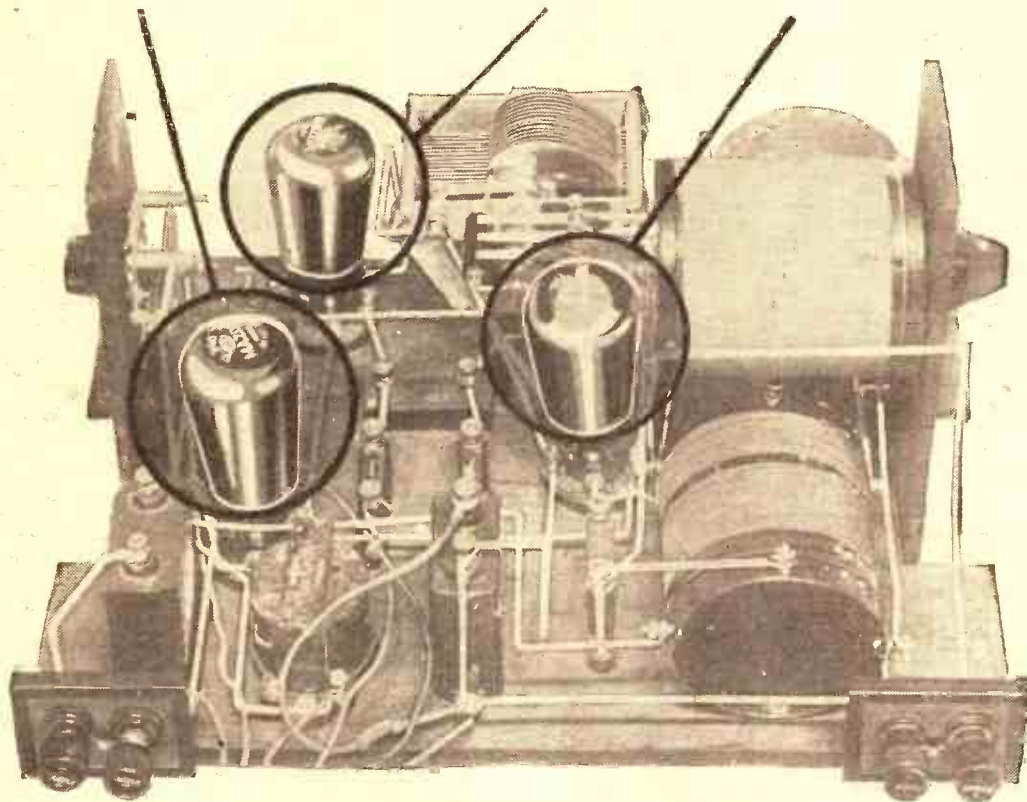
**AMPLIFICATION**  
Complete stability together with high over-all amplification have been achieved by careful selection.

**PRICE 8/6**

**MAZDA  
H.L.210**

**SELECTIVITY**  
Absolutely the maximum obtainable without resource to intricate H.F. stages, multiple tuned circuits, ganging, etc.

**PRICE 8/6**



**MAKE SURE OF THE BEST RESULTS—  
USE THE AMAZING**

# **MAZDA** **THE** **BRITISH** **VALVES**



**THE EDISON SWAN ELECTRIC CO. LTD.**  
*Incorporating the Wiring Supplies, Lighting Engineering  
and Radio Business of the British Thomson-Houston Co. Ltd.*  
Radio Division:  
155 Charing Cross Road, London, W.C.2  
Showrooms in all the Principal Towns

# **EDISWAN**



## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 356.)

### TABLOID REPLIES.

M. J. R. (W.14).—The "Comets" will work from a frame without any alteration at all. (But, of course, a frame is always a poor affair compared to a bigger aerial.)

"PORTABLE SOON."—And don't forget that the "Pop-Vox" is very hot indeed—would do splendidly on an indoor aerial.

J. H. D. (Durham).—Hope to give details next week—very soon, anyhow.

E. T. L. (Cambridge).—No, of course not. We do not do that kind of thing. If you were serious in suggesting it "P.W." is ashamed of you!

"TANNY" (Southwold).—We'll try, but it's going to be a needle-in-the-haystack business, isn't it?

R. B. (Atherton).—Not before September.

"L. L. L." (Reading).—That's what we said.

G. S.—It's a risk; we prefer a good differential.

"NULLA" (Chester).—"Never"? Why, it was in World's Programmes ("M.W.") last month! (Thanks for your P.S.—very gratifying.)

C. B. W. (Norfolk).—But what would Jack Payne have said? Glad you made a "Clear-Cut," anyway.

"ARTHUR."—"Pop-Vox" is the very thing.

### "P.W." BOOKLETS.

F. L. W. (Cheltenham).—"I borrowed a copy of your Thousand and One Radio Hints and Tips from a friend, who tells me that there are other booklets issued by 'P.W.' which

### WHEN WRITING TO US

will readers please note that all Technical Queries, Orders for Back Numbers and Orders for Blue Prints should be addressed to The Fleetway House, Farringdon St., E.C.4, and not to Tallis House.

can be obtained for a few pence. Are they of a similar handy nature? And if so, how much?"

