

#443

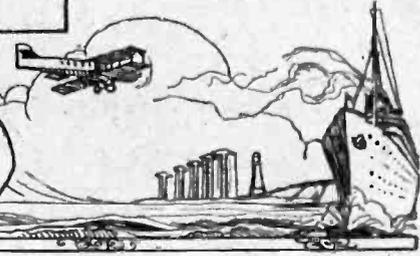
# Popular Wireless

LARGEST NET SALES



Scientific Adviser:  
Sir OLIVER LODGE, F.R.S.  
Chief Radio Consultant:  
CAPT. P. P. ECKERSLEY, M.I.E.E.  
Editor: NORMAN EDWARDS.

Technical Editor: G. V. DOWDING, Associate I.E.E.  
Assistant Technical Editors: K. D. ROGERS.  
P. R. BIRD, G. P. KENDALL, B.Sc.,  
A. JOHNSON RANDALL.



**CHANGE OVER.**  
**A CHRISTMAS HAMPER.**  
**SHORT REPLIES.**  
**THE "HIGHLAND HOPE."**

## RADIO NOTES & NEWS

**HEAVE HO!**  
**ARCTIC VALVES.**  
**"WHAT IS MAN?"**  
**THE NEW TUBE.**

### The B.B.C. and Trade.

I SHOULD think that one way and another the B.B.C. must help trade enormously. I do not refer alone to radio traders. Just think of all the music and gramophone records which must be sold as a direct result of broadcasting. (Incidentally, just think of all the records which are not sold but which would be if they were made. On hearing Borodin's "Danse Polovtsienne" recently, I went out to buy a record of it, without success!) How many books has broadcasting sold? And what about garden stuff, theatre and concert tickets, musical instruments, and soon? Oh, what an advertising medium!

### Change Over.

IT is announced that Mr. Wheeler, Engineer-in-Charge at Belfast, has been appointed Engineer-in-Charge at the new North Regional station, and has taken up his new duties at Moorside Edge. Mr. S. A. Williams, who was formerly at the Manchester station, becomes Engineer-in-Charge at Belfast. Good luck to them both, and no breakdowns.

### A Christmas Hamper.

IF you appreciated our Christmas Number your appetite should be whetted to enjoy the good fare provided by the Special Christmas Number of "Modern Wireless," which is packed as tightly with luxuries as is a Christmas hamper. Amongst the contributors are Sir John Reith, Edgar Wallace, P. P. Eckersley, and Commander Kenworthy. Four new sets are described, the "Plus-X" Four, the "M.W." Three, the "Mains-Power" Three, and the "Tri-Coil" Two. Besides this, there are details of the construction of the "Super-Simple" Mains Unit. A full size blue-print of the

"Plus-X" Four is given free with the magazine, which costs eighteen pence—about eight pages a penny!

### Short Replies.

L. G. K. (Swindon).—Thanks, but the electrical effects of h.p. steam were thrashed out in these Notes many moons ago. O.B.K. (Trondhjem).—Thanks also to you for your letter. Glad the "Explorer" Four solves your difficulties. Nice English you write, sir. E.H. (China).—

winter storms begin?" I quoted, placing my pipe and head over the fence. I wished him good luck with it—ours is an awful road for aerial casualties—and he said that he had reduced its length from 80 to 40 feet. As it was obvious that he was not including the 30 feet of downlead, I had to point out that he had really reduced it from 110 feet to 70 feet, a very different thing. He knew better, of course, but had committed an oversight.

### SPEAKING BY BEAM TO CANADA



This photograph shows the scene at the Bridgwater Beam station when the Colonial Secretary, Mr. J. H. Thomas, spoke by wireless phone to Canada. With him are some of the Dominion Premiers, and (left) Marchese Marconi.

Remarks appreciated. Glad 5 S W does you a bit of good sometimes. Chow, chow! A.E.W. (Nr. Leicester).—We had an idea that the "Three Coil" Three was as good as you say. "Stations literally pour in," eh? Thanks for telling us, old man.

### An Aerial Error.

I OBSERVED that the man on my right spent most of last Saturday afternoon in pulling down his aerial and erecting a new and much shorter one. "Ere the

were safely landed, but lost all their kits.

### Radio in Ceylon.

I HAVE been looking with interest through the "Ceylon Radio Times," and I must say that considering the resources of the island the programmes are wonderfully good; they are largely made up of gramophone concerts, but are certainly none the worse for that. Talk about the B.B.C. and its pronunciation experts! I should like

(Continued on next page.)

### The "Highland Hope."

ONE of the passengers on board the "Highland Hope," which went on the rocks near Peniche, off the Portuguese coast, was Mr. F. S. Hayburn, the Deputy Managing Director of the Marconi International Marine Communication Company, Ltd. After seeing his wife and daughter into a lifeboat he had the luck to be ordered to join the same boat as an oarsman. This boat was damaged by lurching against the liner, and its occupants, or such as remained, had to sit for over an hour up to the hips in water, trying to keep the boat away from the wash of the screws—all being in sodden night attire. Mr. Hayburn and his folk

## RADIO NOTES AND NEWS

(Continued from previous page.)

to hear them trying to tackle "Bhikka Habaraduva Dhammaransi of Divi Bhum-mikaramaza, Unawatuna Galle." I observe, too, that on November 5th, which in Ceylon is not Guy Fawke's Day but "Full Moon Day," "Maka Samaya Sutra" was chanted by two reverend gentlemen whose names would use up three lines of print.

### Heave Ho!

I AM indebted to a Clapton reader for drawing my attention to a testimonial concerning a certain two-valve set, written by someone in Reddish and printed in a Sunday newspaper. "I am more than delighted. I just put a covered aerial on the bed, pulled it along the floor, and was amazed to hear two or three foreign stations." It is not clear whether he pulled the bed along the floor or the aerial which was formerly on the bed but which, possibly, fell off. I think the Reddish man must have been reading about moving coils!

### Valves in the Arctic.

ALTHOUGH we generally treat our valves as tenderly as new babies or eggs, it is interesting to learn, as we do from time to time, what brutal usage they really can stand and yet remain on the active list. Mullards tell us that they have had a cable from the British Arctic Air Route Expedition as follows: "Congratulations. Your valves stand worst treatment imaginable. No casualties yet!" When one considers what happens to the equipment of an Arctic expedition before it is finally dumped on the ice, and what is done to it by blizzards, sledging, etc., this is to be regarded as full marks for Mullards' little bottles. They may one day advertise, "Stop me and drop one!"

### Those Day Programmes.

THE programmes offered by the B.B.C. for consumption during the daytime are such that I am glad that I have to go out of the house every day. You ought to hear my ladyfolk "crack on" about them—"uninteresting talks, and the eternal Gershom P.Q." I think that that was a very good suggestion which was advanced in the "Birmingham Evening Despatch" to the effect that some provision might be made for the many thousands of workers such as bakers, night-watchmen, police, postal employees, and newspaper men, who can only listen to broadcasting during the day.

### "What is Man?"

AN unfortunate incident, a little mistake on the part of Nature, an insignificant insect on a planet "belonging to an inconspicuous middle-grade star in one of the numerous islands of the archipelago of island universes." That is what man is, according to Sir A. S. Eddington, F.R.S. I confess that I found his "talk" very salutary, and after hearing Sir James Jeans, F.R.S., similarly discoursing, some days later, I decided that it would be nothing short of ridiculous to continue boasting of the fact that I still had a snapdragon in flower! If you feel the need for readjusting your conceptions of values, follow these astronomical "talks."

### Are Eggs Eggs?

AS I am on the subject of "talks," a rare occurrence, I should like to call the attention of housewives to a "talk" given in America. It was mostly about eggs, and I was alarmed to learn that there are more kinds of eggs in heaven and earth than were dreamt of in my philosophy. I used to think that eggs are eggs—fresh eggs, new-laid 'uns, shop 'uns and "cookers." Apparently, America has all these, and in addition "quality eggs," "hennery eggs" and "nearby hennery eggs." It's handy to have a hennery nearby, though not too near!

### Items to Note.

SO rarely do we get a Shakespearean play that you will do well to sample "A Winter's Tale," to be broadcast Regionally on Dec. 11th, and Nationally on Dec. 12th, Saturday's Kingsway Hall

## SHORT WAVES.

A woman correspondent asks where she can purchase some new wave-lengths. A friend has informed her that the type of receiver she uses occasionally runs out of wave-lengths, and therefore requires recharging.—"Daily Sketch."

"Wireless music is to be turned on in the main rotunda of the Pennsylvania Railroad Station in New York. . . . It is announced that the whole performance will be chaste and dignified, music quietly floating through the air to amuse and calm people waiting for trains," we read in the "Daily Express."

Usually it's the trains that are "chased."

"Hanything hon the 'air to-night, sir?" inquired the barber.

"I don't know," curtly replied his victim; "I'm not interested in wireless."

In referring to the radio home constructor of ten years ago, the "Pictorial Weekly" writes: "In his time, the wireless receiver was weird and wonderful, and looked it." That's all very well—but did it work?

### MARRIAGE VOW UP TO DATE.

Boy: "Mother, where is daddy?"  
Mother: "On the short waves, I believe."  
Boy: "Why don't we ever see him?"  
Mother: "Because he has not got 3 L O."  
Boy: "But, mother—"  
Mother: "That'll do, son. I took him for better or for Morse."

Oh, woman, in our hours of ease,  
Shy, iussy, coy, and hard to please!  
When Yankee signals are a "wow,"  
It's: "Egbert, WILL you stop that row!"

Concert is the pick of the basket for Dec. 13th. On the 17th Regional listeners should hear the first relay from Warsaw, when a Polish National Programme will be given. I forgot to mention in date order the broadcast of the Hallé concert on Dec. 11th. If you listen only to the second part thereof, Elgar's "Enigma Variations," you will have a red-letter evening.

### A Case for "The Key"?

A MAN of Frinton-on-Sea waxes humorous at the B.B.C.'s expense over the mystery of the "jamming" of London Regional by Stuttgart. According to newspaper reports the B.B.C. had to bring on their super-radio-direction-finding sets, and wonderful wave-meters before at long last they were able to name the offender; yet my correspondent points out that the offender had been naming himself quite clearly over the ether. He suggests that the B.B.C. should buy a copy of our "Key to the Ether," and save the expense

of super D.F.'s, etc. There's summat in it, as the man said when he sat on the pin-cushion!

### Short Acknowledgements.

A LADY of Salop very sadly bemoans the threatened disbandment of the Northern Wireless Band. All clear till March next, good lady! S. H. C. (Willesden) has picked up Buenos Aires and wants a "Knighthood." Did you do it with a cat's-whisker? If not, you don't qualify. G. B. (Wallasey) says the German broadcasting system beat ours over the R101 affair, for they pushed the news out before 9 a.m. at Hamburg. Technical parts of his letter flung to the technical hounds. H. V. S. (Darlington), five pages, largely about Unidync. (Oh, Queen Anne!) Will introduce H. V. S. again later. P. V. (Lagos) asks for samples of transformers. Funny thing, but these "cullud" fellow-Brits. of mine can't get rid of the notion that "P.W." is a sort of shop.

### "Down With Him."

AN old friend of my young and care-free days breezed in here yesterday, on leave after three years' exile in Peru, where he serves the Peruvian State Radio service. He has been based on Cuzco, a town full of interesting relics of a past civilisation. He tells me that, in his opinion, South American revolutions are akin to measles and mumps in Europe—bound to happen! President Leguia is now languishing in prison, yet he had given Peru a postal and telegraph service equal to, if not better, than any in S. America, and has provided for an international radio telegraph and telephone service. He has made his capital, Lima, a town of beautiful buildings and given them a broadcasting service, yet—"Down with him!" Give me England, and—er—England.

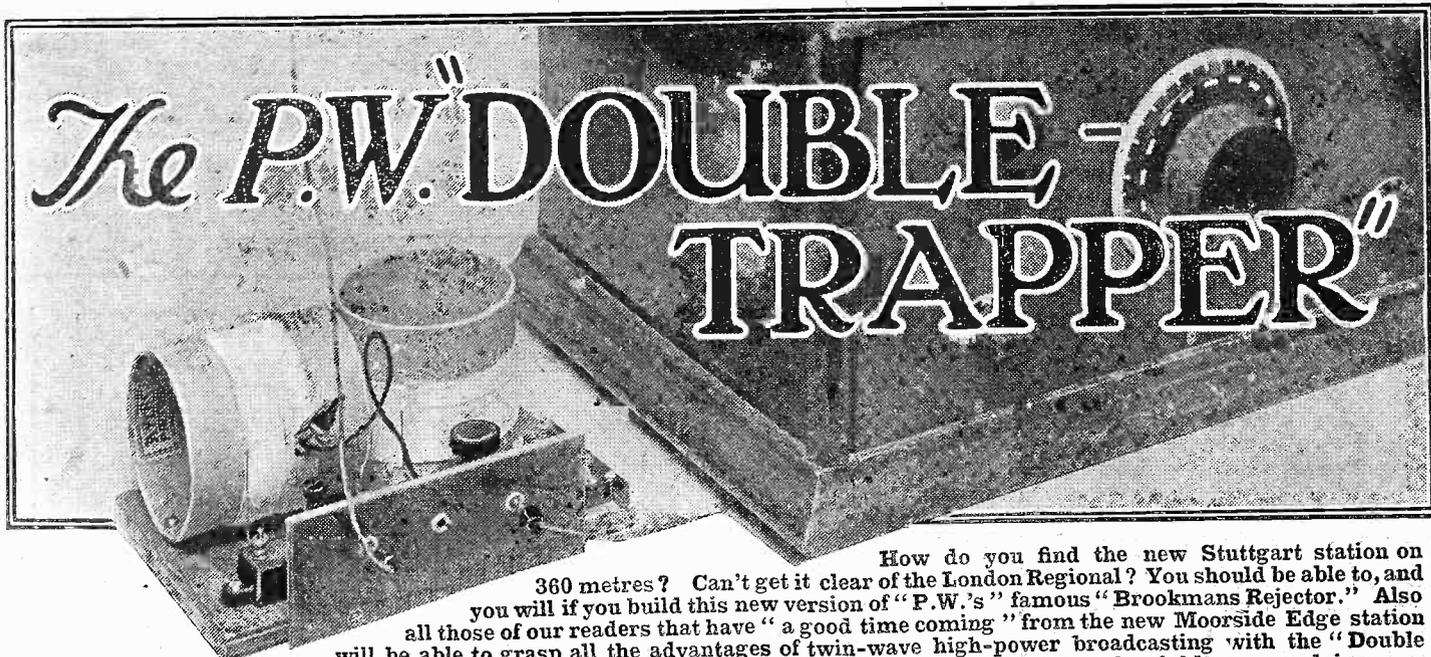
### The New Vacuum Tube.

I REFERRED briefly to this wonderful tube some weeks ago, since when I have gleaned a little more information about it. It is so sensitive that, in conjunction with photo-electric apparatus, it can be used for the determination of the heat of stars which are so distant that through the telescope they appear as mere points of light. My reaction to this is sheer wonder about Man, who can do such a thing! The current which this tube can measure can be as tiny as 0.000000000000001 ampere! (In other words, the amount of "juice" left in a fourpenny flashlamp battery after my kid son has cherished it for a week!)

### Radio Research.

I THINK that I recently expressed the view that serious scientists had given up trying to invent devices to cut out "atmospherics," apparently a futile task. A Canadian report lends a certain amount of weight to my opinion. The National Research Council of Canada has established an associate committee on radio research under the chairmanship of Dr. A. S. Eve, of McGill University. One of the first problems will be the study of the radio-frequency standard. (I am not sure what that means.) That will be followed by investigations into refraction over water, impediments to long-distance transmission and the effect of both the aurora and meteorological conditions on wave propagation. No X's need apply!

ARIEL.



How do you find the new Stuttgart station on 360 metres? Can't get it clear of the London Regional? You should be able to, and you will if you build this new version of "P.W.'s" famous "Brookmans Rejector." Also all those of our readers that have "a good time coming" from the new Moorside Edge station will be able to grasp all the advantages of twin-wave high-power broadcasting with the "Double Trapper." Don't remain fettered to your local, but get about a bit and hear what our Continental neighbours are doing.

IT'S not difficult with the aid of the famous "P.W." "Brookmans Rejector" to cut out any single interfering broadcast station, but what about the problem of cutting out two at once? That's a very different pair of shoes, as many know to their cost!

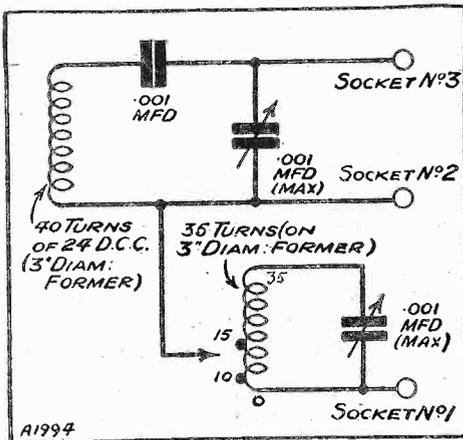
To be sure, in very many cases it is enough to be able to remove one station at a time. In the London area, for example, it is almost always the 356-metres transmission (London Regional) which causes all the trouble. The 261-metres wave

and ready for use by some of the advertisers in "P.W."

However, there are other cases where both transmissions spread badly and interfere with each other and with other stations. What you want then is some device to cut out both at once, and that is a vastly more difficult problem.

Its difficulty is only too well known in the "P.W." Research Department, for it is a puzzle upon which we have spent months of work. It is comparatively simple to find a rejector which will wipe out either of the two transmissions, but when an attempt is made to connect two rejectors in series the trouble begins.

### THE KEY TO THE ETHER



The secret of this wonderful "Open Sesame" to foreign reception.

(National) does not as a rule spread round the dial nearly so much.

In such circumstances a single efficient rejector is all you require, so as to be able to cut out the 356-metre wave when you find it is interfering with some station you want to hear. For these situations we described in a recent issue a very simple version of the "Brookmans Rejector" which fills the bill perfectly.

#### Wipes Them Both Out!

By the way, those who just want results without the trouble of making up this latter unit for themselves may be interested to know that it is being offered complete

#### THE PARTS YOU NEED

- 1 Baseboard, about 5 in. x 7 in.
- 1 Terminal strip, 5 in. x 2 in. (Keystone, or Wearite, etc.).
- 3 Sockets (Clix, or Ealex, Belling & Lee, etc.).
- 2 .001-mfd. max. compression type condensers (Lewcos and Formo in original, or R.L., Lissen, Polar, etc.).
- 1 .001-mfd. fixed condenser (Lissen, or Telsen, Dubilier, T.C.C., Igranic, Mullard, Ready Radio, Ediswan, Ferranti, Magnum, etc.).
- 2 Formers, 3 in. long x 3 in. diam. (Pirtoid, or Paxolin, etc.).
- Wire, screws, tapping clip, about 2 oz. of No. 24 D.C.C. wire, etc.