Three other booklets are now available upon application to The Amalgamated Press, Ltd., Back Number Department, Bear Alley, Farringdon Street, London, E.C.4. The price is 7d. each, post free and they deal with the following subjects.

Firstly there is "Fifty Guaranteed Circuits." This is a comprehensive selection of tested circuits of all types of modern radio receiving apparatus for home use.

"Fifty More Guaranteed Circuits." This is a further selection of specially selected circuits covering a wide range of radio receivers, mains units, etc.

### "P.W." PANELS, No. 20.—ULTRA-SHORT WAVES.

No hard and fast rule exists as to which waves are "ultra" short, but the term is generally used for anything below ten metres.

One advantage of using such a very short wave-length is that a suitable "reflector" can be erected with comparative ease, enabling the transmission to be directional.

Just as the short waves below 100 metres behave quite differently from those used for ordinary broadcasting, so ultra-short waves differ entirely from the short waves.

"How to Make Your Own Components and Accessories." The title of this is self-explanatory, and it is a little handbook which every home constructor should have.

### "EXTENSERISING" THE "COMET" TWO.

"JASON" (Bath).—"Can the 'Comet' Two be 'Extenserised' by simply taking out the tuning condenser and wave-change switch and fitting an Extenser instead?"

Yes. That's it—you've got the idea exactly. The "Comet" Two can be converted at once by transferring the tuning condenser and wave-change switch wiring to the Extenser, which replaces the ordinary variable condenser.

Just treat the three contacts on the Extenser's self-changer as though they were the three contacts of the wave-change switch, and then turning the Extenser's dial will automatically tune over both long and medium waves. You can fix the dial so that all long-wave stations are three-figure readings (over 100), and all medium-wave stations come in with readings below 100.

Don't forget that all switch wiring should be short, but well spaced. That is important if best results are to be obtained.

### AUTOMATIC GRID BIAS.

M. O. C. (Northallerton).—"What is the straight tip about this automatic grid bias? Is it better than a battery in any way?"

"It seems simple enough to insert a resistance, but surely there is a snag in it somewhere, or there would be no more G.B."

(Continued on page 363.)

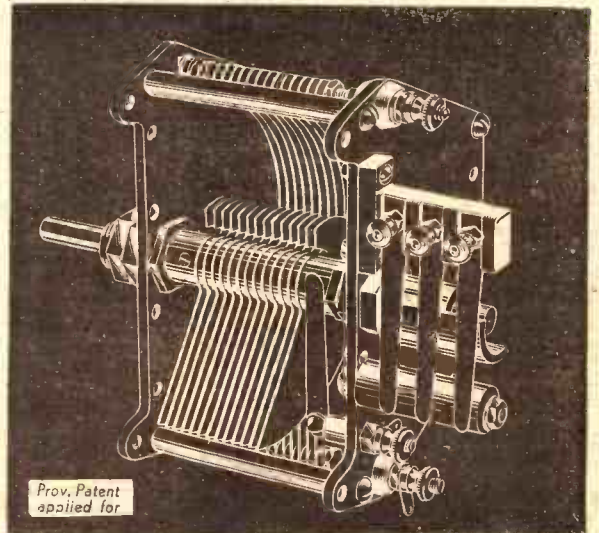
# "POP VOX"

## NEW ERA IN RADIO BEGINS

These are the reasons why your choice of Extenser Condenser is unquestionably—CYLDON

- 1 Sturdy construction, a standard CYLDON feature, and more essential with the Extenser type than others.
- 2 Any number of CYLDON Extensers may be ganged end on end or side by side if desired.
- 3 Solid end plates give highly effective screening with mounting for additional screening.
- 4 Absolute foolproof and exclusive commutator contact system providing the very necessary adjustment for correctly timed change over from short to long waves, eliminating overlap or time lag.
- 5 Reinforced one-hole fixing bearing design makes loosening of bearings impossible by turning on the panel.
- 6 Six point insulation suspension.
- 7 Four pillar frame construction gives absolute rigidity.
- 8 Brush wipe contact superseding pig-tail gives complete rotation through 360° in either direction.
- 9 Finally, the CYLDON Extenser is backed up by the famous CYLDON quality and name.

CYLDON is specified for the "POP VOX"—don't substitute



From all dealers in the country. In case of difficulty send direct to the makers

SYDNEY S. BIRD & SONS LTD.  
CYLDON WORKS,  
SARNESFIELD ROAD,  
ENFIELD, MIDDLESEX

Telephone: Enfield 2071-2

# CYLDON

## FIVE YEARS GUARANTEE

# 15/-

4-in. Bakelite 360°  
dial 2/- extra

S.F.9



# PILOT KITS

CREATE NEW RADIO FASHION



Designer of "POP VOX" CABINET.

Who is he?

The designer of  
"POP VOX" Cabinet  
behind  
PILOT KIT  
Organisation



POPULAR WIRELESS says:—

"WE secured the co-operation of one of our trade friends with the happy result that an inexpensive and artistic cabinet design in keeping with the new ideals was evolved. Actually the price of the 'Pop Vox' Cabinet is approximately the same as for an equivalent cabinet of 'straight' form." "I think you will agree the 'Pop Vox' is far handsomer than many expensive commercial receivers." (May 9th. & 16th.)

HANDSOME OAK CABINET, specially designed and made by Peto-Scott as illustrated and specified; featuring new inset side controls, side wings and plinth in ebonised wood. All hand polished.

**19/6** SPECIAL CHASSIS Baseboard as specified with ebonised side pieces to carry selector coil and differential condenser and 2 angle brackets for fixing 4/6. **25/-** COMPLETE WITH CHASSIS ONLY

POPULAR ACCESSORIES

C.O.D. CASH OR H.P.  
ATLAS A.C. ELIMINATOR TYPE A.C.244 3 tappings—S.G. detector, power. Output 120 volts at 20 m.a. Cash Price £2 19 6  
Balance in 11 monthly payments of 5/6  
REGENTONE MODEL W.I.F. for A.C. MAINS. Three fixed tappings, S.G. Det. and power output 110-120v. at 12/15 m.a. Cash Price £2 7 6  
Balance in 11 monthly payments of 4/4  
BLUE SPOT SPEAKER UNIT, Type 661R. 4 pole balanced armature with Major Chassis and Cone (37 cm.). Cash Price or C.O.D. £2 10 0  
Balance in 5 monthly payments of 8/5  
EXIDE 120-VOLT W.H. TYPE ACCUMULATOR, in crates. Cash Price £4 13 0  
Balance in 11 monthly payments of 8/6  
LAMPLUGH or FARRAND INDUCTOR SPEAKER, for perfect reproduction. Unit and chassis complete, ready mounted. Cash Price £3 10 0  
Balance in 11 monthly payments of 6/5

## KIT "A" £4-8-0

CASH or C.O.D.—You Pay the Postman. Or 12 monthly payments of 8/1. As above, and including valver, cabinet and chassis

1 Panel, 6" x 8", drilled to specification (Peto-Scott)	2 0 6
1 '0005 Cydon "Extenser" with dial	17 0 0
1 Star-Turn Selector Coil (Keystone)	12 6 0
1 '00013-mfd. Differential Condenser (Keystone)	3 6 6
1 Pair long- and short-wave coils	8 6 6
1 L.F. transformer (R.T. Hypermite)	10 6 6
1 Output choke (Iganale Midger)	10 6 6
1 100,000-ohms anode resistance and holder (Ferranti)	2 0 0
2 Grid leaks and holders; 1 1-meg.; 1 2-meg. (Telsen)	3 0 0
1 '0005-mfd. fixed condenser (Telsen)	1 0 0
1 '01-mfd. fixed condenser (T.C.C.)	1 9 0
2 2-mfd. fixed condensers (Franklin)	6 0 0
3 Spaghetti resistances: 1 10,000-ohm; 2 25,000-ohm (Lewco)	4 6 8
2 Terminal blocks (Peto-Scott)	1 0 0
4 Terminals (Belling-Lee)	1 0 0
6 H.T. & G.B. plugs (Belling-Lee)	1 3 6
2 L.T. Spade terminals (Peto-Scott)	1 6 4
C.O.D. Pay the Postman.	£4 8 0
Any parts separately. If value over 10/- sent C.O.D.	
3 Mullard valves, as specified	£1-7-8.

## "POP VOX" FINISHED INSTRUMENT

Complete with valves and Peto-Scott cabinet. Aerial tested. £9-0-0 or 40/- deposit and 11 monthly payments of 12/10

## "POP VOX" C.O.D. LINES

PAY THE POSTMAN—We Pay the Charges  
2 3" x 3" Pirtoid formers. 3 ozs. 24-D.S.C. and 2 ozs. 30-D.S.C. Pay the Postman. 5/-  
2 Ready-wound "Pop Vox" coils Pay the Postman. 8/6  
Extenser condenser and dial Pay the Postman. 17/-  
Star-Turn Selector Coil Pay the Postman. 12/6  
Cabinet and chassis Pay the Postman. 25/-  
Kraft paper for Clear-out Speakers Pay the Postman. 1/6

**C.O.D.**

PAY THE POSTMAN—it costs no more—WE PAY ALL CHARGES on orders over 10/-

**CASH**

WITH ORDER CARRIAGE PAID

**H.P.**

Strict Privacy to all Easy Payment Orders

## "COMET 3" Foundation Circuit ... STILL A FAVOURITE

KIT "A" (less valves and cabinet) £4-0-0 C.O.D. or CASH with ORDER or 12 monthly payments of 7/4.

KIT "B" (with valves). C.O.D. or cash, £5-7-8, or 12 monthly payments of 9/10.

KIT "C" (with valves and cabinet). C.O.D. or cash, £6-7-8, or 12 monthly payments of 11/8. Any parts supplied separately.