#### How It Is Done.

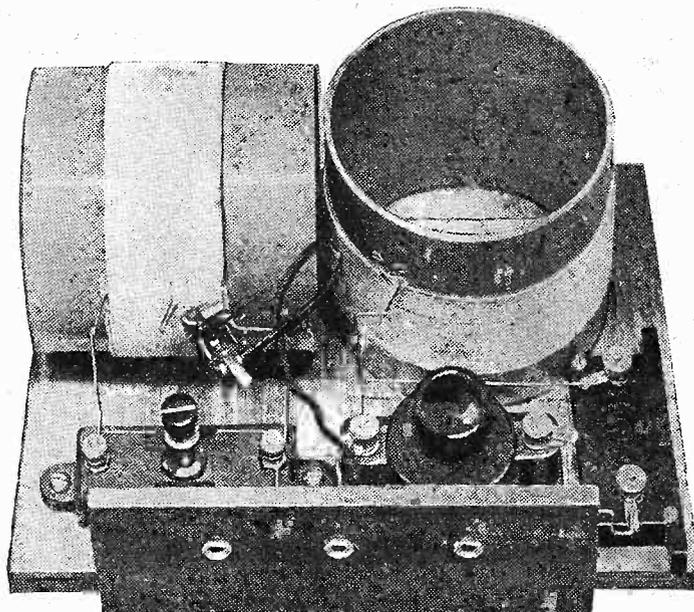
What usually happens is that the adjustments of the rejectors get tied up together, and every time you try to set one it throws the other out. The most effective solution of the problem which we have found lies in the use of two rejectors of entirely different and carefully chosen types.

The only ones which we have found to work really successfully in tandem, so to speak, are those you see in the instrument we are disclosing this week. One is of the wonderful "Brookmans" type, which is an exclusive "P.W." invention, and the other is a modernised version of an older rejector, which was at one time used in our sets quite often.

This latter was known as the "P.W." Standard Wave-trap, and it served the needs of the day very well. However, in its original form, good

as it was, it could not cope with the worst of "Regional" conditions, and so  
(Continued on next page.)

### RADIO'S MAGIC CARPET



The "Double-Trapper" acts like a charm on your set, leaving you free to roam through the ether to distant shores, unhindered by that powerful local that has been troubling you so much.

## THE "P.W." "DOUBLE-TRAPPER"

(Continued from previous page.)

we developed the "Brookmans Rejector."

In the light of recent investigations it has been found possible to improve the earlier type very considerably. The alterations are only very small matters, but they make all the difference to the capabilities of the rejector.

In its latest form it is so thoroughly rejuvenated that it is quite well able to shut out the more easily eliminated Brookmans Park wave. That is how we use it in the remarkable double interference eliminator we are just introducing to you.

### Very Simple Construction.

The "Brookmans Rejector" is used to remove the 356-metre wave, which is almost always far more difficult to eliminate and calls for a really super-drastring rejector. Then for the more amenable 261-metre wave we have provided the simpler rejector which is quite well able to deal with it with sufficient thoroughness for all ordinary purposes.

The two rejectors are connected in series in the unit, and there is a simple little arrangement which enables either or both of them to be brought into the aerial lead to your set.

While you are glancing at the circuit diagram to see how the two rejectors are

connected, we may as well explain the switching, or rather plugging, scheme we have just mentioned.

Observe that the unit has three sockets marked 1, 2 and 3. These give you the desired control of the "rejecting" which is going on. Thus, to get both rejectors into circuit, plug your aerial lead into socket No. 3, and the lead from the aerial terminal of your set into No. 1.

If the rejectors have been correctly adjusted (a simple matter) both local waves will now be wiped out almost completely, except on powerful sets, when they will be heard only when fully tuned in. The distant stations, being relieved of the usual swamping, will now be free to come in loudly and clearly.

So much for general matters. The adjustment of the rejectors will be covered later, but first let us just deal with the very simple and easy constructional work. (Don't be alarmed by the sight of those home-wound coils; they are nowhere near so difficult to make as many people think.)

The unit is assembled on a very simple plan, with just a small cbonite strip and a baseboard. Exact sizes don't matter, but the relative placing of the coils is really important. Do not make any changes here, for any reason whatever.

The coils represent the main part of the work, and you will find details of turn numbers, wire gauge, etc., on the diagrams, also the diameters of the formers. The latter should be 3-in. long, and it is to be noted that the 40-turn winding on the vertical one should be placed roughly in the middle of its tube.

### The Coils.

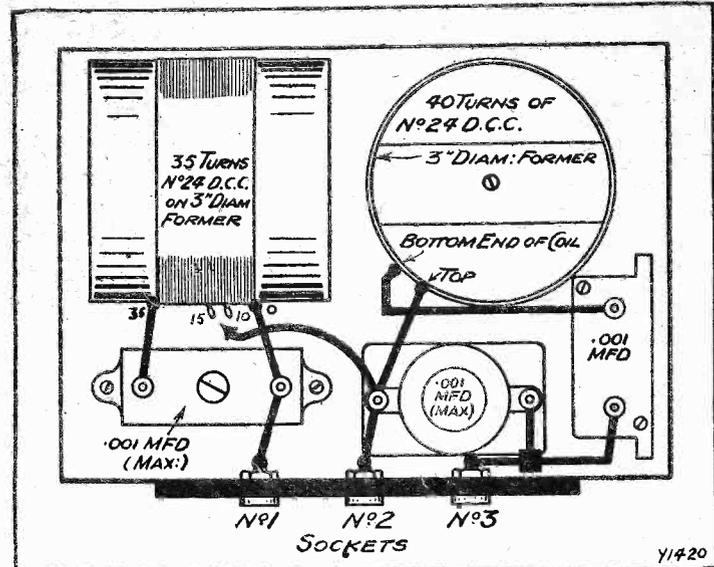
This winding occupies about  $1\frac{3}{4}$  in., so there will be a space of a little under  $\frac{7}{8}$  in. of unoccupied former at either end. The placing of the other winding on its tube does not matter, neither does the direction of either winding. Be careful to note though, that the tenth and fifteenth turns on one coil from which tapings are taken are counted from the end which is wired to socket No. 1.

So much for the coils. They are really very easily and quickly wound, and the rest of the constructional work will not take more than perhaps an hour. The upright coil is

mounted in the usual way with a wooden cross-piece in its lower end, while the other is secured by two screws passing through its walls, one at each end, down into the baseboard.

The rest of the assembling and wiring is really too simple to call for description.

## SURE SELECTIVITY—CERTAIN SUCCESS



Nothing much to wire up, is there? Yet you can get any degree of selectivity required, and complete wipe-out of your interfering local at negligible cost.

The adjustment of the two rejector condensers should be done one at a time, starting with the one for the more powerful station (the one nearest the fixed condenser). Plug into sockets 2 and 3, and adjust this condenser until you find the rejection point. Most Londoners will want to tune it to cut out the 356-metre transmission.

That done, bring in the other rejector (plug into 1 and 3), and adjust it to cut out the 261-metre wave as completely as possible.

Our instructions on these points are necessarily rather brief, and those who are unfamiliar with rejectors would do well to watch the more detailed notes given from time to time in Radiatorial.

## RADIO ODDS AND ENDS

Licence Figures—Police Radio—  
Terminals, etc.

There are now more than 2,000 schools in which children listen regularly to the B.B.C. educational broadcasts.

Wireless licences in this country at the end of July amounted to 3,162,460.

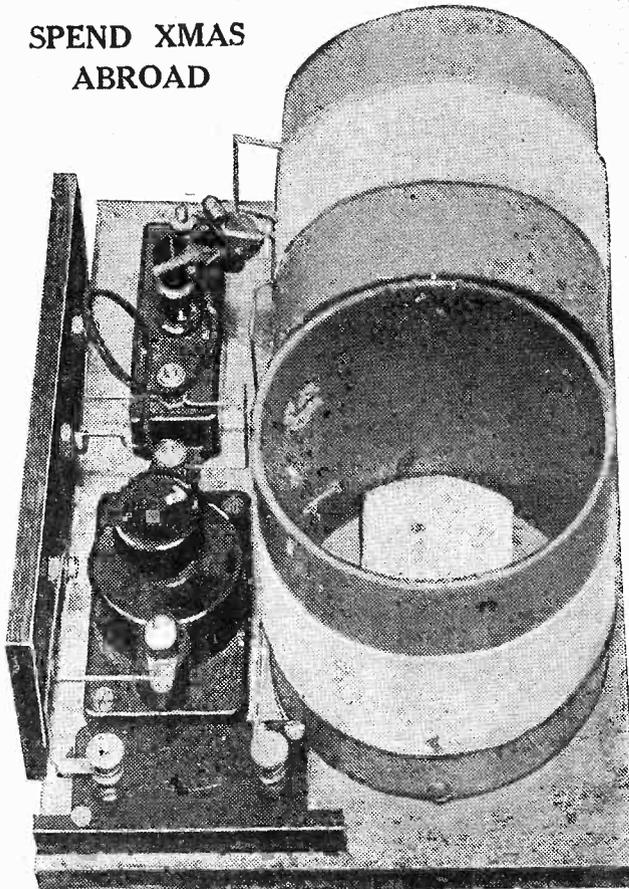
More than 17,000 blind listeners receive free licences from the B.B.C.

The City of London Police are installing a powerful radio equipment at their headquarters in Old Jewry, E.C.

Although B.B.C. stations are normally linked by Post Office trunk lines, transmissions before 6 p.m. are usually relayed to provincial transmitters by wireless.

If you are making your own H.T. unit remember that insulated plugs and sockets and terminals can be obtained, from which it is impossible to receive a shock, and these are certainly well worth the little extra expense.

## SPEND XMAS ABROAD



Why not take a trip round the Continent this Christmas? Your set could take you through France, Spain, Italy, on to Prague, Budapest, and back via Vienna and Germany, on a real Christmas tour. But you must be able to get rid of that troublesome local—and the "P.W." "Double-Trapper" can do it for you. It is not like other "traps," it does not decrease your set's sensitivity, it INCREASES it as well as giving you razor-edged selectivity.



# IF I CONTROLLED the B.B.C. by GEORGE ROBEY

It has often been stated that the B.B.C. programme control should be vested in the hands of variety experts—and where could you find a greater expert than the inimitable George Robey? Here he tells "P.W." readers what he would do to liven up the programmes. And behind the quips and queer asides there is that glimpse of wide sympathy and broad humanity that has endeared "George" to the British public.

**G**ENTLE reader, I'm all of a 'tis-was over a bright idea!

Why a reader's always supposed to be gentle, and what a "tis-was" is, I don't know. However—

You see, I was just walking on my way to the Palladium (my chauffeur had gone to buy the "Radio Times"; one of the B.B.C. announcers had just commandeered the last taxi, and I couldn't ride my bicycle because I'd lent the front wheel to a man who said he wanted to use it on top of his chimney as an aerial) when a great big hand came down whack on my shoulder and a voice said: "Hey, you! Come along with me!"

### I Meet the Editor.

Well I was just wondering if it was a long walk to Vine Street, and who would bail me out, when I looked up and saw Norman. (Norman's the Editor, see?) Nice fellow, Norman. Used to sing in the choir when he was a boy, and keep rabbits and things like that.

The girls adore him. I remember one year, when we were at Brightlingsea together—ahem! Yes, a very steady fellow, Norman. Never has more than "one," and always asks me if I've got a potentiometer on my grid, and if the frequencies of my choke radiate my curves, or something like that.

Terrifically clever, you know. I mean, he can take a loud speaker to pieces and— But, as I was saying, there was I walking along towards the Rose and—the Palladium, when Norman claps me on the shoulder and looks at me like a man in the desert who's just heard Niagara Falls broadcast through a crystal set.

### "My Lucky Day."

"George," says he, "this is my lucky day!" (They invited Norman to go and tour the American Radio Stations some while ago, and ever since he came back he breaks into the vernacular and lurches off pork and beans.) "I was just going to send out an S.O.S. for you."

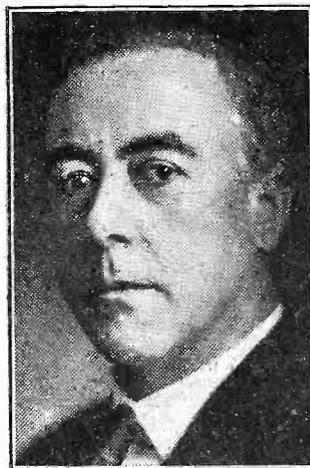
"Give it a rest," says I. "Let the jolly old amperes look after the volts and let the high-tension chase the low. Who cares if an armature balances itself on four poles?"

"Who wants to know why the blushing grids screen themselves? In other words, Norman, forget it; step along with me to

the Palladium and see a show that's worth it. Savoy Hill's a relaxing place. What you need is a change of air."

"That's all very well," says he, stopping short in the street, and, with a dramatic gesture, nearly poking the eye out of an elderly gentleman who happened to be passing at the time, "but have you any idea of the thousands—hundreds of thousands that Savoy Hill is entertaining at this minute?"

"Ah, that's the point, as the old lady said when she sat down on a darned needle,"



"Get to know the public's likes and dislikes, give them what they want, and cut out what they don't want."

says I. "Look at your paper and tell me what they're doing."

"Tell you in a second," says he, producing the "Radio Times" from his dispatch case, and turning over the pages. "What do you want—the Midland or the Regional?"

"The Regional," says I, noticing a nervous, rather crestfallen look on his face as he looked at the Midland programme.

### Trying to Please Everybody.

"The Regional?" he echoes thoughtfully. "Um—yes—ah—I see the Midland's doing—"

"The Regional," I repeated obstinately.

"Yes, yes, of course," he stammers in confusion. "Perhaps, you'd like to have a look, at it?" he suggests desperately.

"Perhaps I would," says I, taking the

paper from him, and looking at him firmly. "Thanks, that's enough," says I, handing it back to him.

There was a moment's silence. Norman's face had gone very red, and he was twirling his walking-stick rather uncomfortably.

"You see, George," he says at last, "they're trying to please everybody—honestly they are."

"Huh!" says I, very stiffly.

"You see, there are some people who go mad over that sort of thing."

### "Get the Personal Touch."

"I believe you, Norman," says I, colder than ever. "I felt that way myself last night. But why must Savoy Hill be so interested in asylums? Now, if I controlled the B.B.C.—"

"Ah," says Norman, producing his notebook and pencil in his best professional manner. "Ah!" says he, "what would you do?"

"If I controlled the B.B.C.," says I impressively, "I should get the personal touch into it. I should get to know the public's likes and dislikes, give them what they wanted, and cut out what they didn't want."

Norman replaced his notebook with a sigh and looked at me sorrowfully.

"That's the trouble," says he. "It can't be done. The public grumble away to themselves, but when it comes to telling the B.B.C. what they do want, well—they're just too lazy."

### The Robey Scheme.

"Ah, but I've got a scheme that's never been tried before," says I mysteriously.

"Oh," says Norman, licking his pencil and taking out his note-book again. "And what's that?"

"I'll have to write it down," says I, with pride. "A few words would not do justice to the propounding of a scheme that will for ever place the B.B.C. in debt with myself."

"All right, George," says he, as we reached the stage door. "Spill the beans."

First of all, to get the personal touch and acquaint myself with listeners' likes and dislikes, I should, if I controlled the B.B.C., announce the scheme of nominating one licence-holder each week (he or she would

(Continued on next page.)

G  
E  
O  
R  
G  
E  
R  
O  
B  
E  
Y

K  
I  
N  
G  
O  
F  
M  
I  
R  
R  
H

## IF I CONTROLLED THE B.B.C.

(Continued from previous page.)

be picked quite at random from the Post Office records) to come up to the studio and broadcast his or her opinion of the programmes generally and make suggestions for their improvement, and for such services should reward the candidate chosen each week with a gift of fifty pounds.

This, in itself, would prove a breathless attraction, for I should see that the chosen one was not communicated with by letter. On the fateful day of the announcement, therefore, one could be pretty certain of every licence-holder listening-in to hear if he or she were going to have the opportunity of airing their grievances and, at the same time, be handsomely rewarded for it.

Mr. Higgins.

I should say that Monday evening every week would be the best day for the surprise nomination and Saturday evening for his or her appearance at the Studio. As a kick-off, therefore, we might, as we all sat around in our drawing rooms, expect to hear an announcement after the style of the following:

"Ladies and gentlemen, as the result of our random choice for the first critic of our programmes, we are happy this evening to address Mr. Alfred Higgins of 399, Prospect Street, Camden Town, London.

"I will repeat that. The name is Mr. Alfred Higgins, of 399, Prospect Street, Camden Town, London. We hope that you are listening, Mr. Higgins.

"As you already know, it has been our increasing desire to become acquainted with

some of our listeners and allow them the opportunity of expressing their opinion of the programmes we submit, and to have suggestions for anything which would add to their popularity.

"We therefore extend a cordial invitation to Mr. Higgins to come up to the studio next Saturday evening for the purpose of giving us his opinion and offering any suggestions that he may have.

"The Toones We Know."

"For this service we would ask Mr. Higgins to kindly accept, as a little memento of the occasion, the reward of fifty pounds, as advertised in the press and in the "Radio Times," the official organ of the British Broadcasting Corporation.

"We may add that a warm welcome

## WHO SAID "FIRE"?



The Burton-on-Trent Fire Brigade uses a system of loud-speaker fire-alarms.

awaits you, Mr. Higgins, and we are assured that our nomination of you will be to the benefit of British Broadcasting as a whole." To which Mr. Alfred Higgins, better accustomed perhaps to the use of the pickaxe than the King's English, but with nevertheless decided views on the matter, would probably respond next Saturday evening in the following manner:

"Ullo everybody! I bin arst by the B.B.C. to come up 'ere at Savoy 'Ill and say wot I thinks of the programmes we've bin 'avin' and wot I'd like to 'ave in futcher.

"Well, ladies and gen'lemen, seein' as 'ow the B.B.C. 'ave paid me fare from Camden Tahn and give me fifty quid as well, I don't like ter complain too much abaht things.

"But since they arst me and they don't mind wot I say, I must say as 'ow this 'ere perishin' chamber musick gives me the sick. Now, I don't mind a good rousin' march on the brass band, but to 'ave to sit and 'ear stuff wot ain't got no toone's somethink cool. So wot I ses is: 'Give us the toones we all know.'

Racing Tips Wanted.

"As the B.B.C. as arst me if I've got any suggestions to offer, I'd like to say as 'ow I think it'd be a good idea if we could 'ave a racing talk every evening instead of the noos at nine o'clock.

"I allus put me bob on each day, same I expect, as you do, and if the B.B.C. 'ad 'old of a good tipster wot noo the winners every day they'd be doin' a service to the community.

"I think that's all I've got ter say, thank you. Oh, I know; the missus says as 'ow she's rather parshall to the cornet, and could Mr. Legget give us 'Abide With Me' if he's got the musik. Good-night, everybody."

Week after week, the excitement would spread; day after day a greater number of licences would be applied for and, slowly but surely, as different classes of people in different spheres of life were called upon to air their views, the requirements of the public would be more easily gauged and catered for.

Another scheme I have for revolutionising the British Broadcasting Corporation is—  
[Ed.—Thank you, George. That will do.]

## THAT GRID SWITCHING.

By A. S. CLARK.

ALTHOUGH switching valves is not so popular at the present as it used to be, there is still a very large number of receivers in which a switch is provided for cutting out one of the L.F. stages. It is quite common for such switching to be of a type known as "grid switching."

Grid switching has one great advantage over the older method of switching in the anode circuit of the detector or first L.F. valve. It makes it possible to keep the last valve—which should be a power valve in the case of a loud-speaker set—always in circuit, and also the output arrangement is never disturbed.

This is achieved by switching the grid of the last valve to the coupling device either

preceding or following the first L.F. valve. The grid bias for the last valve is therefore obtained sometimes via one, sometimes the other, and since the first L.F. valve is supplied via the first coupling device when working on both L.F. stages and different values of grid bias are required by the two valves, grid bias switching has to be provided.

"Up in the Air."

The value of bias on the power valve is therefore always correct and the last valve cannot be harmed by receiving too little bias, but there is another way in which it might be harmed. As the switch is moved from one position to the other the grid of the power valve is momentarily "up in the air" or disconnected.

Generally this will be for only a moment, and possibly not long enough for damage to result, but it might easily get left in the mid-way position for a short while. All that is necessary to guard against the trouble is to put the L.T. switch off for a moment while changing over the valve switch.

## ABOUT YOUR SET.

H.F. TUNING—GRID BIAS, etc.

In sets employing one tuned high-frequency stage in front of the detector, it is of more importance to keep the aerial and H.F. circuits in tune with one another than to handle reaction, for long-distance work.

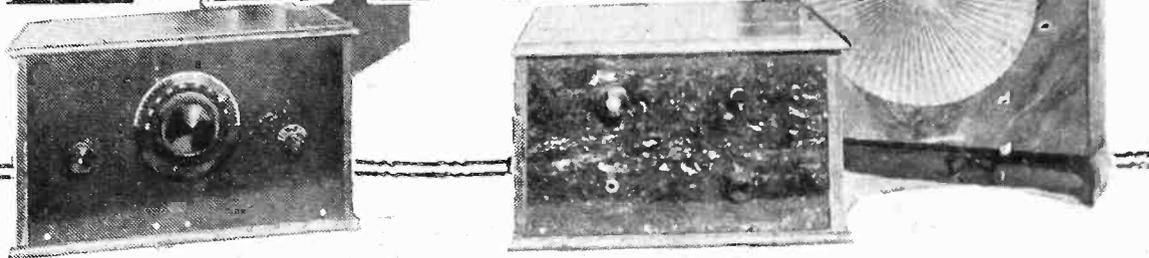
If your grid-bias battery is out of sight in the cabinet do not fail to overhaul your plugs occasionally and to open them out. (Lack of grid bias is very harmful for the valves at the L.F. end.)

Keeping an accumulator in good condition is very largely a matter of regular and correct charging.

When installing a dry rectifier the maker's recommendations regarding the smoothing capacity across the D.C. output terminals should be followed, as too high a value here may damage the rectifier.

# CONCERNING VALVE AMPLIFIERS

By  
Capt. P.P. Eckersley  
M.I.E.E.



I HAVE tried to show how any valve may be "worked out" as to its characteristics, and designed for the circuit it has to feed into.

It is perhaps not uninteresting to consider this subject a little further. The most common mistakes are made concerning the output stage.

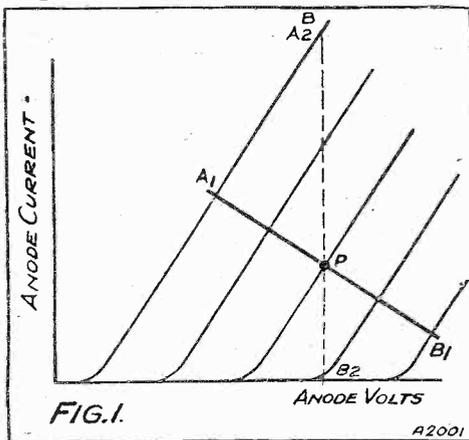
Let me revive your memory. We took a set of anode-volt anode-current characteristics as in Fig. 1. We chose a working point P and we found a line which was the locus of all the points swung through as the grid was varied between zero grid volts and maximum negative grid volts.

### The Slope of the Line.

The slope of the line gave the anode impedance. If the anode impedance was 0 the line was vertical, if infinite the line was horizontal. If there were no anode impedance there was no volts change on the anode.

As the impedance in the anode is varied the load-line tips up and down. If it tips too vertically (too little anode impedance) then the intercepts ( $A_2 P B_2$ ) are not equal, and distortion must set in since the anode volts change in one direction of grid volts

### DISTORTION REVEALED



Load-lines on anode-current anode-volts curves. The full line indicates good conditions, and the dotted line bottom-bend distortion.

swing does not equal the anode volts change with the other direction of grid volts swing. We get "bottom-bend" distortion if the anode impedance is too low.

But consider that we have so designed things that the intercepts  $A_1 P B_1$  are equal whatever, within limits, the value of

In his final article of a short series our Radio Consultant-in-Chief deals with those valve operating requirements that make for first-class loud-speaker results.

(4.) OUTPUT CIRCUITS.

the anode impedance. Without drawing all the characteristics then consider Fig. 2. We draw simply the boundary characteristics. Here is the line swinging round P.

There is no bottom-bend distortion whatsoever in the conditions as represented. The vertical projections of the lines,  $A_1 B_1$ ,  $A_2 B_2 = A^1 B^1$ ,  $A^{II} B^{II}$ , etc., represent the anode volts change with given grid volts change.

Consider that this represents a valve feeding direct into a loud speaker. Now a loud speaker has an inductance and a resistance. The reactance of the windings increases with frequency. Thus, since resistance remains constant, the impedance of the loud speaker increases rapidly with frequency.

Thus consider Fig. 2. At maximum frequency we may represent the condition of affairs as  $A_3 P B_3$ . The anode-volts change, i.e. the voltage fed into the loud speaker, is represented by  $A^{III} B^{III}$ . Medium middle frequency conditions are represented by  $A_2 B_2$ , the anode-volts change being now  $A^{II} B^{II}$ . But at the low frequencies the anode-volts change is  $A^1 B^1$ , much less than at the other frequencies.

### Too Little Bass.

So a valve is apt to give too little "bass" to the loud speaker unless matters can be arranged so that the load-line stays constant. This can be done in two ways, firstly by making the anode-volts anode-current curves infinitely steep, or by arranging it that even at minimum impedance the line is sensibly horizontal.

This latter condition means, in fact, that the lowest impedance of the loud speaker must be large compared with the valve impedance, hence the necessity for low impedance output valves. In this case the change of slope of load-line is relatively small with changing frequency.

Perhaps, however, I may conclude by warning those who have followed me closely that even if they have achieved a

constant voltage output valve they have not necessarily achieved perfect quality from the loud speaker.

It is part of the general muddle that loud-speaker design has not been greatly concerned with output-stage design, and equivalently output-stage design has been unconcerned with loud-speaker design. I do not think I shall be blaming anyone, but rather remarking a fact, when I say that loud-speaker design has been largely empirical.

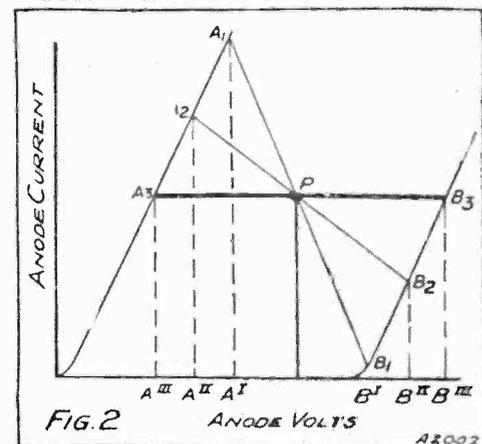
### "Hit and Miss" Principle.

The B.B.C. has been taken as a standard of quality, a fairish typical output valve feeds the loud speaker and the rest develops by continuous listening.

If, of course, a system could be set up in which one "control" prevailed we might get so-much nearer perfection. But people say where would come the stimulus if we are to discount individualism? Which is all another story.

But the conclusion to these articles should be that people ought to be in a position to design their generators (output stages) to match loud speakers and have freedom from distortion and maximum power output.

### THE "LOAD-LINE" VARIES



This diagram illustrates how the load-line slope varies with varying load-speaker impedances and with varying frequencies.

It is a matter of choice of valves. But if the transformer output is favoured we are far less dependent upon the choice of valve. We can, by a transformer, make the anode impedance anything we like.

**LATEST BROADCASTING NEWS.**

**TELEVISION IN 1931.  
BROADCASTING HOUSE EXCAVATIONS—THE EX-KAISER  
A B.B.C. LISTENER—AMOS  
'N ANDY.**

As a result of further private examinations, and a good deal of consideration, the B.B.C. has decided against suspending the Baird television transmissions at the end of December. The transmissions will go on in the New Year.

Apparently the demonstrations revealed just enough improvement to justify continuance of broadcasting facilities. There is also no doubt that the B.B.C. engineers are beginning to take more interest in television. They are known to be agreeable to trying-out any system or process; but they come to the conclusion, both on general and technical grounds, that the Baird system is still the best in the field.

This being so, they propose, during the next stage of development to co-operate as far as possible with the Baird engineers. There is, of course, no question as yet of programme values in television, but the newly-discovered technical interest of the B.B.C. should be most welcome in Long Acre.

Among forthcoming experiments which may be undertaken is the testing of a portable television transmitter. If this were to materialise as a practical possibility, its use would add tremendously to the interest in such "Outside broadcasts" as the Derby and Grand National. But that is looking ahead with a vengeance!

**Broadcasting House Excavations.**

In the excavations for Broadcasting House in Portland Place, it was discovered that the Bakerloo Tube passed that point, 96 ft. below street level, or 16 ft. deeper than is shown on any existing maps. A letter received by Mr. Tudsbury, the B.B.C. Civil Engineer, from one who was engaged on the tube excavation, recounts how the head ganger presented him with a "crystal lump," and the petrified remains of a human foot and leg discovered in virgin soil over 90 ft. underground.

**Opera Subsidy Echoes.**

The Opera Subsidy has claimed more Parliamentary time and interest than any other subject connected with broadcasting in the past five years. But one result is to awaken many M.P.'s to the possibilities of broadcasting as a fruitful field of awkward questions. Also it has brought home to political circles the importance of the new appointments to the Board of the B.B.C., which will have to be made in 1931. Government opinion is disposed to regard any vacancies as fit spoils for party patronage, and in the event of a reversal of fortune at the next General Election, this interpretation would be a kind of re-insurance against the feared misuse of the state monopoly by a new Government of another political colour. Conservative headquarters has got wind of this trend of opinion in the enemy camp, with the result that there is already a busy canvassing of likely candidates "in the Conservative interest."

**Ex-Kaiser a B.B.C. Listener.**

The ex-Kaiser has announced his intention of listening to the National programme on Sunday, December 21st, when the Rev. Joseph Llewelyn Thomas preaches in Welsh at the monthly religious service, which is to be relayed from Aberpergwm Church, Port-Neath-Vaughan.

Mr. Thomas is a distinguished cleric and has written many publications, including "Kaiser William's Pilgrimage to the Holy City," and "A Visit to the ex-Kaiser at Doorn."

**Amos 'n Andy.**

Amos 'n Andy are to be heard by British listeners on Wednesday, December 31st.

and their turn is broadcast from one end of the United States to the other. Of course, they command an enormous fee, but such is their personality and hold over the American public, that while they are "on the air" the whole of the United States virtually ceases to do anything else but listen to them.

Telephone calls fall by a colossal number, and several churches have had to alter the time of evensong services because people simply will hear Amos 'n Andy. Their "turn" is a conversation between two negroes, but Amos 'n Andy are white men.

Amos, whose real name is Freeman Cosden, was formerly an actor, and Andy, otherwise Charles Correll, was a bricklayer and an amateur minstrel before he took up broadcasting.

**COMING SHORTLY:**  
**MY RADIO CAREER**  
By "ARIEL."

---

**NEXT WEEK:**  
**"THE CONTRADYNE" TWO**  
Powerful.—Selective.—No Soldering!  
Anyone can make it with ease. No bother  
from the Local  
Station breaking  
through into  
long waves.



For those who may not have heard about these famous microphone artistes we hasten to say that they are probably the most popular of all broadcasters the world has ever known. Every night, for fifteen minutes, they hold forth, in the interests of a firm of toothpaste manufacturers (but not in any ram-it-down-your-throat advertising style),

It will be very interesting to see how British listeners take to the kind of stuff which has properly got the whole of North America by the ears. We hope that conditions are suitable for a first-class relay.

**FOR THE LISTENER.**

By "PHILEMON."

A critical survey of some of the recent programmes, with frank comments on the fare provided and the way it is served up.

**A Thrill.**

I TRUST that you heard "Dr. Jekyll and Mr. Hyde." It was not very good as a play; but as a thrill it would take some beating.

Other attempts have been made to dramatise the stories of Robert Louis Stevenson, but without much success. He was a great story-teller, but had no sense of the theatre. Indeed, he did not really believe in the theatre.

He was once asked to write a play; but he refused, because "playwriting," he said, "is a falsification of life." There were too many soliloquies in this play; but they couldn't be helped; the material was dramatic but not theatrical.

**Leon M. Lion.**

The thrill of the dual personality was in the hands of this well-known and very

accomplished actor. He made the most of it. It was largely a matter of the extraordinary use of his voice.

B.B.C. repertory players who may have been listening had a fine lesson on what the voice can be made to do. The gulf between the professional actor and the next best is very wide.

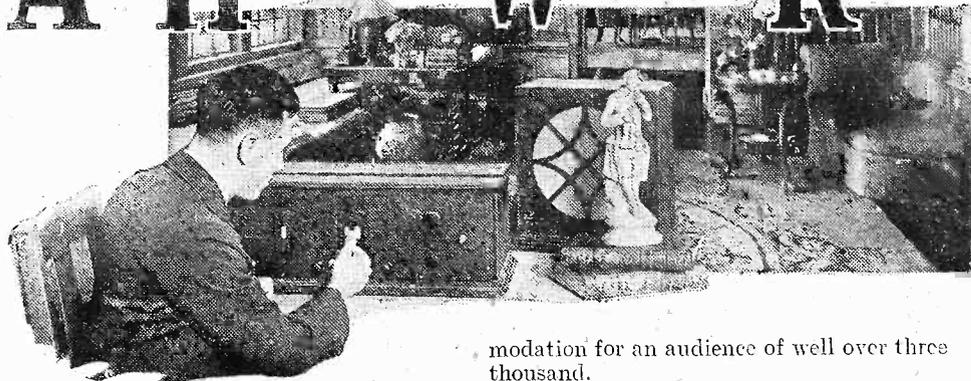
By the time these Notes appear you will probably have heard Ernest Thesiger and Ernest Milton in a play by Lord Dunsany. Evidently Savoy Hill is taking the dramatic side of its work "Ernestly."

**The Ginger Group.**

The Vaudeville hour has recently been much improved by the introduction of what is officially known as "The Four-some," and popularly as "The Ginger Group." The result is that we get fewer and better items, with The Ginger Group

(Continued on page 701.)

# AT HOME WITH RADIO STARS



The subject of our intimate and exclusive sketch this week is that popular violinist and orchestra leader who was the first to give a vital impetus to the broadcasting of restaurant music in this country.

(5.) DE GROOT.

**I**F you entered De Groot's sitting-room you would know at once that you were in the home of somebody "in the profession." And it would not take you very long to realise that the somebody concerned moved in the very best musical circles.

For grouped on the mantelpiece and crowded together on top of the grand piano are dozens of photographs of the people who matter in music. Sir Landon Ronald rubs shoulders with Rachmaninoff. Ysaye plays his violin soulfully towards the smiling eyes of Myra Hess.

## His Friends.

All the modern masters are there—and they are not all of the highbrow variety. Accorded a special place of honour on the corner of the mantelpiece is Gracie Fields, friendly and smiling.

I was examining the collection when De Groot entered the room. He was gratified, I think, to see that I was interested in his photographs.

And well he might be, for such a number as he possesses must surely be unique, and is as fine a testimonial to the esteem in which he is held as any man could desire. "They are my friends," he said. "I am proud of them."

De Groot speaks with a strong, but not unattractive, foreign accent. (He converses fluently in French, German, Dutch, and English.) He was born in Holland, but the greater part of his life has been spent in England, and he became a naturalised subject many years ago.

## A Bad Beginning.

His outlook on life is sound; he is a true philosopher, and has an overwhelming belief in the goodness of things. If he is in luck, he is pleased but not excited; if things go wrong, as they sometimes do, then he awaits the better things ahead. And, at a time when there is so much talk of trade depressions and other ugly aspects of our existence, it is refreshing to hear such views expounded.

It was with a smile that De Groot told me of his first visit to this country. "I was sixteen at the time," he said. "A violinist in an orchestra of Dutch youths. An Englishman who heard us playing said we should do well in England, and he eventually arranged that we should appear for a week at Newcastle-on-Tyne.

"The theatre at which we were to appear was called the Olympia, and is still in existence as a talkie house. It had accom-

modation for an audience of well over three thousand.

"At our first performance about twelve people put in an appearance. There was a similar number at our second and last concert.

"My fellow-musicians and myself returned to Holland penniless, hungry, and terribly seasick. It was not a very promising introduction to England."

Quite recently, De Groot again appeared in Newcastle. By coincidence he played at a theatre adjoining the old Olympia. But on this occasion he topped the bill, and the enormous number of encores he gave testified to his popularity with the discriminating Northerners. That is a sound justification of his philosophy of life.

To De Groot, music is, first and foremost, an art. But it is also a business. As I talked with him, I fancied I noticed a certain regret in his manner—a regret that he could not altogether forget the business side of his profession.

In this I may be wrong, but I am convinced that the artist in De Groot disdains the pounds, shillings and pence, the organisation and the clerical work which the business side of him demands.

## A POPULAR BROADCASTER



De Groot and the violin that entrances so many radio listeners and gramophone enthusiasts.

"You must find that incessant travelling to various parts of the country is very tiring," I suggested.

"It would be more so if I travelled by train," he replied. "I go everywhere by car, which occasionally I drive myself. Only in exceptional circumstances do I travel by rail.

"Such an occasion was the last Royal Command Performance when I was playing in Aberdeen. I travelled twelve hundred miles in order to play for a bare ten minutes at the Palladium."

## Bridge as a Pastime.

I learnt afterwards that De Groot collapsed on his return from Scotland. The sad truth is that his health is not what it was. Wisely, he conserves his strength by comfortable travelling, and retiring early to bed at night.

"What do you like best after music?" I asked.

"There is something I like more than music," he returned. I frowned, for this was a strange confession from an acknowledged master of music. Then I saw the twinkle in his eye. "It is a good game of bridge," he explained.

Bridge is the foremost of De Groot's hobbies; and since Mrs. de Groot and his son and both daughters are equally keen he does not lack for practice. He is, too, interested in all sorts of literature, but the only opportunity he gets for reading is at night. He collects china, and showed me a cabinet containing many picturesque pieces of shepherds, animals, and the like.

## A Radio Benefactor.

Also—and this, my experience has taught me, is something unusual amongst radio performers—he likes *listening* to the wireless. He has a beautiful all-mains five-valve cabinet set. As he opened the doors and showed me the simplicity of the working, I could not help wondering if wireless listeners appreciated how much they owe to De Groot.

For it was he who first popularised restaurant broadcasts, a form of entertainment which, in the first instance was nothing more than a very doubtful experiment. De Groot had a great responsibility, not only to himself but to a vast and ever-growing wireless public when he undertook the first public broadcast from the gill room of the Piccadilly Hotel.

He has, too, discovered and encouraged wireless talent, and there is many a star broadcaster to-day whose success is due to De Groot.

# THE B.B.C. YEAR BOOK

By THE EDITOR.

Some interesting facts and figures illustrative of the progress made in broadcasting during the past year.

UNDER the title of "The B.B.C. Year Book, 1931," the B.B.C. publishes for the fourth year in succession its annual review of the aims and achievements of the broadcasting service in Great Britain and Northern Ireland. The record embraces the period from November 1, 1929, to October 31, 1930. The price of the publication is two shillings.