For full details of complete comet range see our previous advertisements in P.W.

FINISHED INSTRUMENT

## FLEXI-COUPLED "COMET 3"

Complete Kit "A" £4-16-6 or 12 monthly payments of 8/10.

KIT "B" (with valves). C.O.D. or cash, £6-4-0, or 12 monthly payments of 11/5.

KIT "C" (with valves and cabinet). C.O.D. or cash, £7-4-0, or 12 monthly payments of 13/3. If value over 10/-, sent C.O.D.

Ready built, exactly as specified, French polished Oak Cabinet, aerial tested and fitted with valves. Foundation Circuit £7-15-0 or 12 monthly payments of 14/3.

## EXPRESS ORDER FORM

To PETO-SCOTT CO. LTD.

Please send me C.O.D./CASH/H.P.

for which I enclose Cash H.P. Deposit £ s. d.

Name.....

Address.....

# PETO-SCOTT CO. LTD.

77, CITY ROAD, LONDON, E.C.1. Clerkenwell 9406. 62, HIGH HOLBORN, LONDON, W.C.1. Chancery 8266. Manchester: 33, Whitlow Road, Chorlton-Cum-Hardy. Phone: Chorlton-Cum-Hardy 2028. Newcastle, Staffs.: 7, Albany Road. Phone: 67190.



## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 358.)

batteries in use. What is the real difference between the two methods?

The object of the two methods is one and the same—that is to keep the grid at a negative potential with respect to the filament. When a battery is used for this purpose it needs to be looked after occasionally, as failure to keep the bias correct on an amplifier valve, or especially a power valve, will have a serious effect upon the life of that valve.

One of the advantages of automatic grid bias is that the plate current itself is utilised to give the negative bias to the grid, and thus whenever the plate current is flowing there is certain to be a negative potential available. Moreover, if by accident the plate current should be increased by excessive voltage, the grid bias will also be increased.

This is an advantage as compared with a battery, that can give only definite negative bias.

The disadvantage of automatic grid bias obtained by means of a series resistance in the plate circuit is that the high value of the resistance introduces coupling effects which are not found with a battery, and which have to be compensated for by shunt condensers, etc.; also the voltage drop along the resistance is lost so far as the filament-plate potential is concerned. Therefore automatic grid bias is most generally used in mains sets where the provision of a high voltage offers no difficulty. In fact, it may be said as a generality that a grid-bias battery is better when high-tension batteries are used, and automatic grid bias is better for mains sets. Of course, this is liable to modification in particular instances, and as stated previously, the object of the two methods is the same, the only difference being in the relative convenience of attaining this object.

### AN ADVERTISER'S CORRECTION.

Messrs. Peto-Scott Co. Ltd. inform us that in their advertisement in our last issue, the Kit "A" price for the "POP-VOX" should have read "Cash Price £4 8s. 0d. — or 12 monthly payments of 8s. 1d." In the detailed list of parts, the price of the Igranic Midget Output Choke should have read as 10s. 6d.

## FOR THE LISTENER

(Continued from page 340.)

I did, not because he was asked to, but because he wished to. He gave his reasons. Among them was this one.

He felt that the situation was beginning to make him a "trimmer." The B.B.C. censorship is perfectly justifiable, and it is most courteously exercised, but the effect of it is to require a toning-down, sometimes a suppression, of personal opinions and convictions when they reach that rough-edged point at which listeners find them rather hard to bear.

You are therefore required to become less and less yourself, and, in time, this becomes intolerable.

Personally I am sorry that Nicolson has gone. He has an amusing, original, and a provoking mind. I am among those who like being provoked.

### A Live Man.

Not too often, of course, but occasionally. Irritation enlivens me. It does me good. I am not such a fool as to think that my point of view is the only one, nor necessarily the best one. I am not going to give it up easily. I am ready to fight for it.

But I like the man who makes me think it out again, and more clearly. I like the man who shakes me a little, and so compels me to establish myself. Besides, one is always learning, and this makes the world so much more interesting.

There is so much in our programmes which is quite ordinary and usual. I do not mean dull, but unprovoking. They are good, plain, straightforward dishes.

For this reason one tires of them a little, as one tires of stewed prunes and rice pudding at a boarding house. One would like, for a change, an occasional dish with a sharper sauce.

And I should have thought that there would have been room in such programmes for at least one man who should be given a perfectly free hand, who should be allowed to express the whole of himself frankly and fully. A man who would stand in no fear of being rapped on the knuckles if he teased us and set us on edge now and again. How ever much you may disagree with him, there is nothing so interesting in all the world as a live man.

### Mr. Nicolson's Successor.

To ban controversial subjects entirely seems to me to be a mistake, both from the point of view of the speaker and from that of the audience. We want our speakers to be at their best, and a man cannot be at his best if he has to go gingerly, if he has always to be taking care where he steps.

This puts him out of his stride. High-spirited men, who are just the sort of men we want to hear, cannot stand it for long, so that in the long run we are left to the mercies of the half-and-halfers, the trimmers, those who do not feel strongly either way, because they have little personal power.