### A Super Studio.

Interesting details are given of the future headquarters of British broadcasting in Portland Place, London, which are expected to be ready for occupation by the autumn of 1931. The building will contain some twenty studios, from the super studio, or concert hall, which is three storeys in height, to dramatic studios and studios for special branches of broadcasting. One of the amenities of the concert hall studio will be a lounge for the comfort of the public. Several of the studios in the new building will be far larger than the largest studio in the B.B.C.'s present premises at Savoy Hill.

Among the new features of the Year Book for 1931 is a comprehensive summary of the broadcasting events of the year. Besides a calendar of outstanding broadcasts and programmes of an unusual nature, this section contains lists of prominent speakers, musicians and variety artistes who have appeared before the microphone during the year. Schedules are also included of sporting events and public ceremonies which have been relayed, and lists of cathedrals, churches, theatres and music-halls which have contributed to programmes.

### Programme Proportions.

A chapter entitled "Finance" provides an answer to those who would appropriate a part of the B.B.C.'s funds for subsidies. In this chapter the B.B.C.'s needs in the way of revenue and capital expenditure are examined and found to exceed its present financial resources. The excess of income over revenue expenditure is the Corporation's only resource for meeting capital expenditure, which must increase rapidly as progress is made with the Regional Scheme. It is stated that "the Corporation is entering on a phase of development in which its needs in the way of revenue and capital expenditure are bound to exceed greatly its present financial resources, and it is obvious that some of the existing limitations of its resources will have to be overcome very shortly if its progress is not to be unduly impeded."

Programme developments are the subject of an article which shows that the boundaries of broadcasting are continually extending. In the course of the next five years practically all the important broadcasting activities in Europe will be available for listeners in Great Britain. Relays from Canada, Australia, America and liners at sea are still romantic experiments

Foremost among the special articles on music is a chapter on the new B.B.C. orchestra. It is the aim of the Corporation that this orchestra should set a standard for English orchestral playing and should bear comparison with the finest orchestras in the world. Although the full orchestra attains to the imposing strength of 114 for symphony concerts requiring a full modern orchestra, the players will undertake every kind of work calling for division and subdivision to suit varying musical requirements. From the ranks of the full organisation seventy-eight players will be taken for symphony concerts requiring a medium sized orchestra. For light symphony concerts another division of sixty-seven players will be made, and for "popular" orchestral concerts and similar programmes forty-seven players will be taken. For theatrical programmes thirty-six players will be used.

An indication of the way in which alternative programmes may eventually be provided for the whole of the British Isles is contained in an analysis of National and

The story of the North Regional transmitting station explains the plans that have been made to introduce alternative programmes for listeners in the North of England. The station at Moorside Edge is nearing completion and has been allotted the most effective wave-length in the "medium band" which this country possesses. The North Regional transmitting station has been built on lines similar to the London Regional station; but certain innovations have been made. The process of changing over the service from the present system of low-power stations to the new high-power station is described.

### Scotland's New H.Q.

Chapters are devoted to the Children's hour, religious activities, educational progress, the National Chorus, poetry reading and the S.O.S. service. Sir Frank Dyson, the Astronomer Royal, contributes an article on the B.B.C. time signals. Mr. Tyrone Guthrie foretells the future of broadcast drama. Scotland's new headquarters and the Northern "Proms" are the subjects of separate chapters

A section of the Year Book is devoted to the technique of broadcasting. Problems of reception and of the design of equipment used in transmission are explained and typical queries which have been raised by listeners in correspondence with the B.B.C. account for the subjects of several informative chapters. Pages devoted to the identification of stations should interest listeners who wish to receive continental programmes,

and articles on technical progress and high quality receivers should attract those who like to keep abreast of improvements.

### That Subsidy.

The row about Mr. Snowden's grand opera "subsidy" continues. It is a nice and convenient political whip—but listeners who judge impartially will realise that the anti-operaites, who drag in arguments about the unemployed and "want of public money," etc., know very well that the money for assisting

opera comes from a fund founded on deductions made from listeners' licence fees.

It is grossly unfair to accuse Mr. Snowden of spending public money, for no one can deny that the impression thus given leads people to believe that money paid in the shape of income-tax—or such like—is being used for the opera subsidy.

### Getting a Return.

In actual fact, as we have pointed out before, it is only the listener who is paying for the subsidy; and the listener cannot legitimately grumble. He is getting a definite and valuable return—in the shape of 60 opera broadcasts a year.

It is better to have these opera broadcasts than the Treasury should collar a proportion of the licence fees and give nothing in return!

## OPERA FOR TRAVELLERS



Whiling away a weary journey on a Hungarian railway with opera picked up from a local station.

London Regional transmissions. The analysis as printed in the Year Book is as follows:—

	National %	London Regional %
Music .. .. .	58.742	83.507
Drama .. .. .	1.889	1.673
Talks .. .. .	23.324	13.284
Religious Services ..	5.504	1.076
Appeals .. .. .	.164	.192
Children's Hour ..	5.569	—
Special transmissions	.433	.101
Pictures .. .. .	4.375	.167

The percentages of wireless receiving licences to population are shown by counties in the form of a schedule and by means of a shaded map of England. A comparison is made of British and American alternative programmes on October 1, 1930.



# WHY YOU SHOULD BUILD P.W. SETS



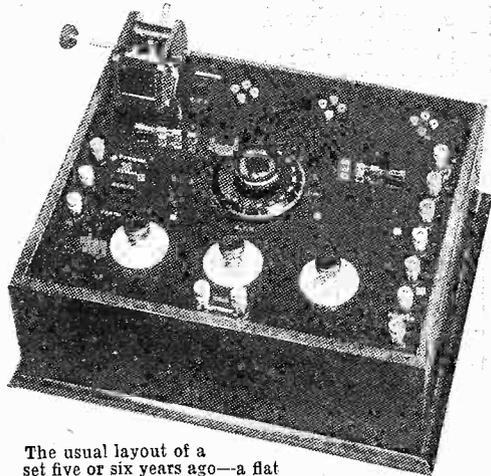
By G.V. DOWDING, ASSOCIATE I.E.E.

NEW "P.W." sets are *new* sets, and in many cases they are based on entirely novel circuits—the result of continuous research and experimenting on the part of our Research and Construction Department.

As readers will probably have noticed, we have developed the set designing side of our activities very much during the past two or three years. Nevertheless, we are always prepared to accept set designs from outside sources, and very seldom does a week pass when we do not test out two or three designs submitted to us by independent engineers and by amateurs.

We examine these sets with complete impartiality and are very glad when, on rare occasions, we find one that includes novel features, and is able to pass the necessarily rather severe tests, because it is our main aim to give "P.W." readers the best

## NOT POPULAR NOWADAYS!



The usual layout of a set five or six years ago—a flat panel with valve holders, coil holders, etc., mounted on it.

of everything in the way of radio that is available.

However, it is difficult for the individual to compete with a scientifically directed organisation having "on tap" some of the keenest radio intelligences in the country, and so it is seldom that independent designers are able to achieve the standards we have set.

### The Acid Test.

If you have any doubts at all about the newness of current "P.W." sets, do please apply this acid test. Take any set design of one or two years ago—our own, or anybody else's—and, if you can, build it up. Then look through your last few "P.W.'s" and search out a fairly current "P.W." set, with an ostensibly similar circuit, and build that up. You will find that for ease

There are some very good reasons, as you will see in this special article by our Technical Editor.

of operation, selectivity and punch, the latest "P.W." receiver will knock that old design into a cocked hat!

The experiment is one that could be carried out only by an amateur having a fair number of spare components at his disposal, and one who would be prepared to spend the necessary amount of time on it. But he would find it most amusing and instructive.

An easier way to make similar comparisons is to try and find someone with a set a year or two old and someone else with a modern "P.W." set of a similar character, and borrow both receivers for an evening!

Others can take our word for it that the difference in all-round efficiency between two such instruments is staggering. We ourselves are able to gauge the difference with precision for the simple reason that we do not rely upon ear-tests, but upon scientific measurements.

### Very High Standards.

And the standards laid down for the performances of different classes of sets have been creeping up steadily all the time.

Meanwhile, components and valves have been improving at a similar steady rate, so taking everything into consideration, it is very well worth while for constructors who are still using sets of 1928 and earlier vintage seriously to consider the advisability of scrapping their old friends in favour of current designs.

In many cases it will prove a great wrench to part with an old favourite, but it will be a change attended by many real advantages. At first they might not be appreciated; skill in handling the old set's controls will have been gained by long experience, and any faults in reproduction will have dulled on the ears through constant repetition.

Here is another important point. We do not alter our set designs from week to week. We do not rush into production with every minor improvement we manage to effect.

Look back over the past year and you will notice that our programme for that period reveals a wide diversity of set types rather

than a series of similar sets in slightly different make-ups. And don't go only by the theoretical circuits, for new coil designs and layout arrangements, etc., are often just as vital as circuit developments.

Also you cannot fail to notice that we do not slavishly adhere to certain specified principles; our policy is to allow plenty of room for the individual constructor to use his own discretion. And we endeavour to include in each of our programmes sets suitable for every conceivable purpose and pocket, even, as far as we can, catering for those minorities having very specialised requirements.

### Our Main Endeavour.

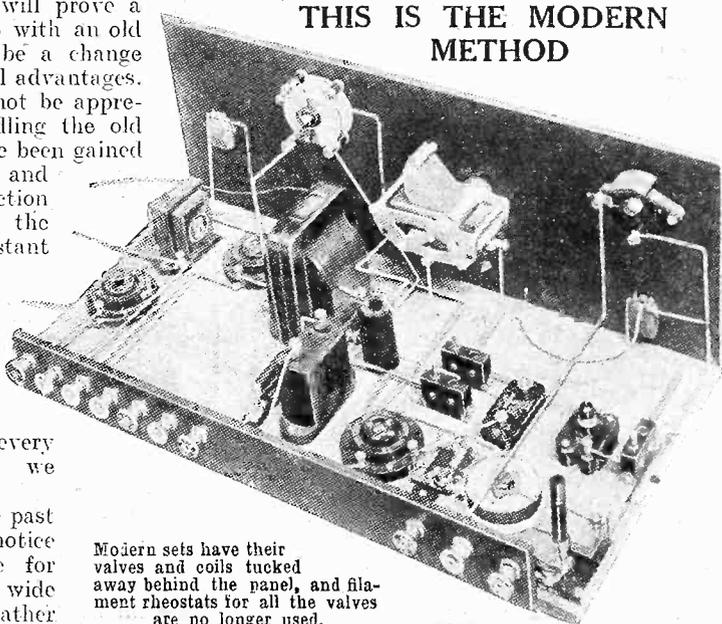
In this way we endeavour to satisfy every reader. In certain cases we are able to produce designs that appeal equally strongly to extraordinary large numbers of constructors—the colossal successes of the "Titan," "Magic," etc., proves that.

As has been said, each constructor knows the kind of set which he wants—his finances guide him to a very great extent—and it is our job to see that he gets it, giving him that little extra guidance provided by a fair and unexaggerated description of each of our designs.

Where a successful series of sets is followed fairly soon by important developments, our policy is to make the new developments applicable to existing sets as far as is humanly possible.

In conclusion, constructors should note that we do not unnecessarily vary our forms of lay-out; always looking ahead we aim at leaving scope for the rebuilding of sets, when they become old, in accordance with new ideas.

## THIS IS THE MODERN METHOD



Modern sets have their valves and coils tucked away behind the panel, and filament rheostats for all the valves are no longer used.

**T**HERE certainly is not much cause for complaint about the general behaviour of the short waves just recently, judging by the amount of distant stuff that I have heard during the few minutes at my disposal.

Every morning after breakfast, on 20 metres, I have logged at least five New Zealanders, and very often a stray Australian or two. On the one or two afternoons I have had "on the air" I have infallibly heard Sumatra, the Philippine Islands and Australia, and at 10 a.m. one day I logged that most difficult place of all, Hawaii. So that things may definitely be said to have bucked up at last.

**The Effects of Day and Night.**

One can learn a lot by studying a globe and holding a small spotlight at different angles, to observe the positions of the areas of light and shade. It might surprise readers to know that there is a time of day and time of year when the line of light and shade from here stretches straight down to Africa in one direction and curves across Greenland to the Pacific Coast of Canada in the other!

In my humble opinion, it is almost a proven fact that short-wave signals travel best of all along this line, and worst of all when crossing it at right-angles; the intermediate position is that when they have to cross at a fairly acute angle, which is relatively easy for them.

**SHORT-WAVE NOTES.**

By W. L. S.

Details of an interesting theory advanced by amateurs.

This is rather surprisingly confirmed, in connection with the previous remark, by the fact that at this time of the year, at about 4.30 or 5.30 p.m., one can often hear South Africans and the very infrequent West Coast Canadians coming in at the same time.

Sometimes even the stations right down low on the Californian coast can be heard at this time, which in itself would seem very strange were it not considered in relation to the "shade line."

**Real Distances and Echoes.**

Incidentally, a globe also teaches us how entirely wrong ideas of distance can be formed by familiarity with a "Mercator" map. If you study the latter you will see that the distances from London to Alaska and from London to the southernmost point of Chile appear to be about equal. By operating on a globe with a piece of cotton you will find that the ratio between the two is about three to one!

As a result of an interesting argument with some fellow-amateurs on this subject, an interesting theory came forward. It is well-known that a short-wave echo is often heard on stations sufficiently powerful to get right round the world a second time, and that on super-high-powered commercials as many as four or even five echoes can sometimes be heard.

**A Possible Cause of Smudginess.**

The suggestion coming from the discussion was that the peculiar "smudginess" of certain distant signals is caused by the signals coming simultaneously along three or four paths of slightly different length.

If you consider the line from California to London, taken round the surface of a globe, you will discover that it is quite difficult to find which line really is the shortest. Surely, now, if the line of light and shade were so placed at a particular time that signals following it round would not be taking the shortest route, that would account for some funny things?

**Different Paths for Signals.**

The stronger signal would probably arrive that way, but there might well be a weaker one that was following the shortest path.

I should be immensely interested to know whether readers have had any experiences in connection with distant reception that might confirm this.

**CORRESPONDENCE.**

**FOR THE PORTABLE-SET OWNER.  
ARE U.S. PROGRAMMES BETTER?  
—THOSE MAINS UNIT VOLTAGES—  
PENTODE ARTICLES.**

Letters from readers discussing interesting and topical wireless events or recording unusual experiences are always welcomed; but it must be clearly understood that the publication of such does in no way indicate that we associate ourselves with the views expressed by our correspondents and we cannot accept any responsibility for any information given.—EDITOR.

**FOR THE PORTABLE-SET OWNER.**

To The Editor, POPULAR WIRELESS.

Dear Sir,—I believe there are a good number of people who, like myself, invested in a portable in order to obviate the beginner's dilemma of choosing speaker, batteries, etc.

These people (again like myself) acquire a certain amount of radio-knowledge and consequently wish to have a "receiving" range greater than that of the average portable.

I have experimented considerably in order to achieve the best results from the following scheme: Wind about 25 turns of wire (26 D.C.C. is equally as good as special frame aerial wire) on a diagonal frame, so that the rectangle formed by the turns of wire is approximately the same shape as the frame aerial in the set. (See top of sketch.)

Both ends should be earthed, or one end earthed and the other end connected to an aerial. Even one end earthed and one end free will work quite well.

The frame should be placed behind the portable and parallel to its aerial.

I have mine on the window sill and a curtain covers it.

Although the long-wave transmissions are not "boosted" much the medium-wave stations are very much helped. Normally I cannot receive London or Midland Regionals at any strength. (The circuit is 2 H.F., Det., R.C., L.F.)

With the extra frame aerial I can pick up quite a lot of stuff after dark, my latest bag being Naples direct at moderate loud-speaker strength. The scheme is quite selective, and I can receive Stuttgart with only a trace of London.

I hope the above will be useful to others.

Yours faithfully,

N.B.—Flat or dead spots may be cured by altering the distance between the frame and the set.  
Sussex. J. D. MOSLEY.

**ARE U.S. PROGRAMMES BETTER?**

The Editor, POPULAR WIRELESS.

Dear Sir,—Mr. L. W. Corbett, in his recent article

on "Are U.S. Programmes Better," raises the question of the readiness of British advertisers to foot the bill for expenses, if advertising were permitted in the B.B.C. programmes. This point has already been settled by advertisers themselves, who are so keenly anxious to "get on the air" that they have gone to some of the more powerful foreign stations in order to reach the British public. In doing so they have, incidentally, provided a few spots of interest to alleviate the depressing dullness of the Sunday programmes inflicted upon us by the B.B.C.

The illogical attitude of the B.B.C. in this matter is hard to understand, in view of the fact that gramophone record manufacturers are advertised several times weekly, even to the extent of giving the reference numbers of records played. If the B.B.C. desire to introduce bright and interesting music into its programmes by means of gramophone selections, well and good, but this can be achieved without advertising the makers of the records. To the owner of a gramophone it may quite feasibly be of interest to know where the record can be obtained, but why limit advertisement to one class of merchandise?

Yours faithfully,

Birmingham.

H. B.

**THOSE MAINS UNIT VOLTAGES.**

The Editor, POPULAR WIRELESS.

Dear Sir,—I was interested to read in the issue of POPULAR WIRELESS for October 25th, two letters, viz., one from Mr. Burnard with regard to the "Neutype" Four, and one from Mr. Lefever with reference to mains unit voltages.

I can certainly endorse very heartily Mr. Burnard's remarks regarding the "Neutype" Four. I made up this set some little while ago, and was surprised at the very excellent results obtained. The number of stations that can be received without reaction, or with very little, is remarkable. Selectivity, too, is a prominent feature.

In the construction of the set, I departed a little from the instructions and descriptions given, adding a volume control, a potentiometer for the detector valve, an output filter, and an H.T. supply lead for each valve. Also, the R.C.C. unit was substituted by a low-ratio L.F. transformer. With 150 volts on the H.F. and the super-power valves, 90 on the detector and 120 on the first L.F. valve, a fine variety of programmes is available. I think the "Neutype" Four is a really good receiver.

I agree with Mr. Lefever that a high-resistance voltmeter is a necessity with every H.T. mains unit. A voltmeter of 1,000 ohms per volt resistance is not an easy thing to borrow. The mains unit I have in use at present has six tapings, the current and voltage from each varying with different valves, and the maker can supply no information beyond maximum milliamperage figures for each tapping and for the unit as a whole. I found as much as 40 volts fluctuation on the "maximum" tapping when trying two different super-power valves.

Like Mr. Lefever, I would welcome enlightenment from one of the well-known manufacturers.

Yours truly,

Itull.

A. J. LONG.

**PENTODE ARTICLES.**

The Editor, POPULAR WIRELESS.

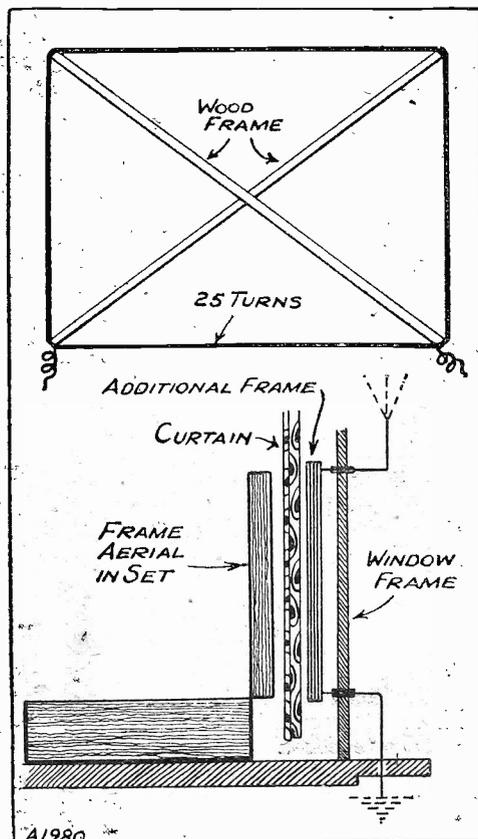
Dear Sir,—I feel I must express my thanks to you for the instructive articles in the recent four numbers of POPULAR WIRELESS, entitled "Radio Pictures."

I do hope these articles will be published separately, as it would be most useful for young folks to obtain such useful knowledge so splendidly expressed. May we see many more such articles.

Yours faithfully,

Ventnor.

ISAAC WESTLEY.



How Mr. Mosley arranges the extra aerial for his portable.

# LISSEN

## FIXED CONDENSERS

Deliver all their  
stored up energy

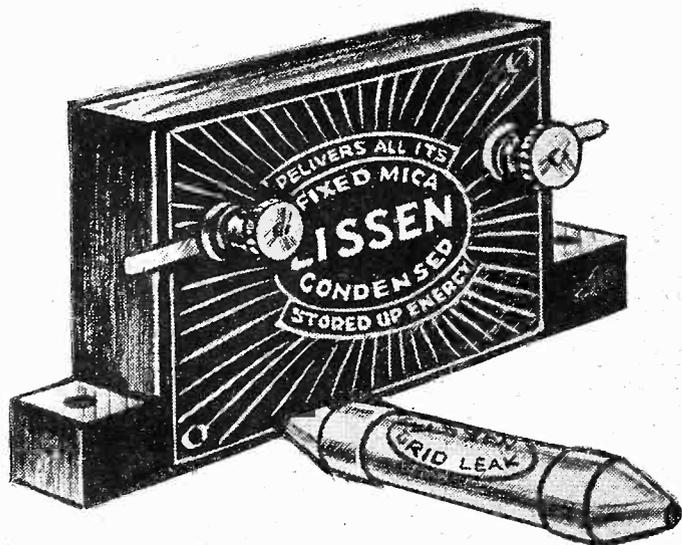
Because you are using bigger H.T. voltage—because you are seeking always more power and more purity from your set—because you are going out for ever more distant stations—your need for condensers that will stand up to all demands without leakage and without break-down is more urgent now than ever.

Lissen fixed condensers have become the standard fixed condensers in almost every published circuit. Accurate to within 5 per cent of stated capacity.

·0001 to ·001 mfd., 1/- each

·002 to ·006 mfd., 1/6 each

**INSIST UPON LISSEN PARTS ALWAYS**



D.C.  
**27/6**  
MODEL  
A

A.C.  
**60/-**  
MODEL  
A

**MOULDED CASES  
MADE OF INSULATING  
MATERIAL—HEAVY  
CAB TYRE FLEX LEADS**

The current you get from Lissen Batteries is the purest form of current you can get for radio. But if you want to use an eliminator, use a Lissen Eliminator. You'll then get H.T. current from your mains smoother, steadier, better than before.

There are four types of Lissen Eliminators; one of them will almost certainly be just right for your set. Tell your dealer what voltage your mains supply is and whether it is A.C. or D.C.; tell him what output you require, or what valves you are using, and he will demonstrate for you the Lissen Eliminator to suit your needs.

**D.C. MODEL "A"**  
Employs 3 H.T. + tappings:  
H.T. +1 giving 80 volts for  
S.G. valves; H.T. +2 giving  
60 volts at approx. 2 m/A  
for detector valves; H.T.  
+3 giving 120/150 volts at  
20 m/A.  
PRICE **27/6**

**D.C. MODEL "B"**  
Employs 3 H.T. + tappings:  
H.T. +1 and H.T. +2 are  
continuously variable (by  
means of two control knobs)  
and capable of giving any de-  
sired voltage up to 120/150  
volts at approx. 2 m/A.;  
H.T. +3 giving 120/150  
volts at 20 m/A. for power  
valves.  
PRICE **39/6**

*D.C. Models working on 100-  
110 mains voltage give output  
voltage of approximately 60%  
of above voltages.*

**A.C. MODEL "A"**  
Tappings as in D.C. Model A.  
100-125 volts  
and  
200-250 volts

PRICE - - - - - **£3-0-0**

**A.C. MODEL "B"**  
Tappings as in D.C. Model B.  
100-125 volts  
and  
200-250 volts

PRICE - - - - - **£3-15-0**

# LISSEN ELIMINATORS

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX

*before*  
**YOU BUY YOUR  
 NEXT BATTERY**  
*THINK of the  
 new process*  
**EDISWAN  
 RADIO BATTERIES**



Now Ediswan give you a dry battery with a greater capacity than ever before. Made under a new process, it gives tremendously long service—longer than ever before. And greater power—power that is steady and silent—giving new life to your set, new sparkle to your reproduction. Super capacity at ordinary prices. Get an EDISWAN Battery to-day—all good radio dealers sell them.

60 volt	10 m/a	...	...	...	...	7/9
66 volt	10 m/a	...	...	...	...	8/6
120 volt	10 m/a	...	...	...	...	14/6
60 volt	super power	20 m/a	...	...	...	15/6
120 volt	super power	20 m/a	...	...	...	31/6

**LOWER PRICES—SUPER QUALITY**

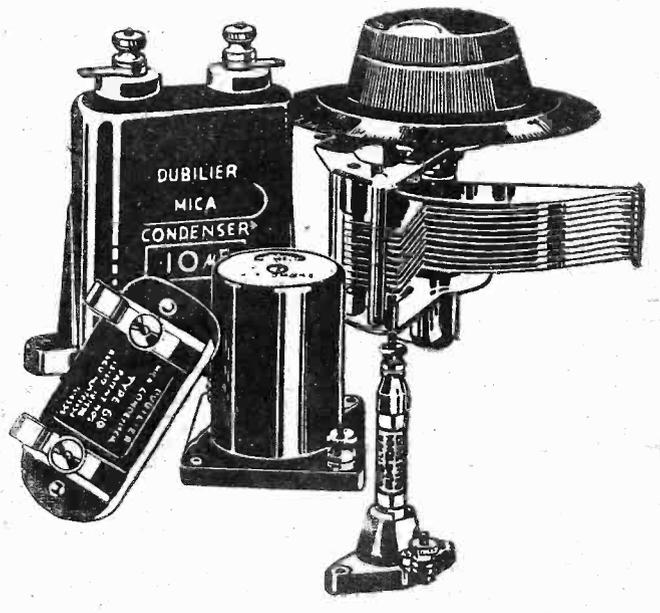


**THE EDISON SWAN ELECTRIC CO. LTD.**  
 155 Charing Cross Road, London, W.C.2  
*Branches in all the Principal Towns*

B. 100.

*The best is  
 now cheaper!*

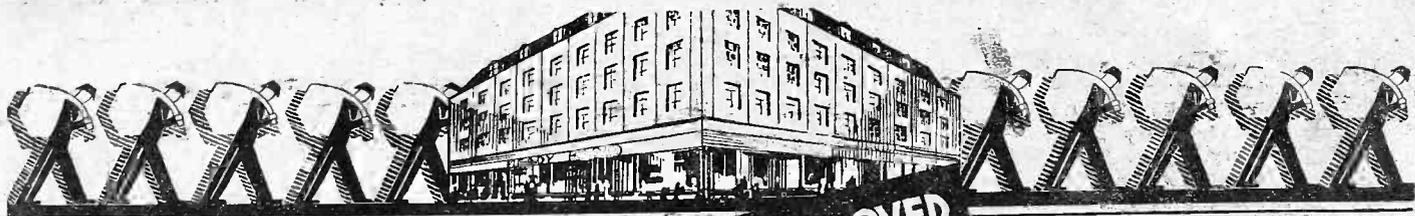
Dubilier Condensers and components are specified in all the best set designs—you have only to look through several issues of the Wireless periodicals to prove that. There *must* be a reason. There is. Set designers know that for maximum efficiency and all-round reliability Dubilier Apparatus is unequalled.



WRITE FOR CATALOGUE, SENT FREE

**DUBILIER  
 RADIO COMPONENTS**

**DUBILIER CONDENSER CO. (1925) LTD.,  
 DUCON WORKS, VICTORIA RD., ACTON, W.3.**



**TROUBLE-FREE SET BUILDING**      **USE READY RADIO APPROVED NON-SOLDERING KITS ONLY**      **USE 'JIFFILINKS' FOR WIRING-UP**

**"MAXI-POWER" FOUR**

- KIT A** less valves and cabinet  
equal monthly payments of **£7.8.0** or **13/6**
- KIT B** with valves less cabinet  
equal monthly payments of **£9.15.6** or **18/-**
- KIT C** with valves and cabinet  
equal monthly payments of **£11.5.6** or **20/9**

**'EASY-CHANGE' THREE**

- KIT A** less valves and cabinet  
equal monthly payments of **£4.4.6** or **7/9**
- KIT B** with valves less cabinet  
equal monthly payments of **£5.12.0** or **10/3**
- KIT C** with valves and cabinet  
equal monthly payments of **£7.2.0** or **13/-**

**"SHARP-TUNE" TWO**

- KIT A** less valves and cabinet  
equal monthly payments of **£4.9.0** or **8/3**
- KIT B** with valves less cabinet  
equal monthly payments of **£5.8.0** or **10/-**
- KIT C** with valves and cabinet  
equal monthly payments of **£6.7.0** or **11/9**

**THE "NEW COIL" FIVE**

- KIT A** less valves and cabinet  
equal monthly payments of **£10.18.3** or **£1**
- KIT B** with valves less cabinet  
equal monthly payments of **£14.5.9** or **26/3**
- KIT C** with valves and cabinet  
equal monthly payments of **£16.5.9** or **29/9**

**"CONTRADYNE" THREE**

- KIT A** less valves and cabinet  
monthly payments of **£5.0.9** or **9/3**
- KIT B** with valves less cabinet  
monthly payments of **£6.8.3** or **11/9**
- KIT C** with valves and cabinet  
monthly payments of **£7.11.9** or **14/-**

**TO OVERSEAS CUSTOMERS**  
All your goods are very carefully packed for export and insured, all charges forward.

**THE "CHEF-D'OEUVRE"**

1 Permeol polished ebonite panel, 18 x 7 x 3/16 in.	£	8	4
1 Permeol matt. ebonite strip, 18 x 2 x 3/16 in.		2	0
1 Hand-polished, solid oak cabinet with 10 in. baseboard	1	10	0
1 ReadRad Drogograph S.M. dials		13	0
1 ReadRad .00015 mfd. differential condenser		5	0
1 ReadRad on-off switch		10	0
2 ReadRad "P.W." dual-range coils	1	10	0
1 Contradyne coil		7	6
3 Telsen sprung 4-pin valve holders		3	0
2 ReadRad .0005 mfd. variable condensers		9	0
1 ReadRad Brookmans .00075 mfd. condenser		3	6
1 ReadRad "Hilo" H.F. Choke		4	6
1 Telsen H.F. choke		4	0
2 Dubilier .002 mfd. fixed condensers		3	0
1 Dubilier .01 mfd. fixed condenser		4	0
1 Dubilier .1 mfd. fixed condenser		3	0
1 ReadRad 2 meg. grid leak and base		2	6
1 Telsen "Radiogrand" L.F. transformer 5-1		1	4
1 ReadRad .001 fixed condenser		12	6
1 ReadRad .0003 fixed condenser		10	
2 ReadRad 3-point wave-change switches		10	
1 ReadRad 600 ohm resistor		3	0
9 Belling-Lee "B" terminals		2	6
1 ReadRad 10 in. x 6 in. screen		4	0
3 Valves as specified (S.G., Detector and Power)	1	19	0
1 Packet "Jiffilink" for wiring		2	6
Wire, screws, flex, wander plugs, etc.		1	8
<b>TOTAL (including valves and cabinet)</b>	<b>£9</b>	<b>17</b>	<b>0</b>

Any of the above components can be supplied separately if desired.

- KIT A** less valves and cabinet £6.8.0 or 12 equal monthly payments of **11/9**
- KIT B** with valves less cabinet £8.7.0 or 12 equal monthly payments of **15/3**
- KIT C** with valves and cabinet £9.17.0 or 12 equal monthly payments of **18/-**

The new "P.W." Brookmans Condenser is entirely different from all other kinds of rejectors, wave-traps and selectivity devices. It definitely eliminates local interference and improves distant reception. Particularly designed for use with all circuits without alteration to your receiver.

**COMPLETELY ASSEMBLED AND-READY FOR IMMEDIATE USE.** Post Free **5/9**

Send to-day for a copy of our 1931 "Radio Out Of Income" FREE Catalogue—a complete encyclopedia of Components, Sets, Speakers, and everything necessary for the Wireless enthusiast. **POST FREE.**

**"EKCO" ALL-ELECTRIC 3-VALVE RECEIVER**

(Model 313 for A.C. or D.C.—Mains). Entirely self-contained—No aerial or battery required. S.G. DETECTOR and POWER. A.C. or D.C. Cash **£22.10.0** or 12 equal monthly payments of **£2.1.0**

**"EKCO" ALL-ELECTRIC 2-VALVE RECEIVER**

(Model 312 for A.C. or D.C. Mains). DETECTOR and PENTODE A.C. or D.C. Cash **£14.10.0** or 12 equal monthly payments of **£1.6.6**

**COSSOR "EMPIRE MELODY MAKER"**

Complete Kit including valves and cabinet. Cash **£6.17.6** or 12 equal monthly payments of **12/6**

**MULLARD 1931 "ORGOLA" 3-VALVE KIT**

S.G. DETECTOR & POWER Complete Kit including valves and cabinet. Cash **£8.0.0** or 12 equal monthly payments of **14/9**

**MULLARD 1931 "ORGOLA" 4-VALVE KIT**

2 S.G. DETECTOR and PENTODE. Complete Kit including Valves and Cabinet. Cash **£13.12.6** Or 12 equal monthly payments of **£1.4.9**

**1931 OSRAM "MUSIC MAGNET" FOUR**

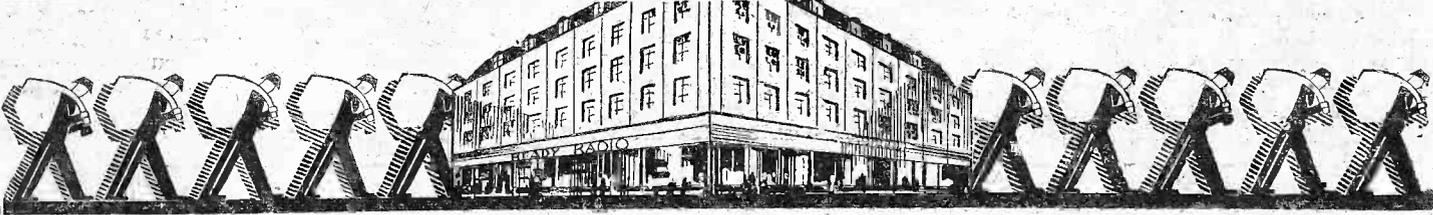
2 S.G. DETECTOR and POWER. Complete Kit including Valves and Cabinet. Cash **£11.15.0** Or 12 equal monthly payments of **£1.1.3**

**TO INLAND CUSTOMERS**  
Your goods are dispatched post free or Carriage paid.

**Immediate Dispatch**

**Ready Radio**  
159, BOROUGH HIGH STREET,  
LONDON BRIDGE, S.E.1.  
Telephone: Hop 5555 (Private Exchange)      Telegrams: READIRAD, SEDIST

**Cash or Easy Payments**



# EASY TERMS

WE supply the following Radib Apparatus on deferred terms. We carry adequate stocks and can give prompt delivery.

**NEW HEAYBERD A.C. ELIMINATOR KIT C.150.** Complete kit of parts for building an H.T. Eliminator, including steel case. Output, 25 M.A., 150 volts. 3 H.T. tappings. One variable. Cash Price £3 16 0

Or 7/6 with order and 11 monthly payments of 7/.

**NEW EPOCH PERMANENT MAGNET MOVING-COIL SPEAKER UNIT.** P.M.66. Cash Price £5 15 0

Or 11/- deposit and 11 monthly payments of 10/6.

**LISSEN 2-V. SET.** Battery model including valves. A reliable Regional Receiver. Cash Price £3 10 0

Or 5/6 with order and 11 monthly payments of 6/6.

**NEW OSRAM MUSIC MAGNET 4 KIT.** A first-class long-distance receiver incorporating 2 H.F. stages. single dial tuning. Cash Price £11 15 0

Or 16/- with order and 11 monthly payments of 21/.

**NEW MULLARD ORGOLA 1931 3-V. KIT.** High grade complete kit of parts including valves and cabinet. Cash Price £8 0 0

Or 10/6 with order and 11 monthly payments of 14/6.

**NEW COSSOR EMPIRE 3 KIT.** A considerable advance on last season's 3-valve Kit and at a lower price. Cash Price £6 17 6

Or 19/- with order and 11 monthly payments of 12/6.

**N.K. FARRAND INDUCTOR.** Loud speaker unit, quality of reproduction almost equal to a moving-coil speaker. Cash Price £3 10 0

Or 5/6 with order and 11 monthly payments of 6/6.

**B.T.H. PICK-UP AND TONE ARM.** One of the best pick-ups available. Cash Price £2 5 0

Or 5/- with order and 9 monthly payments of 5/.

**CAIRNS & MORRISON'S HOME RECORDING OUTFIT,** including special Microphone Pick-up. Descriptive Leaflet on request. Complete Kit. Cash Price £4 12 0

Or 8/- with order and 11 monthly payments of 8/6.

**NEW BLUE SPOT 66R UNIT.** The finest balanced armature movement on the market. Complete with large Cone and chassis. Cash Price £2 10 0

Or 5/- with order and 10 monthly payments of 5/.

**LONDON RADIO SUPPLY CO.,**  
11, Oat Lane, Noble St., London, E.C.2.

Telephone: National 1977.

# Build this H.T. ELIMINATOR FOR XMAS

WITH a screwdriver and a pair of pliers this efficient Stal H.T. Eliminator can be built in less than two hours and at a saving of over 40%. There is no soldering, no dirt, no mess—you can build it in the drawing room. The Stal kit of parts comes to you complete (except for the rectifying valve) with full and explicit instructions and illustrations which make the building so easy you can't go wrong.

Why then go to the expense of an all-electric set, when you can make your present tried and trusted set into an all-electric by using this economical Eliminator for your H.T. and by fixing a Stal Charger (costing only 17/6) to your accumulator for a constant L.T. supply.