Moreover, it is bad for the audience. A healthy people loves controversy and thrives on it. Provided it is without bitterness, nothing so promotes intelligence and sharpens the wits.

I trust that a successor may be found for Mr. Nicolson, and that all to be required of him may be that he shall be sincere.



That reminds me, have a

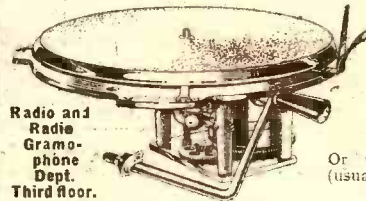
# PLAYER

The Quality and Quantity Cigarette

# WHITELEY'S

## Offer Powerful "COLLARO" Double Spring Motors

AT 30% REDUCTION



Particularly suitable for home Radio-Gramophone construction. Each one is absolutely brand new and is complete and ready for mounting. Plays two 12 in. records with one winding.

Or without plate and automatic stop (usually 33/-) Special Price **22/6**

Radio and Radio Gramophone Dept. Third floor.  
List Price **38/-**  
**WHITELEY'S SPECIAL PRICE,**  
complete as illustrated with unit plate and automatic stop. **26/6**

Sent Carriage Paid by goods trains in England, Scotland and Wales with Whiteley's assurance of complete satisfaction or money returned in full.

### Another Typical Whiteley Value.

## The Whiteley "X" 108-volt High-Tension Battery

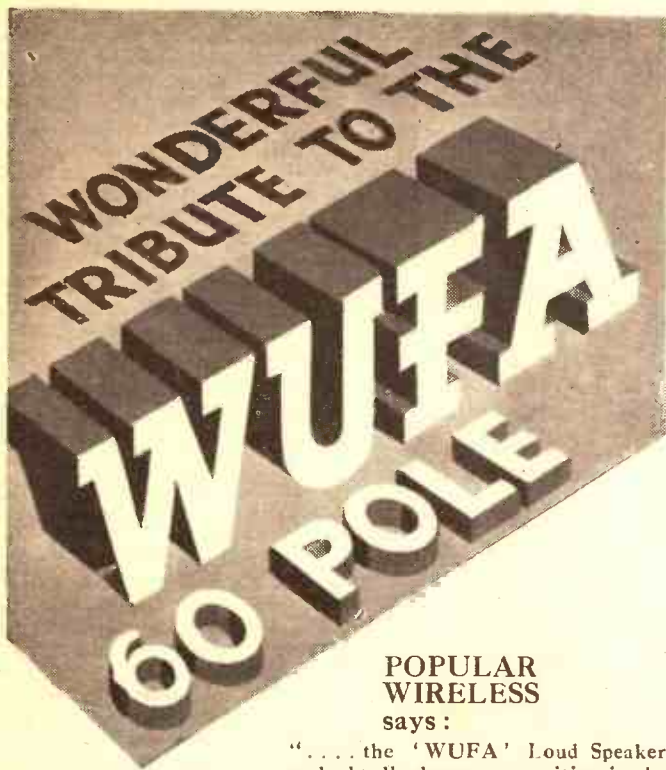


Specially made for Whiteley's by one of the largest and best-known British Battery manufacturers. It is equal in performance and efficiency to many batteries costing considerably more, and fits most well-known portable Receivers.

Each battery is carefully tested before despatch, and may be ordered by post with complete confidence. **8/9**  
Postage 1/3 extra on single batteries, in England, Scotland and Wales. If three or more are ordered we pay postage.

WM. WHITELEY, Ltd., Queen's Rd., London, W.2.  
Park 1234.





**POPULAR WIRELESS**  
says:

"... the 'WUFA' Loud Speaker undoubtedly deserves a position in the first three or four of the 'electromagnetics,' and not at the bottom of that enviable and leading class either. It is a Loud Speaker replete with 'attack' and with more bass than you would expect any 'electromagnetic' could possess."

"... I would advise all to make sure of hearing a 'WUFA' before arriving at a final decision."

"Amateur Wireless" says:  
"... the sensitivity being of a high order and the quality also above the average."

"Manchester Evening Chronicle" says:  
The adjustment by means of a double cam... enables the best results to be obtained from strong or weak signals... "Reproduction is of the very finest quality."

"Wireless Magazine" says:

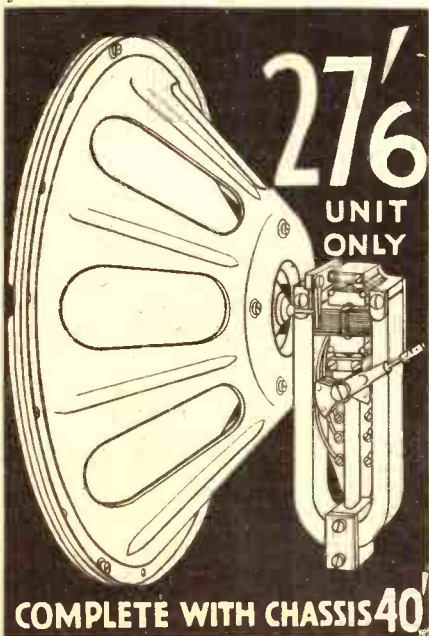
"Very sensitive unit... Even response... very high notes and all low notes being well handled. Thoroughly recommended; excellent value for money."