Write for full particulars

A.C. H.T. KITS	
40 m.a. Senior Kit, Output 175 v. 40 m.a. 3 Variable Tappings.	60/-
20 m.a. Junior Kit, Output 140 v. 20 m.a. 1 Variable Tapping.	42/-
Built-up Eliminators	
40 m.a. Stal A.C. Senior Kit, Output 40 m.a. 175 v. 3 Variable Tappings (plus Triotron Rectifying Valve G.A. 24, 12/6).	3 7 6
20 m.a. Stal A.C. Junior Kit, Output 20 m.a. 140 v. 1 Variable Tapping (plus Triotron Rectifying Valve G.N. 14, 9/6).	2 9 6



**H.T. ELIMINATOR KITS**  
ELECTRIC LAMP SERVICE CO. LTD.,  
39-41, Parker St., Kingsway, London, W.C.2  
Telephone: Holborn 6624, 6635, 0070.  
Northern Distributors:  
CHORLTON METAL COMPANY LTD.,  
Millgate House, 18, Amber St., Shudehill,  
Manchester. Telephone: Blackfriars 7637

# A FULL-SIZE BLUE PRINT

of the

# “PLUS-X” FOUR

is given away with the

# SPECIAL

# DOUBLE XMAS NUMBER

of

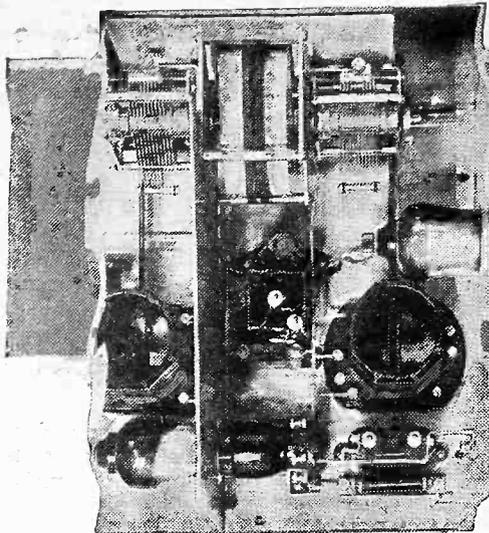
# “MODERN WIRELESS”

The “Plus-X” Four is something really startling in set design. It is a star of star sets, and includes an ingenious arm-chair control.

Make sure of your copy of the December “M.W.”

Now on Sale.

Price 1/6



# POWER GRID DETECTION

By Carden Shiels.

A development for the "music lover" that is, of late, becoming increasingly popular in "moving-coil" circles.

IN the past designers have chiefly devoted themselves to improving the "reach" or selectivity of receiving sets, no doubt because this proved to be a strong "selling" point. They found that listeners generally were more interested in bringing in a variety of foreign programmes than in the musical quality of what they heard.

At the present time there is a decided movement in favour of the "music-lover." The fascination of listening to the foreigner has given way—in the case of a large and growing section of listeners—to a preference for National and Regional programmes, provided the "quality" of reproduction is such as will satisfy a critical musical ear.

## Methods of Rectification.

Of course, the ideal set should provide for both requirements, but, unfortunately, we are still in the stage where high selectivity necessarily involves some falling-off in the quality of response, and vice versa.

The modern receiving set is now falling into two distinct classes, one suitable for general purposes, and the other specially designed to give the highest possible moving-coil quality at comparatively close range and with great volume.

The new method of power-grid-rectification represents the latest advance towards perfect, i.e. distortionless reproduction. In spite of its growing popularity—and of its use in many of the mains-driven sets shown at the recent exhibition—the difference between power-grid-rectification and its older rivals, "leaky grid" and "anode bend" is not widely understood.

The earliest valve detector was the two-electrode valve, which, although theoretically perfect so far as quality is concerned, did not long survive the appearance of the leaky-grid three-electrode detector.

## An Interesting Comparison.

Volumes have been written on the precise action of the grid-leak in separating out or detecting the signal components from the received carrier-wave. So far as the purpose of this article is concerned, it is sufficient to say that rectification here takes place in the grid circuit.

By contrast, in the anode-bend detector, the signals are separated out from the high-frequency components in the anode circuit of the valve.

This allows a very simple distinction to be made between the two methods. In the

leaky-grid detector the carrier-wave is first rectified (in the grid circuit) and the rectified signals are then amplified between the grid and plate. In other words, the valve combines the task of rectification with one stage of low-frequency amplification.

In anode-bend rectification, on the other hand, the carrier-wave (including the signal components) is first amplified between the grid and plate, and the low-frequency signals are afterwards separated from the high-frequency components in the plate circuit. That is to say, the anode-bend rectifier is equivalent to one stage of H.F. amplification, followed by a stage of detection.

H.F. stage, and so reduces selectivity. As against this, anode-bend rectification necessitates the use of a large negative bias, which increases the internal impedance of the valve, and makes it essential to use high-resistance coupling to the first L.F. amplifier, with a corresponding increase in H.T. voltage.

## Inconclusive Arguments.

In short, arguments on the relative merits of grid-leak and anode-bend rectification appear to be unending and inconclusive so far as proving the superiority of one method over the other.

As the name implies, power-grid-rectification is a reversion to the principle of grid-leak rectification, but it is combined with certain improvements which remove its original defects whilst incorporating the advantages of anode-bend rectification.

From one point of view it is a development which has been made possible by the use of H.T. mains units. One hundred volts on the plate, particularly when used in conjunction with resistance coupling, rules out the use of dry-cell H.T. batteries unless 200-250 volts

are available, in order to compensate for the voltage drop across the anode resistance.

## Where the Difference Lies.

With the high plate voltage of 100 (as compared with 40-60 on an ordinary leaky-grid rectifier) is combined the use of a much smaller grid condenser and leak than before. By lowering the capacity of the condenser from 0.0003 to 0.0001 mfd., high-frequency loss is reduced to zero for all frequencies below 10,000 cycles, which is the highest practical limit of audibility.

The leak resistance instead of being 1 or 2 megohms as usual, is reduced to .25 megohms. This allows the grid condenser to discharge in a very short period of time, i.e. in less than one ten-thousandth part of a second, so that the highest essential

(Continued on page 703.)

## NOTED GERMAN RADIO INVENTOR



Baron von Ardenne is only 23, but he has many inventions to his credit, his latest being a system for re-radiating distant station programmes by small local transmitters.

Anode-bend rectification claims to be an improvement on the use of the grid-leak and condenser. Its supporters point out, quite rightly, that the grid condenser offers a shunt path to the high frequencies and so leads to a serious loss in the upper register. They forget that a by-pass condenser in the plate circuit of the anode-bend rectifier can be equally at fault in this respect.

It is also true that the grid-leak rectifier produces serious distortion on high input voltages. On the other hand, it will respond to input voltages too feeble to be detected by an anode-bend rectifier, i.e. it is more sensitive than the latter.

## Increase in Impedance.

Again the grid-leak circuit allows grid current to flow. It therefore tends to "damp" the tuned circuit of the preceding

## FROM THE TECHNICAL EDITOR'S NOTE BOOK.

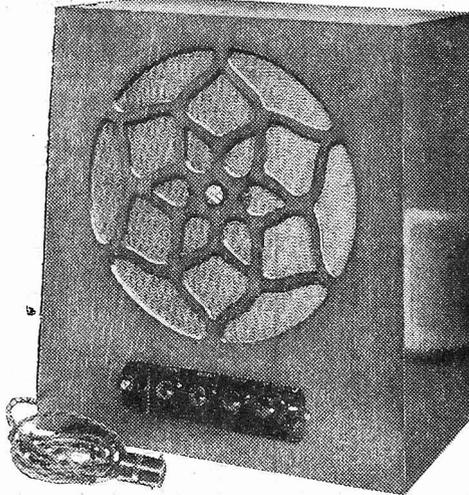
# Tested and Found—?



## ANOTHER COLUMBIA SET.

THE Columbia Graphophone Co., Ltd., seems to be entering into radio very enthusiastically. I have just received a sample of yet another new Columbia set, and this is model 309, a mains "two" of a most interesting nature.

It is a compact table model, having a loud speaker built into it. It has been designed specifically for those who have no radio knowledge whatever. The only external controls are two switches, one for on-off purposes and the other to provide a choice between two programmes.



The plate has been removed and you can see the four controls that are pre-tuned to any two stations. A range of coils for different wavebands is available, and the suitable pair is plugged into the sockets inside the set.

Tuning and reaction controls are fitted, but these are hidden behind an ornamental plate. When the set is installed this plate is removed and the two sets of controls are adjusted to the two programmes, these then being made available merely by operating the appropriate switch.

The set is, of course, installed and adjusted by the dealer. The outfit has sufficient sensitivity to collect a pair of programmes practically anywhere in the country, and at good strength and with good quality.

As with the other Columbia I recently tested, the set is very selective, and there is no overlap at all at a distance of but a few miles from the Brookmans station.

This model 309 is available both for A.C. and D.C.—the particular one I had on the test bench was designed for D.C. operation.

There is a noticeable hum, although this

was quite drowned by the speech or music. The Columbia people will probably score a success with this set: and they deserve to if only because it adequately meets the requirements of a very large number of listeners.

## STADION H.T. BATTERIES.

J. Fabian, of Cowper Street, Great Eastern Street, London, recently sent me a sample of the Super-Quality Stadion high-tension battery which he has just placed on the British market. It arrived with seals unbroken, and was said to have been picked at random from stock.

On breaking the seals, it was seen that several of the sockets were badly corroded. But I think this corrosion is due to a gaseous discharge from the pitch filling (which I noticed was very "bubbly" in appearance), and not to electrolyte creeping.

The sockets of the Stadion are on the side—an excellent scheme that appeals strongly to me. Also the sockets for the grid-bias tappings are arranged in one separate row—another attractive feature.

But unfortunately the battery did not stand up to its test for long before a rather serious voltage drop occurred.

## IGRANIC RADIO COMPONENTS.

Publication No. 6,681, due to Igranic Electric Co., Ltd., describes their excellent range of radio components and concludes with a list of European broadcasting stations and the Igranic coils that can be used in various positions for their reception.

## HEYBERD'S MAINS UNIT.

Of particular interest to mains enthusiasts will be the new leaflet issued by Messrs. Heyberd, which describes their various mains components and constructor's kits.

## ASTRA COMPONENTS.

Astra slow-motion dials are made under an Ormond licence. There are one or two different models available in different sizes, but the same general principles of structure are found in each. The gearing is obtained by a small cog working on a large semicircular section that is toothed.

When it is desired to drive the condenser without gearing, the slow-motion control knob can be pushed upwards out of action. It clips into the neutral position as easily and as definitely as the smoothest on-and-off switch, and it snaps back into operation just as readily.

I am rather prejudiced against cogwheel gearing, for so many

past attempts have resulted in harsh, uneven movements, but this is not the case with the Astra. The adjustment is perfectly smooth throughout, and there is not the slightest trace of backlash.

By means of the above-mentioned "gear-change," the direct drive is free from all restrictions. There is a very sharp scale, and a hair-line is carried around and contributes greatly to the close readings which can be obtained. There is a definite

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.

stop at each end of the scale. The Astra dials are well made and are nicely finished.

There is also an Astra reaction condenser having a maximum capacity of .0001 mfd. This has an all-brass construction and a neat pigtail is fitted to render a completely permanent connection to the moving vanes. Its action is smooth; it is indeed one of the best little reaction condensers I have examined.

## "POLAR" TWO-GANG CONDENSER.

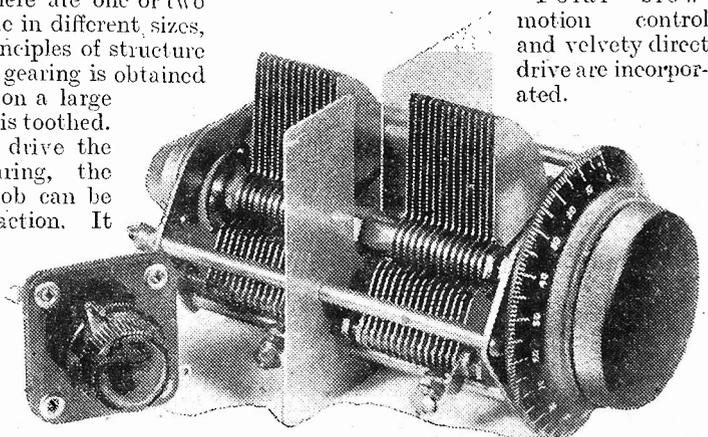
The only thing that can limit the usefulness of the latest "Polar" "Ideal" gang condenser I have seen, is the necessity of matching the set layout and its screening with the divisions and screen of the gang condenser.

But that is serious only in the case of high-efficiency H.F. stage sets. I can see a real use for this excellently made "Polar" Two-Gang in the even more popular two-tuning circuit sets of a simple character.

A very nice little trimming condenser is available and this is also shown in the accompanying photograph.

With a maximum capacity in each section of .0005 mfd., this "Polar" "Ideal" product sells at 18/6. The usual remarkably smooth

"Polar" slow-motion control and velvety direct drive are incorporated.



The "Polar" "Ideal" Two-Gang condenser and a "Polar" "trimmer" that can be used in conjunction with it.

# THE "QUEST" CABLES MULLARD FROM GREENLAND

**THE GREAT NORTHERN TELEGRAPH COMPANY (LIMITED)**  
*of Denmark*

TELEGRAMS TO CHINA, HONG KONG, JAPAN, MACAO, THE PHILIPPINES, U.S.S.R. (RUSSIA),  
FINLAND, LATVIA, ESTONIA, LITHUANIA, POLAND, SWEDEN, DENMARK,  
FAROE ISLANDS, ICELAND, GREENLAND, ETC.  
*should either be written on the Company's own forms or marked:—*

TELEPHONE LONDON WALL 8166

**Via NORTHERN.**

Date: \_\_\_\_\_ Delivery No. **1166**

19 NOV 1930

19 NOV 30

Recd. at 99B by \_\_\_\_\_ Sent to \_\_\_\_\_ at \_\_\_\_\_ By \_\_\_\_\_

Station from:— Nr. of Telegram:— Nr. of Words:— Date, Hour and Minutes of Time handed in:— Via indication (if any):—

ANGMAGSSALIK K414 17W 19 14 20 =

MULLARD CHARING CROSS ROAD LDN =

CONGRATULATIONS YOUR VALVES STAND WORST TREATMENT

IMAGINABLE NO CASUALTIES YET =

LEMON ANGMAGSSALIK \*

In fractional numbers the integer is separated from the fraction by a double dash, for instance: 1 is rendered as 1 = 3/4

Please mark replies "VIA NORTHERN." Book of Forms supplied free on application from the Co.'s London Office, 5, St. Helen's Place. No inquiry respecting this message can be attended to without the production of this form.

**BRITISH  
ARCTIC  
AIR  
ROUTE  
EXPEDITION**

STILL MORE EVIDENCE  
OF THE RELIABILITY  
AND EFFICIENCY OF  
**MULLARD**  
THE MASTER VALVE

Advt. The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2.

ArRs



# RADIOTORIAL

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

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

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

### THOSE RADIO TERMS

J. C. (Newport, Middlesbrough).—"As I am only just starting to pick up wireless at the age of fourteen, I wish to know the meaning of a few words such as 'mfd.', 'meg.', 'ohms,' etc. Can you explain them so that I know what they mean, although I have not been trained for wireless?"

We would like to help, J. C., but the trouble is that there are such a lot of terms that cannot be explained in a few words. (Did you see all "Pentode's" articles? If not, they will teach you a great deal about that kind of thing.)

However, we can give you a few helpful examples based on those terms you name.

"Mfd." for instance, is the abbreviation for microfarad. That word "micro" is a prefix, which means one-millionth.

This prefix micro can be used in front of other words, as well as in front of farad, and in wireless we often speak of a micro-henry, which is a millionth of a henry.

(In the same way, if you have £1 of your own in your pocket you may not be a millionaire, but you could certainly claim to be a micro-millionaire. You see the idea? Micro means a millionth part.)

"Farad" is an interesting word, too. It signifies the unit of capacity.

You know that all condensers have a certain amount of "capacity"—some more, some less—and there must be some kind of unit capacity to which all other capacities may be compared. That unit is the "farad."

The farad does for capacity what the mill does for distance. It gives you a standard—a means of comparison. But as it is too big for ordinary use we deal in condensers having not farads of capacity, but in millionths of farads. In other words, in microfarads.

Even a microfarad is a pretty hefty capacity, so we sub-divide that into the usual fractional or decimal parts, and thus we get "half a microfarad condenser," or a "point five" condenser (.5 mfd.) which is the same thing.

Or for tuning and other small capacity jobs we use .0005 mfd., or .0003 mfd., etc, these being so many decimal parts of a millionth of a farad.

Whilst we are about it we might add that the "farad" is called after the brilliant Englishman, Michael Faraday, the son of a blacksmith, and one of

(Continued on page 698.)

## HOW IS THE SET GOING NOW?

Perhaps some mysterious noise has appeared, and is spoiling your radio reception?—Or one of the batteries seems to run down much faster than formerly?—Or you want a Blue Print?

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

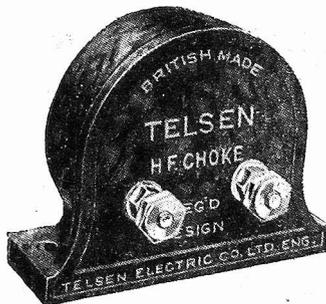
Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do. On receipt of this an Application Form will be sent to you free and 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.

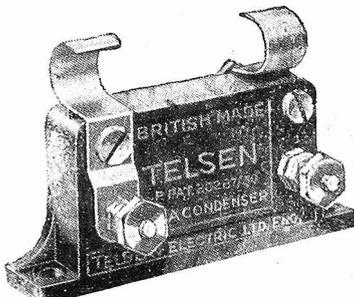
**LONDON READERS PLEASE NOTE:** Inquiries should NOT be made by phone or in person at Fleetway House or Tallis House.

AS WITH TELSEN TRANSFORMERS SO ARE TELSEN COMPONENTS DESIGNED TO WITHSTAND

# THE TEST OF TIME



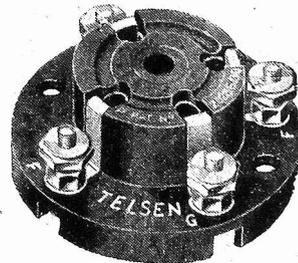
**TELSEN H.F. CHOKE.** Designed to cover the whole wave-band range from 18 to 4,000 metres. Extremely low self-capacity, shrouded in genuine Bakelite. Inductance 150,000 microhenries. Resistance 400 ohms. Price 2/6 each.



**TELSEN FIXED (MICA) CONDENSERS.** Shrouded in genuine Bakelite made in capacities up to .002 u.F. Pro. Pat. No. 20287/30. .0003 supplied complete with Patent Grid Leak Clips to facilitate series or parallel connection. Can be mounted upright or flat. Tested on 500 volts. Price 1/- each.

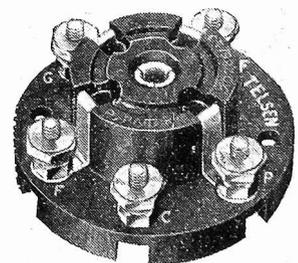
Telsen components embody many new and patented features in design, which is the outcome of careful research into modern radio construction. These exclusive features not only ensure the radio set builder of the utmost all-round efficiency in present radio circuits, but ensure him of this same efficiency for years to come!

Only TELSEN could design components of such technical perfection—Start RIGHT—incorporate



**TELSEN FOUR-PIN VALVE HOLDER.** Price 1/- each.

**TELSEN VALVE HOLDERS.** Pro. Pat. No. 20286/30. An entirely new design in Valve Holders, embodying patent metal spring contacts, which are designed to provide the most efficient contact with the valve legs, whether split or NON-SPLIT. Low capacity, self-locating, supplied with patent soldering tags and hexagon terminal nuts.



**TELSEN FIVE-PIN VALVE HOLDER.** Price 1/3 each.

# TELSEN COMPONENTS

Advt. of Telsen Electric Co., Ltd., Birmingham.



**T**HE Full O'Power is not merely a good battery—it is far more than that—it represents a very definite advance in Radio Battery manufacture.

Modern machinery ensures that every battery produced is of identical efficiency; there can be no risk of buying a Full O'Power which is "not quite up to standard." What is more, this new method of manufacture has given the Full O'Power battery a far larger output of power and a far longer working life. You cannot appreciate the extent of this added power, this added life, until you have actually experienced it.

Buy a Full O'Power to-day; take it home and make the test yourself. Your radio reception will acquire a new strength and purity and, as the months slip by, you will realise what 'long life' means when you are using Full O'Power—the battery that is "definitely superior."

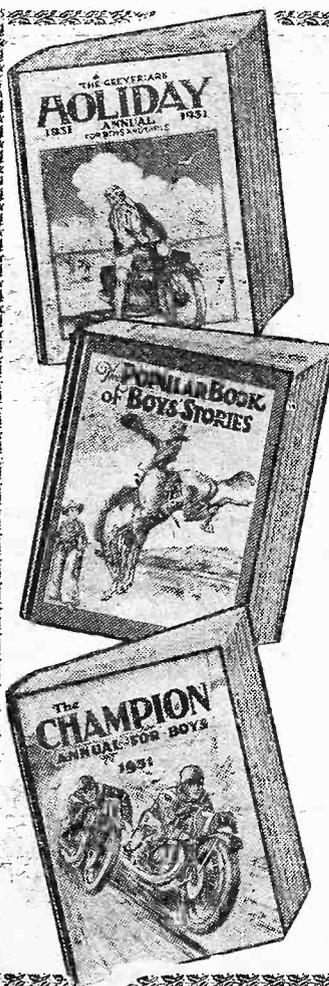
Write for the  
**FULL O'POWER**  
BOOKLET

**SIEMENS**  
**FULL O'POWER**  
BATTERIES

*Specified for*  
**MULLARD "ORGOLA,"**  
**COSSOR,**  
and  
**FERRANTI**  
SETS

**BUY ONE TO-DAY AND TEST IT FOR YOURSELF!**

SIEMENS BROTHERS. & CO., LTD., WOOLWICH, S.E.18



## Tip-top Books for Boys!

**The HOLIDAY**  
**Annual 6/- net**

Every boy will revel in the budget of ripping school yarns and thrilling adventure stories of the HOLIDAY ANNUAL. Each tale will hold them enthralled. Here they can meet all the jolly schoolboy characters of Greyfriars, St. Jim's, and Rookwood Schools, whose merry pranks cannot fail to entertain. There are many other interesting features, too, including pithy poems, puzzles, and eight beautiful plates.

**The CHAMPION**  
**Annual 6/- net**

A Budget of thrills, mystery, and adventure—that's the CHAMPION ANNUAL. Here are stories of hazardous exploits in all parts of the world. True to life stories of school and sport, and many thrilling tales that carry you breathlessly to the last word. There is also a wealth of delightful illustrations. This is an ideal gift book that every boy will want.

**THE POPULAR BOOK OF**  
**BOYS' STORIES 2/6 net**

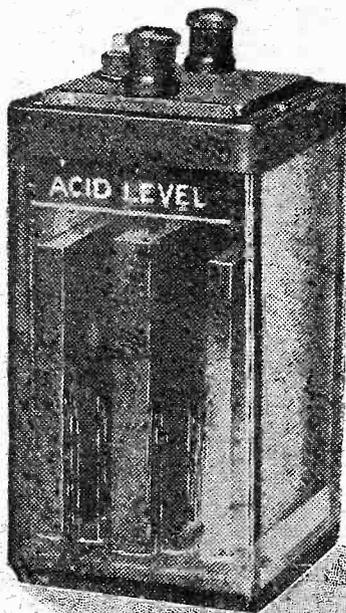
Here's a splendid book of thrilling adventure stories that's too good to be missed—a book full of swift moving action that will hold every boy spellbound until the last page! That's what POPULAR BOOK OF BOYS' STORIES offers! Here are gripping sea mysteries, stirring tales of the Wild West, and exciting tales of Speed-boat Racing, Scouting, Motor Racing, Cricket, Flying—in fact, every phase of adventure is represented in this grand all-fiction annual, which is splendidly illustrated.

*On Sale at all Newsagents and Booksellers*



**★ ALL BRITISH  
ALL  
RELIABLE**

For unfailing reliability and long service, there's no Accumulator like the All-British EDISWAN. It is heavily built throughout, and embodies the special EDISWAN paste-retaining grids. In every respect it is worthy of the EDISWAN reputation for dependability and long life.



- B.W.G.2. 24 Ampere hours . . . 8/9
- B.W.G.3. 36 Ampere hours . . . 11/9
- B.W.G.4. 48 Ampere hours . . . 13/9
- Major, 70 Ampere hours . . . 11/6

From all good radio dealers and EDISWAN SERVICE STATIONS.

**EDISWAN  
ACCUMULATORS**

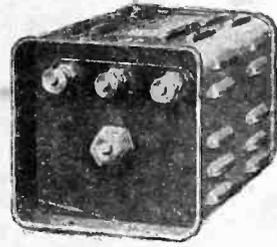


**THE EDISON SWAN ELECTRIC CO. LTD.,**  
155 Charing Cross Road, London, W.C.2  
Branches in all the Principal Towns.

B.93

**WESTINGHOUSE**

**GIVE YOURSELF CHEAPER... BETTER... LESS - TROUBLE RADIO**



If you use electricity in your home it is easier, cheaper and less trouble to run your radio set from the mains. Where mains provide alternating current, it is a simple matter to convert this to direct current for wireless use by means of a Westinghouse Metal Rectifier.

Prices are, from 15/-.

Our forty-page booklet, "The All-Metal Way, 1931," gives full details of the most suitable type for any particular purpose, with recommended circuits. Send the coupon with 3d. in stamps for a copy.

**The WESTINGHOUSE BRAKE & SAXBY SIGNAL CO., LTD.,**  
82, York Road, King's Cross, N.1.  
Telephone: North 2115.

**WESTINGHOUSE**

THE WESTINGHOUSE BRAKE & SAXBY SIGNAL CO., LTD.,  
82, York Rd., King's Cross, N.1. Please send me a copy of your  
40-page booklet, "The All-Metal Way, 1931." Enclose 3d. in stamps.  
**PLEASE WRITE IN BLOCK LETTERS.**

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
P.W. 1312720

**A RADIO-GRAMOPHONE CABINET OF OUTSTANDING QUALITY**

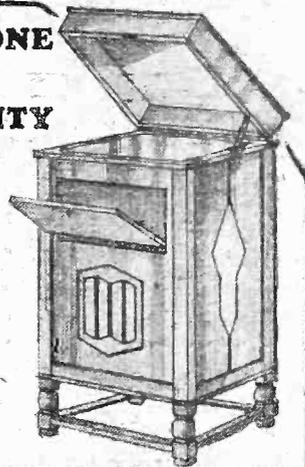
3' 3" high x 20" wide x 21" deep.  
Size for panel, 14" x 7".

Designed to suit Magnavox or similar Moving-Coil Speakers.

Made in high-class hardwoods, beautifully French polished.

- Oak . . . . . £5 10 0
- Mahogany . . . . . £5 15 0
- Walnut . . . . . £5 17 6

**GEO. BLAKEY & SON, LTD.,**  
National Works, WAKEFIELD  
Tel. 2518.



**"POPULAR WIRELESS" ADVERTISEMENT RATES**

Whole Page £40      Quarter Page £10  
Half Page £20      Eighth Page £5  
Narrow Column Advt. (3 cols. to page) per inch 30/-  
Minimum Space accepted - - - half inch 15/-

NO SERIES DISCOUNTS. ALL ADVERTISEMENT COPY SUBJECT TO EDITORIAL APPROVAL

COPY AND BLOCKS MUST BE IN HAND 11 DAYS BEFORE DATE OF ISSUE TO ENSURE PROOFS

ALL communications respecting ADVERTISING must be made to:-

**JOHN H. LILE, Ltd.,** 4, Ludgate Circus, London, E.C.4  
and NOT to Editorial or Publishing Offices.

## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 695.)

when holding the unit. Rough and ready comparisons can easily be made to determine which seems the best panel and which position in the panel gives maximum sensitivity and clearness.

### THE "EASY-CHANGE" THREE.

E. J. (Stapleford, Notts.).—"I am going to put up the 'Easy-Change' Three, but do not understand the wave-change switching from what is said on blue print. How do the switches go?"

On the medium waves the "X" coil,  $L_x$ , is used for tuning and aerial coupling, by closing  $S_2$  and putting the panel plug in the appropriate socket. (Closing a wave-change switch means placing all the contacts in connection with each other. In the opposite position the contacts are broken and the switch is said to be "open.")

Coil  $L_1$  is the reaction winding, and this serves on long waves also by virtue of the special positioning of the coils (see note on blue print for this).

The long-wave secondary coil,  $L_2$ , is also in circuit on medium waves in parallel with the "X" coil, but since it is very large in comparison it has a negligible effect on the tuning range of the circuit, and, of course losses are kept well down in this way.

To go over to long waves you open  $S_2$  (put it to "off"), and the low-wave coil,  $L_2$ , thereupon goes out of circuit to all intents and purposes. If all you want is 5 X X you will in most cases find you can then get it at particularly good strength by re-tuning to some point near the middle of the dial.

If, however, you want foreign stations on long waves without interference from 5 X X, then you should shift the plug to the other socket on the panel. This gives you a quite normal primary and secondary on long waves, the reaction coil serving also as a primary or aerial-coupling coil.

### THE L.S. RETURN LEAD.

L. A. T. (Cheshunt).—"Last Christmas we had a great stunt at a friend's house by means of a loud speaker connected across the 'input' terminals of a two-valve amplifier. (No doubt you know all about the method, which allows anyone's voice at the first loud speaker to come out of the ordinary loud speakers connected to 'output.' It comes out just like broadcasting, but with a strong 'local' flavour!)

"I want to try the same idea, but with a telephone earpiece hanging (in disguise) on the Xmas tree at the distant end.

"Concealing the two wires is the difficulty and I am wondering if I could use one wire instead of two, because the 'return' wire only goes to earth on the set. (It's a choke-filter circuit, 2-mfd. condenser).

"Could I take it to an 'earth'—say a water-tap—close to the Xmas tree, instead of bringing it right back to the set again?"

Yes, it will be quite O.K. to earth at the loud-speaker end, instead of at the set end. You should not have any difficulty in hiding the wire, because just for this occasion quite fine wire will do. (The green-coated thin wire of about 32 gauge, which is often used for tying presents, etc., to Xmas trees, is just the thing.)

### MAKING THE "P.W." DUAL-RANGE COIL.

F. E. (Ilford).—"Which number of 'P.W.' gave details for making the 'P.W.' Dual-Range Coil at home?"

The coils were described in detail for home constructors in "P.W." dated October 11th, 1930. There was such a run on this number that it is out of print, but the constructional details are given again below:

To make a "P.W." Dual-Range Coil you need a piece of ribbed former (either eight or nine ribs will serve), 2½ in. long and 2½ in. in diameter over the ribs. In the ribs you must file a series of eleven slots with the edge of a narrow file (just as for the "Con-

tradyme" coil). Slots to be about ⅛ in. wide, the full depth of the rib, with a space of about ⅛ in. between them (not critical).

This former is thus equipped to carry a slot winding in eleven sections. Ten slots are for the long-wave secondary, and one is for the reaction winding, which serves for both wave-bands.

Now the windings. The reaction one goes in the second slot up from the bottom. Thirty turns of a fairly fine gauge, such as No. 30 D.S.C. wire.

The long-wave secondary consists of 25 turns in each of the ten slots, making 250 in all, of No. 26 D.S.C. Start at the bottom, put 25 turns in first slot, miss over the second slot, leaving it empty for the reaction winding, and continue in third slot, then the fourth, and so on up to the top.

Now the reaction coil. The direction of this is vital. The starting end is to be joined to the lower end of the large winding, and it is then to carry on as though it were a continuation of the latter. Imagine that the large coil had finished at the bottom, then carry on the reaction winding as though it were the same winding having another section added in a continuing direction.

The outer former is 2½ in. long and 3 in. in diameter, and is of Pitted or other good material. The low-wave secondary has 48 turns of No. 24 D.S.C., in the same direction as the long-wave secondary.

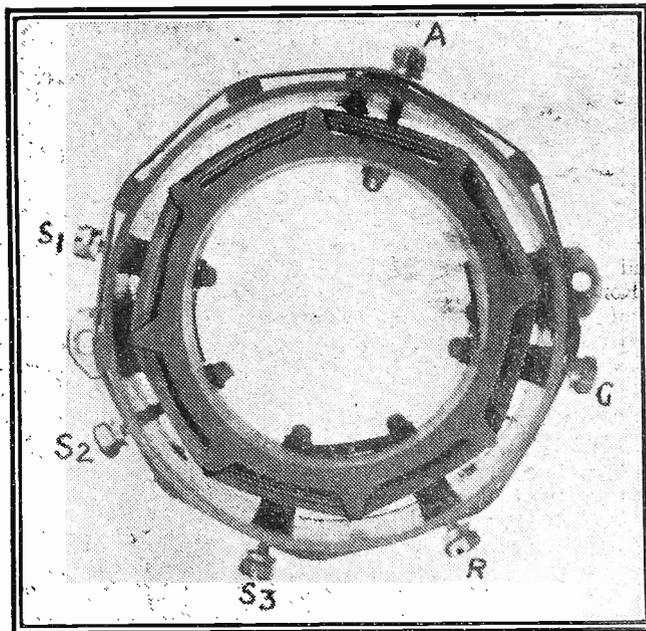
Supported above the lower end of this on eight or nine ebonite spacers (about ⅜ in. × ¼ in. × ¼ in.) is the primary, consisting of 12 turns of the same wire in the same direction.

Important: Lower edge of primary to come over lower edge of low-wave secondary, which in turn is to come over lowest slot in long-wave former.

Next, the connections: Top ends of both secondaries go together to "G." Top end of primary to "A," lower end to "S<sub>1</sub>." Lower end of low-wave secondary to "S<sub>2</sub>." Lower end of long-wave secondary and start of reaction to "S<sub>3</sub>." Finish of reaction to "R."

Method of Assembly: Six 1-in. brass screws must be passed outwards through both formers. Positioning can be done with nuts or ebonite washers

### THE "P.W." DUAL-RANGE COIL



Note the method of assembly by means of long brass screws which pass through the formers, and being fitted with suitable nuts they act as terminals.

(cut from small tubing) between formers. Double nuts on outer ends to serve as terminals, preferably with soldering tags. All to be placed round lower edge of formers, in positions shown.

Mounting in sets: Small brass brackets attached at the bottom, or a wooden cross-piece fitted inside ribbed former, will enable the unit to be fixed firmly to baseboard of set.

### THE NEW "P.W." COIL.

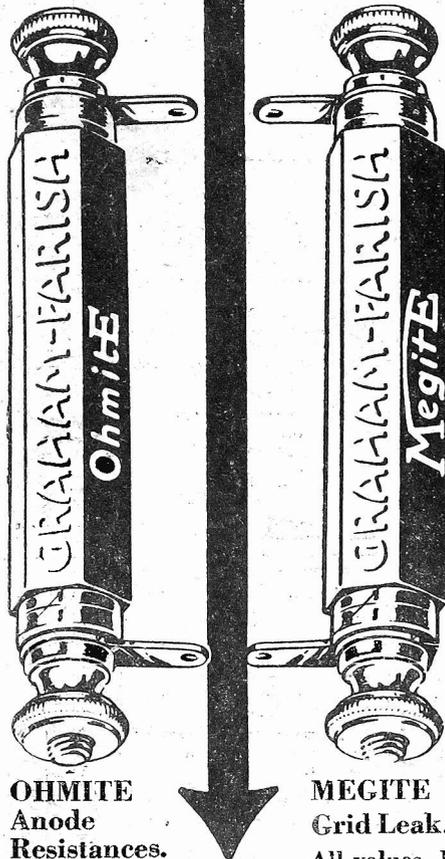
#### FAULTY SPECIMENS IN CIRCULATION.

It has come to our notice that a number of faulty specimens of the new "P.W." coils have been circulated.

The terminals are screwed to the former in such a way that they grip some of the turns of the short-wave secondary winding and, in cases brought to our notice, have caused short-circuits.

Readers should look out for this fault, and make certain that there is clearance between the terminals and the winding in question.

**YOU**  
can make  
this test in your  
own home



**OHMITE**  
Anode  
Resistances.  
100 ohms to  
500,000 ohms,  
2/3 each

**MEGITE**  
Grid Leak.  
All values, 1  
megohm to  
5 megohms.  
2/- each

Connect an Ohmite or Megite in series with a NEW H.T. battery and a pair of headphones, then observe the absolute silent functioning of the Resistance due to lack of molecular displacement, a feature of Ohmite and Megite Resistance.

Compare with any other resistance obtainable at the price and you will immediately endorse our claim that every Graham Farish component is the finest value for money obtainable.

Graham Farish components carry a written guarantee of accuracy.

**GRAHAM FARISH**  
LIMITED · BROMLEY · KENT

**FOR THE LISTENER**

(Continued from page 680.)

filling up the longer or shorter intervals between.

The ginger is quite hot enough to be appreciated. The hour passes much more quickly. The dull patches have been eliminated.

**All About Money.**

I listened to Mr. Reginald McKenna for so long as I could follow him in his talk on "Monetary Policy." He soon got beyond me.

The only monetary policy with which I am at all familiar is not quite so complicated; though it is hard enough to deal with. How to make sixpence stretch to ninepence; how to keep from getting cold feet in an overdraft; how to avoid income-tax; and so on.

Mr. McKenna's inquiries did not cover natty little problems like these. Indeed, at the very start he said that current cash was a comparatively insignificant factor in "Money." To me, on the contrary, it is everything, and then some.

**Amos N'Andy.**

These American comedians are to broadcast to us from America on New Year's Eve. They are £1,000-a-week men across the pond.

Their monetary policy is fairly straightforward. When they broadcast in America, everything else stops; Broadway doesn't jazz; Wall Street doesn't crash; Al Capone drops his gun.

When they broadcast across the Atlantic, the liners will cut out their engines, and the icebergs will dip their snowy ensigns. And we shall hear the Big Noise.

Ronald Frankau will be in bed that night with the ear-ache. Flotsam and Jetsam will be carried out on the ebb. Attaboys!

**Lord Beaverbrook's Broadcast.**

I was very interested to hear this flutterer of the doves. The impression I got from his voice and manner was that things would be likely to move in the direction he wished them to. He crackled with energy.

He seemed hardly to be able to control his head of steam. I understand that somebody is going to answer his arguments. For all I know they may be answered. But it is one thing to answer an argument, and another to stop a man.

I imagine Lord Beaverbrook to be a man who will take some stopping. At any rate, if he is the railway engine, heaven forbid that I should be the cow!

**Mudlarker.**

It isn't spelt quite like that. It is a German wireless station. It gets on top of our little London Regional and worries it like an Airedale worrying a Dandy Dinnont. I wish it wouldn't.