"Glasgow Weekly Herald" says:

"... Reproduction is practically that of a moving coil unit, except that the heavy drumming associated with the moving coil is absent. Tone is beautifully deep and round, and volume is immense... the amplification obtained when using this unit is nearly that of an added L.F. valve."

A Radio Society member said:

"At a test my 'WUFA' was found to be the winner out of 25 speakers of all makes, including two moving coil speakers."



**COMPLETE WITH CHASSIS 40**

Genuine WUFA's have RED magnets.  
Beware of Imitations.

ASK YOUR DEALER TO DEMONSTRATE.

**M. LICHTENBERG**

4, Great Queen Street, London, W.C.2.

**FOR BEST RESULTS**  
with the "P.W."  
**"POP-VOX"**  
use  
**"GOLSTONE"**  
**SPECIFIED**  
**COILS AND**  
**COMPONENTS**



**GOLSTONE**

**STAR TURN**  
**SELECTOR COIL**

"GOLSTONE"  
"P.W." & "M.W."  
DUAL RANGE  
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Specified and  
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DW/12. 10/6

Built to exact specification, with Engraved Dial. One Hole Fixing. For Flexi-Coupling and other Circuits. Laboratory Tested to give highest possible efficiency. No. R8/106... **10/6**



From all First-class Radio Stores. Refuse substitutes. If any difficulty write direct. Large illustrated Radio Catalogue FREE on request.

**WHY NOT BUILD**  
**A PORTABLE?**

In the JUNE Issue of "WIRELESS CONSTRUCTOR" there are full details of

**THE "VI-KING" PORTABLE**

which was designed and is described by Victor King. It is a magnificent instrument well within the reach of all constructors and capable of giving you many alternative programmes wherever you may be.

This June "Wireless Constructor" also contains a score or more of other fine features and constitutes one of the brightest and best numbers of this popular journal that has ever been produced. Listeners, constructors and experimenters will all find it of intense interest and value.

**THE "WIRELESS CONSTRUCTOR"**

Now On Sale Everywhere. Price Six Pence.



**2XAF, PCJ, 5 SW, ROME, NEW YORK, AMATEURS, Etc. AMAZING NEW S.R.S. ULTRA SHORT WAVE ADAPTOR.**

**BRINGS SHORT WAVE RECEPTION WITHIN THE REACH OF ALL SETS—BATTERY, OR ALL ELECTRIC.**

No alterations of any description Just plug into your detector valve holder.

**NOTE THIS SPECIFICATION :**  
All stations 10 to 100 Metres without Coil changing. Double-spaced tuning condensers, with internal pigtail, absolutely noiseless. All working parts totally enclosed. No hand capacity, dead smooth reaction.

**NOTE THE GUARANTEE :**  
This short wave adaptor is fully Guaranteed to convert any Battery, All-Electric, or Portable Set instantly to short wave reception without alterations of any description or any extra components being necessary. Moreover such is its sensitivity that any 2-valve set will give loud-speaker results.

Incorporates the World-famous S.R.S.

**PATENT ULTRA SHORT WAVE UNIT**

And look at the Price **18/6** Postage 9d. ex. (Please state if set is All Electric.)

Now why miss the fine stations daily working on short waves and receivable at loud-speaker strength in daylight on 2 valves?

**EARLY APPLICATION ADVISABLE.**  
Send for Leaflets and Testimonials.

**STONEHOUSE RADIO SUPPLIES,**  
54, Union Street, Plymouth, Devon  
(Phone : 2496.)

**WATCH** S.R.S. FOR STARTLING SHORT WAVE DEVELOPMENTS. THIS IS THE FIRST.

**EASY PAYMENTS**

The first firm to supply Wireless parts on easy payments. Five years advertiser in "Popular Wireless." Thousands of satisfied customers. Send us a list of the parts you require, and the payments that will suit your convenience, and we will send you a definite quotation. Anything wireless.

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Phone : Museum 1414. Gt. Portland St., W.1

**EXACT TUNERS**

250 to 2,000 metres  
Thousands of these tuners are in use, and we can strongly recommend them. No further coils are required. Send P.O. for particulars and circuits—FREE.

**THE EXACT MANUFACTURING CO.,**  
Croft Works, Priory Street, Coventry.

THE PICTURE PAPER WITH THE MOST NEWS

**SUNDAY GRAPHIC**

**MAKE YOUR RADIO ALL-ELECTRIC**

for **9/2** and 11 payments of 8/8, or Cash £4:15:0

**MAINS UNIT, Type C.B.1**  
(Westinghouse)

**H.T., G.B., and L.T.**  
IN ONE COMPLETE UNIT

1-7, DALTON STREET. **TANNOY** West Norwood S.E.27.  
PRODUCTS

**NO MORE BATTERIES NO MORE BATTERIES**

**TECHNICAL NOTES**  
By Dr. J. H. T. ROBERTS, F.Inst.P.

The "Green Spot" Again.

SINCE I mentioned in these Notes a little time back the mysterious "green spot" which sometimes indicates the position of a breakdown in a coil or transformer, I have received quite a number of letters from different readers, showing that this trouble is much more common than I first imagined.

A Reader's Experience.

One reader says: "I was extremely interested in the point you mentioned relating to coils and transformers, as I have had a great deal of trouble with a pair of home-made dual-wave transformers due to breakdown in the wire from time to time which is caused by the mysterious 'green spotting' you mention. This first evidenced itself in my coil some time ago, the finer double silk-covered wire on the primaries being chiefly affected.

"I attributed it at first to acid fumes from my H.T. and L.T. accumulators located under the set, but although I went to a lot of trouble to exclude these fumes, the green spotting continued. Since then I have tried: (1) covering the windings with insulating tape; (2) coating with shellac varnish; (3) coating with cellulose lacquer.

"The first remedy did not prevent the spotting, but the second and third did prevent it to a large extent; when it did occur it was on the under sides of the windings, that is, in contact with the formers, which are of paxolin. I have now rewound the coils with enamelled wire, which seems to be immune from the trouble."

Silk Covering.

My correspondent continues: "I think that the trouble lies in the material of the formers are made, or the varnish with which they are covered, and not in the wire, and that covered wire accelerates the action on account of the covering absorbing moisture from the air either before or after winding. I shall be interested to learn, by way of your Notes and as the result of any correspondence you receive, whether this trouble occurs with coils wound on ebonite or similar formers."

Several other letters are more or less on the same lines, one writer (in the silk industry) suggesting that perhaps the trouble is due to the acid used in dyeing the silk. Apparently certain users of silk for insulation insist upon the silk being dyed without acid.

I have been to some little trouble to give the experiences of these correspondents because, as I say, this trouble is evidently fairly widespread, and I hope the above Notes may prove of service to other readers.

Anode-Current Characteristics.

Newcomers to radio often imagine that the current in the anode circuit of a valve is alternating current, or has an alternating-current component. This belief, no doubt, arises owing to the fact that the anode current, when the set is in operation, is able to actuate a device such as a transformer, which one normally associates with alternating-current operation.

As a matter of fact, in the absence of signals (and assuming that the circuit is not oscillating, of course) the anode current should flow steadily from the filament to the anode—speaking of the current in the real or electron sense.

When signals are being received, however, the "resistance" of the valve is of a fluctuating character, due to the fluctuating voltages applied to the grid, and in these conditions corresponding fluctuations are communicated to the anode current. It is, in fact, these fluctuations which, when impressed upon the loud-speaker, reproduce the speech characteristics.

Another way of looking at this matter is to say that the anode current rises and falls in value, but the "mean line" about which it varies is not the line representing zero current strength. True alternating current varies about the zero line, so changing its direction.

True A.C.

You will see from this why it is that although the anode current is always in the one direction and therefore not true alternating current, it is nevertheless able to

**TECHNICAL TWISTERS**

**No. 62. ATMOSPHERICS. CAN YOU FILL IN THE MISSING LETTERS?**

"Atmospherics" is the name given to sounds caused by the irregular discharges of . . . . . gathered on clouds, etc.

Thus the crackles due to a faulty connection in a set are not really "atmospherics" at all, though often described as such.

True atmospherics can always be . . . . . when lightning is visible.

The electrical disturbance of a . . . . . flash can be heard for hundreds of miles, and there is often a faint background of such noises in summer-time.

Last week's missing words (in order) were: Wave-change. Above, Below. Switching. Different.

actuate a transformer. As I have mentioned before, you can feed into the primary of a transformer either alternating current, interrupted direct current, or fluctuating direct current (as a matter of fact, interrupted direct current is simply a particular case of fluctuating direct current, since at the interruptions the current fluctuates to zero value).

If current of a variable character is fed into the primary of the transformer, it naturally produces correspondingly varying current in the secondary, but in the latter case the current varies around zero value, so that we do actually get from the secondary of the transformer alternating current, although it may not be (and in the above-mentioned cases would not be) of regular sine-wave form.

(Continued on next page.)



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# TECHNICAL NOTES

(Continued from previous page.)

## The Exponential Horn.

The exponential horn does not seem to be so widely used with receiving sets as at one time seemed probable. No doubt this is due largely to its much greater size as compared with the compact and convenient cone speaker which is now so extremely popular.

In the cinematograph theatres the exponential horn speaker is largely used, however, owing to the fact that it helps to render speech clear and easily understandable. On the other hand, there is much to be said in professional talking-picture use for the cone speaker, since this distributes the sound more or less uniformly over a wide area.

It has been argued against the exponential horn—or any other horn for that matter—that in order to render the reproduction sufficiently loud for those people sitting in the back parts of the hall, the actual loudness of reproduction at the speaker itself has to be such that it becomes almost unbearable for those in the front.

## For Talkies.

For home use the ordinary cone type of reproducer has much to recommend it, since it is so compact and inexpensive and gives proper distribution of sound, whilst in the home the amplification used is so small—or perhaps I should say the actual loudness at the speaker itself is so small—compared with that in the loud-speakers used in talking picture cinemas that the question of clearness and intelligibility does not arise in the same way.

If there is any lack of clearness in the average home loud-speaker, it is almost invariably due to the radio set itself and does not depend on the difference between a cone and an exponential horn reproducer. In other words, an exponential horn for home use is more or less a refinement which many listeners do not find essential, since there are now upon the market so many really excellent examples of the cone type of reproducer.

## Transformer Overload

When choosing a transformer you should consider very carefully how it is going to perform when overloaded, as transformers so frequently are. With a power transformer the question of overloading is one of the most important and a generous safety allowance is made for heavy overloading for varying lengths of time.

In the case of transformers for radio work the question of overloading is equally important, although here we are not concerned with overheating or with breakdowns so much as with freedom from distortion.

(Continued on next page.)

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**TECHNICAL NOTES**

(Continued from previous page.)

There is a great tendency amongst a section of radio experimenters to go in for fairly high-ratio transformers, say 5 to 1 or 6 to 1, and so on, no doubt in the belief that greater overall magnification is obtained in this way. As a matter of fact, the liability to distortion, when overloading takes place, is as a rule much greater with a coupling transformers having a ratio of, say, 6 to 1 than with a smaller ratio transformer.

It has often been argued by experts that a ratio of 1 to 1 in intervalve transformers should be used specifically for the purpose of avoiding, or at any rate minimising, the distortion effects of overloading. I have discussed before in these Notes the question of transformer ratio and have shown that so far from gaining anything it is often definitely a disadvantage to use a high-ratio transformer instead of a low-ratio one.

It is curious, however, how many people still cling to the belief that there must necessarily be some special virtue in a high-ratio transformer.

**Microphonics.**

It is rather curious that after having made so much fuss about anti-microphonic valve holders we should now be returning very largely to the rigid type. It is not so long ago that nobody would have thought of constructing a receiver without using springy valve holders.

The change, of course, has been brought about by the very great improvements in the construction and robustness of the electrode systems in present-day valves, which have largely rendered springy valve holders unnecessary.

As a matter of fact, in some types of sprung holders the amount of free play allowed was excessive, and if the receiver were suddenly shifted about there was considerable danger of the valves themselves (if placed fairly close together) striking each other, with the possibility of broken filaments or even broken bulbs.

Again, sometimes the soldered connections to the sockets would become broken off and many an experimenter has been a long time looking over the usual sources of trouble before discovering that this was the real cause. Provided the valve itself is anti-microphonic it is in many ways an advantage to use an ordinary rigid holder.

**An Elusive Trouble.**

Talking about valves, although the valve pin seems such a comparatively unimportant detail, it is in reality nothing of the sort, and endless trouble is sometimes caused by valve pins making bad contact with the sockets. So if you have an elusive fault, inspect the valve pins.

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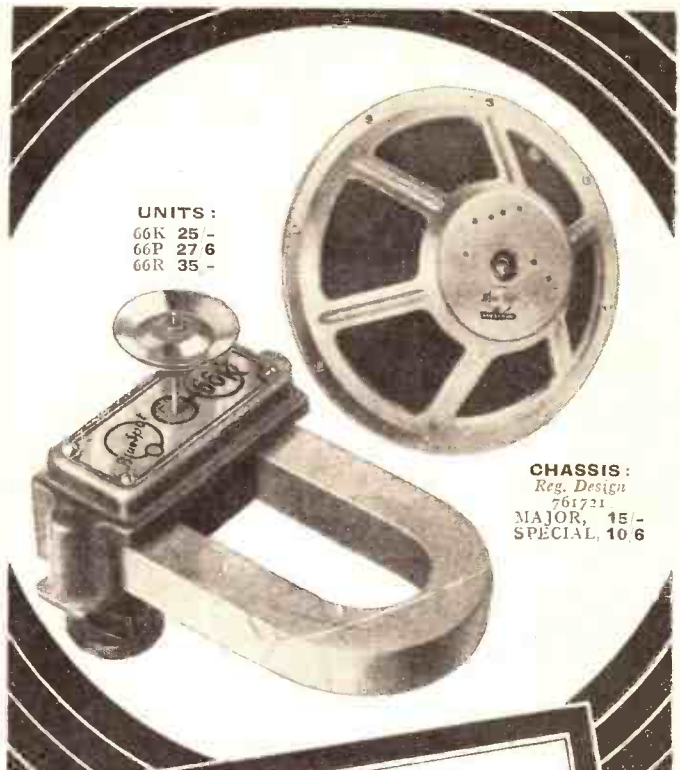
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