I was just beginning to like the Germans again. When I was in Italy they were my great stand-by. The other evening when somebody was lecturing on "Currents from our Hearts," a quite different sort of current was flowing from mine enough to drown this Mudlarker in a tide of fiery wrath. Isn't somebody going to do something about it?



**DAY and NIGHT . . . .  
FROM NOW UNTIL XMAS**

From now until Christmas our Organisation will be working day and night without cessation in meeting the demand for better Radio this Christmas. We are determined that every customer ordering Radio from us before the Holidays will not be disappointed. Place your order now.

EVERYTHING RADIO FOR CASH OR EASY TERMS WITH SERVICE AFTER SALES.

**Pilot Radio Kits**

... Build one of these fine "P.W." Sets for Xmas ...

**SUCCESS GUARANTEED.** Every part down to the last screw, in an attractive carton, including The Famous Pilot Test Meter, without which no set is complete.

**"CHEF D'OEUVRE" (See last week's issue.)**

Kit "A" Cash Price £5-19-4 or 12M'thly 10/11  
Kit "B" " £7-18-4 payments of 14/6  
Kit "C" " £9-3-4 " 16/10

**THE "INTERCHANGE" THREE**

(Described in 22/11/30.)  
Kit "A" Cash Price £4-17-3 or 12 Monthly 9/11  
Kit "B" " £6-4-9 payments of 11/5  
Kit "C" " £7-9-9 " 13/9

**THE "NEW COIL" FIVE "P.W." 29/11/30**

Kit "A" Cash Price £9-12-0 or 12 Monthly 17/7  
Kit "B" " £13-2-6 payments of 24/1  
Kit "C" " £15-4-6 " 27/11

**IMPORTANT NOTE.** KIT "A" is less valves and cabinet. KIT "B" with valves less cabinet. KIT "C" with valves and cabinet. Any parts supplied separately.

**SEND NOW FOR THE PILOT CHART.** Contains detailed Price Lists of all the latest and best Kits, and over 30 valuable Hints and Tips for the Amateur Constructor.

**"P.W." DOUBLE-TRAPPER**

(See this issue)

**Assembled, Wired & Tested.**

**READY FOR USE. 11/6 Post**  
**Send no money. Free**  
**Pay the Postman.**

**IMMEDIATE DELIVERY.**

**Manufacturers' Kits and Accessories**

Send **10/-** **COSSOR EMPIRE MELODY MAKER KIT**, 1931 model, S.G., detector, and power. Cash Price £6 17 6  
Only Balance in 11 monthly payments of 12/9.

Send **23/6** **1931 OSRAM MUSIC MAGNET KIT**, two S.G., detector, and power. Cash Price £11 15 0  
Only Balance in 12 monthly payments of 18/6.

Send **10/6** **DYNAPLUS SCREEN THREE KIT** S.G., detector, and power. Cash Price £5 14 6  
Only Balance in 11 monthly payments of 10/6.

All the above kit prices include valves and cabinet.

Send **8/6** **EXIDE 120-VOLT WH. TYPE ACCUMULATOR**, in Crates. Cash price, £4 13s. 6d. Balance in 11 monthly payments of 8/6.

Send **7/6** **STANDARD WET H.T. BATTERIES**, 144 volts, 20,000 m/a. Cash price, £4 2s. Balance in 11 monthly payments of 7/6. Other voltages and capacities available. Detailed prices on application.

Send **10/9** **REGENTONE W.5. COMBINED H.T. ELIMINATOR & TRICKLE CHARGER**, 1 S.G., 1 variable, and 1 fixed tappings for H.T. L.T. charging for 2, 4, and 6 volts. For A.C. Mains. Cash price, £5 17 6  
Only Balance in 11 monthly payments of 10/9

Send **11/-** **ATLAS H.T. ELIMINATOR AND CHARGER**. Model 188 for A.C. Mains. Cash price, £6.  
Only Balance in 11 monthly payments of 11/-.

Send **6/5** **LAMPLUGH INDUCTOR SPEAKER**, for perfect reproduction. Unit and chassis complete, ready mounted. Cash price, £3 10s.  
Only Balance in 11 monthly payments of 6/5.

Send **9/2** **CELESTION D.12 LOUD SPEAKER**. An entirely new model in oak. Cash price, £5.  
Only Balance in 11 monthly payments of 9/2.

Buy by post - it's quicker. Post this coupon NOW

**PETO-SCOTT CO. LTD.**

**OUR NEW CATALOGUE**

describing ALL THE LEADING MAKERS' Receivers, Components, Radio Gramophones, Pickups, etc. A valuable guide to Radio. Get your copy to-day.

LONDON: 77, City Road, E.C.1. Phone: Clerkenwell 9406-7-8.  
82, High Holborn, W.C.1. Phone: Chancery 8266. MAN-  
CHESTER: 33, Whitelaw Road, Chorlton-Cum-Hardy.  
Phone: Chorlton-cum-Hardy 2028. NEWCASTLE, STAFFS:  
7, Albany Road.

Please send me FREE your (a) 1931 Easy Way Catalogue (b) Latest Pilot Radio Chart.

NAME .....

ADDRESS .....

P.W. 13/12/30.

**PROMPTITUDE . . . FAIR DEALING . . . TRUSTWORTHINESS**  
(A Customer's Unsolicited Testimony.)

# ENGINEERS!

Can't we get together?



**WRITE FOR THIS BOOK TO-DAY IT'S FREE!**

All we ask is the chance to prove that you can earn £300, £400, £500 per year or more. Other men are doing it and you can do the same.

We have an unrivalled and world-wide organisation waiting to help you, whether you be novice or expert. If you wish for something more than a "bread and butter" job you owe it to yourself to investigate our service.

Our handbook, "Engineering Opportunities," has pointed the way to better things to over 20,000 of your fellows. It contains details of A.M.I.Mech., E., A.M.I.E.E., A.M.I.C.E., A.M.I.A.E., A.M.I. Struct., London Matric., C. & G., G.P.O., etc. Exams., outlines home study courses in all branches of Electrical, Mechanical, Motor and Wireless Engineering, and explains our unique guarantee of

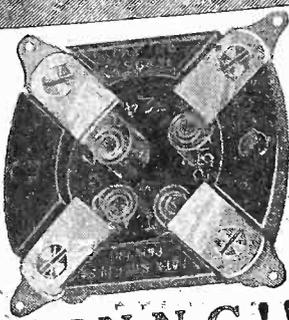
### NO PASS—NO FEES

In a brilliant foreword Prof. A. M. Low shows clearly the chances you are missing.

"Engineering Opportunities" and our advice are quite FREE. Don't neglect this offer—give vent to that "upward urge" and send a postcard NOW, stating Branch, Post, or Exam. which interests you.

**British Institute of Engineering Technology,**  
101 Shakespeare House, 29/31 Oxford Street, W.1

**PATENTS, TRADE MARKS,**  
Inventions Advice Handbook and Consultations FREE.—B. T. KING, C.I.M.E.  
Regd. Patent Office (G.B., U.S. and Canada)  
146a, Queen Victoria Street, London, E.C.4.  
43 years' references. Phone Cent 0682



## PON-N-G!!

Modern valves may be less microphonic, but so are our ears very much more critical. Keen constructors are not content merely to have less "pong," they want it cut right out. That's why Benjamin antiphonic valve holders never lose their popularity.

See that your valve-holders are Benjamin.

Write for our Catalogue No. 1142.  
**THE BENJAMIN ELECTRIC LTD.**  
Tarriff Rd., Tottenham, N.17  
Tottenham 1590.

**1/6**

# BENJAMIN

## THE "CRYSTACHOKE."

(Continued from page 689.)

means a quite unusually good standard of both volume and selectivity.

For example, the receiver was tested on an aerial containing the full permissible 100 ft. of wire placed on top of a high building at a distance of under 15 miles from Brookmans Park, and then proved capable of separating the two transmissions with the greatest of ease.

### Simple Adjustment.

That may not sound very remarkable to those who do not know how much real "juice" is picked up by this aerial, but it really indicates most unusual selectivity. No ordinary crystal set will do anything like it, and this one, be it noted, not merely did it quite easily, but gave good loud signals into the bargain.

From further tests we believe we are safe in estimating that the receiver will separate the two transmissions properly at all distances greater than about nine or ten miles on any aerial of normal size and height.

The exact method of getting the adjustable capacity tap is rather interesting. One of the two condensers provides the necessary tuning of the circuit, while the other is of the compression type. The idea is to set the latter at maximum (knob screwed right down), tune upon the ordinary variable and note results.

Then reduce the capacity of the compression condenser, re-tune and again note results. Try various combinations in this way until you find the best one, and thereafter no further adjustment will be needed. That is simple enough, isn't it?

### Easily and Quickly Built.

It is a particularly easy little set to build, too, and we shall not take long in giving the necessary constructional details.

The coil is the main part of the set, and this just calls for brief description. The "former" is a piece of 3-in. diameter tubing, 3 or 3½ in. long, and on this you must wind 55 turns of No. 24 double cotton-covered wire (or 50 of No. 24 double silk) in a single, close layer. Start at the bottom and make tapping points for the aerial clip (twisted loops, later scraped bare, will do) at the 15th, 20th, 25th and 30th turns as you go.

In the lower end of the tube fit a wooden cross-piece in the usual way for purposes of mounting on the baseboard. Fix the cross-piece with small screws passing through holes in the wall of the tube into its ends, and pass a larger screw down through it into the baseboard of the set.

### The Aerial Taps.

The rest of the job is just a simple matter of assembly and wiring in accordance with the wiring diagram, and it won't be long before you have the receiver ready for test. The main adjustment we have already described, and it just remains to add that you should try the aerial clip on each tapping point on the coil, re-tuning each time, and noting which gives the best results.

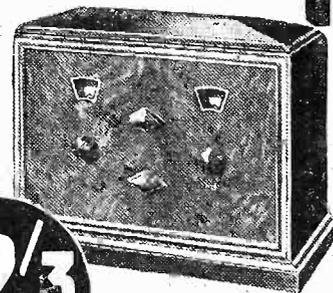
A final point: the set is expressly intended for the "Regional" areas, and so no provision is made for long-wave reception.

# BROWNIE DOMINION MAINS 5-G-3

A REALLY superb all-electric 3-valve receiver in a handsome, richly polished solid walnut cabinet—that's the wonderful new Brownie Dominion Mains 5-G-3—the main set for the connoisseur! Just switch it on—then sit back and enjoy the cream of the world's programmes at brilliant loudspeaker strength!

### YOUR DEALER will DEMONSTRATE

Your dealer will be delighted to demonstrate the Brownie Dominion Mains 5-G-3. In any case send now for illustrated catalogue of the complete Brownie range of battery and mains operated receivers. Prices from 50/-.



PRICE including royalty and valves

£18.10

OR

**32/3**  
**DOWN**

Brownie Wireless Co. (G.B.) Ltd., Dept V., Nelson Street Works, London, N.W.1.

### MAKE OR BUY A GRAMOPHONE

at a quarter shop prices, or buy Cabinets for Wireless. British double spring motor 12" velvet turntable, swan arm, metal sound-box, amplifier, needle cups for £1/18/6 p.p. and build your own Cabinet. Portable Gramophones from 15/6, postage 1/6. Motors from 7/6. Lists free 64 pp. 1931 Catalogue No 220 with Reduced Prices, Drawing, and How to Make Gramos., 3d.

REGENT FITTINGS CO. (P.W.), 120, Old Street, London, E.C.1

## ALL MANUFACTURERS' GOODS



advertised in "Popular Wireless" can be obtained by post from Young's.

All goods guaranteed. Send a note of your requirements TO-DAY and pay the postman.

### YOUNG'S

(Glasgow) Ltd., 40, Stockwell Street, GLASGOW.

**DX** THE STANDARD PLUG-IN COIL  
Sold everywhere from 1/-  
DX COILS LTD., LONDON, E.8

Make THE DAILY SKETCH  
YOUR Picture Paper

## POWER GRID DETECTION.

(Continued from page 693.)

musical frequency can pass through without causing the grid to "choke" and so produce "frequency" distortion. The higher plate voltage is also found to eliminate "amplitude" distortion for any depth of modulation up to 80 per cent.

Put in another way, power grid-detection consists in adjusting the detector valve so that it operates on the straight-line part, both of the plate-current grid-volts curve and of the grid-current grid-volts curve.

### Grid Current is Necessary.

As some current must flow in the grid circuit (to ensure rectification) there should be no negative bias on the grid. In mains-driven valves, the grid may be connected directly to the cathode, but for other valves a small positive bias is necessary. This, combined with 100 volts on the plate, means that the total current passing through the

## SEEN IT?

You ought not to miss the  
**XMAS DOUBLE NUMBER**  
of  
**MODERN WIRELESS**

Packed with good radio reading and full of fine constructional articles. It also includes a

**FULL-SIZE BLUE PRINT**  
of the  
**"PLUS-X" FOUR**

Price **1/6** **GET IT!** Now *on Sale*

detector valve may be of the order of 6-8 milliamps, instead of 1-2 milliamps, as usual. Hence the term "power" grid-detection.

### Not for Dry H.T. Batteries.

Such a large output current would, of course, be a serious drain on a dry-cell H.T. battery, though it is immaterial in the case of mains-driven valves. If the rectifier is transformer-coupled to the first L.F. stage, a parallel-feed should be used to prevent saturation of the transformer core by the heavy D.C. component.

The low value of leak resistance used naturally tends to damp the preceding stage of H.F. amplification, but since the main object of power grid-detection is purity of reproduction, any loss of selectivity due to this cause is of no practical importance.

## DIRECT OR RELAY.

A Tip for the D.X. Listener.

As the German stations are rather fond of picking up American broadcasts on short waves and relaying them on ordinary wavelengths, do not assume because you have heard an American announcement you necessarily picked it up direct across the Atlantic.

All "Popular Wireless" Kits are obtainable for Cash or by Easy Hire Purchase Terms

USE  
READY  
RADIO  
APPROVED  
KITS

KIT A	KIT B	KIT C
includes all components less valves and cabinet	includes all components with valves less cabinet	includes all components with valves and cabinet

### "MAXI-POWER" FOUR

KIT A £7.8.0 or 12 equal monthly payments of 13/6	KIT B £9.15.6 or 12 equal monthly payments of 18/-	KIT C £11.5.6 or 12 equal monthly payments of 20/9
------------------------------------------------------	-------------------------------------------------------	-------------------------------------------------------

### "EASY-CHANGE" THREE

KIT A £4.4.6 or 12 equal monthly payments of 7/9	KIT B £5.12.0 or 12 equal monthly payments of 10/3	KIT C £7.2.0 or 12 equal monthly payments of 13/-
-----------------------------------------------------	-------------------------------------------------------	------------------------------------------------------

### "SHARP-TUNE" TWO

KIT A £4.9.0 or 12 equal monthly payments of 8/3	KIT B £5.8.0 or 12 equal monthly payments of 10/-	KIT C £6.7.0 or 12 equal monthly payments of 11/9
-----------------------------------------------------	------------------------------------------------------	------------------------------------------------------

### "INTERCHANGE" THREE

KIT A £5.4.3 or 12 equal monthly payments of 9/6	KIT B £6.11.9 or 12 equal monthly payments of 12/-	KIT C £8.1.9 or 12 equal monthly payments of 14/9
-----------------------------------------------------	-------------------------------------------------------	------------------------------------------------------

### "CONTRADYNE" THREE

KIT A £5.0.9 or 12 equal monthly payments of 9/3	KIT B £6.8.3 or 12 equal monthly payments of 11/9	KIT C £7.11.9 or 12 equal monthly payments of 14/-
-----------------------------------------------------	------------------------------------------------------	-------------------------------------------------------

### "NEW-COIL" FIVE

KIT A £10.18.3 or 12 equal monthly payments of 20/-	KIT B £14.5.9 or 12 equal monthly payments of 26/3	KIT C £16.5.9 or 12 equal monthly payments of 29/9
--------------------------------------------------------	-------------------------------------------------------	-------------------------------------------------------

The new "P.W." Brookman's Rejector is entirely different from all other kinds of rejectors, wavetraps and selectivity devices. It not only eliminates local interference but also improves distant reception. Particularly designed for use with all circuits without alteration to your receiver.  
**COMPLETELY ASSEMBLED & READY FOR USE. Post free 5/9**

TO OVERSEAS CUSTOMERS. All your goods are very carefully packed for export and insured, all charges forward.

TO INLAND CUSTOMERS. Your goods are despatched post free or carriage paid.

TROUBLE-FREE  
SET BUILDING

USE "JIFFILINKS"  
FOR WIRING-UP  
NO SOLDERING

IMMEDIATE  
DISPATCH

You can Buy any  
**RECEIVER,  
EQUIPMENT  
OR  
SET OF PARTS  
FROM  
READY RADIO  
BY  
EASY  
PAYMENTS**

Send for our New 1931  
"Radio out of Income"  
Catalogue of Modern  
Sets, Accessories and Com-  
ponents. Post Free.

**Ready Radio**

159, BOROUGH HIGH STREET,  
LONDON BRIDGE, S.E.1.

Telephone: Hop 5555 (Private Exchange) Telegrams: READIRAD, SEDIST.

Ready Radio (R.R. Ltd.), London Bridge, S.E.1.

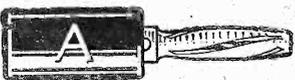


**CLIX FOR CONTACT**

*Clix for Contact*

**Is your Set O.K. for Xmas ?**  
Look to your Contact Points and specify CLIX for your replacements.

**THE NEW CLIX SHOWCASE** to be seen on your dealer's counter will help you. It's the little things that count!



No. 9. Pat. Pro. Pat.  
**CLIX PARALLEL PLUG 2d.**

One of the 14 Clix lines included in the Showcase. There are 27 different Clix devices for contact. Write for descriptive leaflets.

**LECTRO LINX, LTD.,**  
254 VAUXHALL BRIDGE RD., S.W.1

**R.T.A. FOR THE AMATEUR**

Make your own Radio Cabinet with our Ready-To-Assemble Parts. You can do it with ease at one-half the retail price. Simply send us your Drawings, stating full details. Our Quotation will reach you per return.

**WE CAN SUPPLY CABINETS TO HOUSE ANY RECEIVER DESCRIBED IN THE WIRELESS PAPERS. EITHER COMPLETE OR R.T.A.**

Lists from  
**STANJACK WOOD PRODUCTS, LTD.,**  
8, BRANSTON STREET, BIRMINGHAM.  
Cen. 0600.

**RELIABILITY WIRELESS GUIDE NO. 162**

A Complete List of all that is best in Radio at Keenest Prices. Trade Enquiries Invited.

**J.H. TAYLOR & CO.**  
4 Radio House, MACAULAY STREET, HUDDERSFIELD, Phone 341.

POST FREE ON REQUEST

**WET H.T. BATTERIES**  
Solve all H.T. Troubles. SELF-CHARGING, SILENT, ECONOMICAL

**JARS** (waxed), 2" x 1" sq. 1/3 doz ZINCS, new type 10d. doz. Sacs 1/2 doz Sample doz (18 volts), complete with bands and electrolyte, 4/11. post 9d. Sample unit, 6d. Illus. booklet free

Bargain list free.  
AMPLIFIERS 30/- 3-valve set. £5  
**P. TAYLOR, 57, Studley Road, STOCKWELL, LONDON**

**THE PICTURE PAPER WITH THE MOST NEWS**  
**-SUNDAY GRAPHIC-**

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

**In the Grid Circuit.**

I HAVE more than once been asked whether the effect of long loud-speaker leads is the same as that of long leads to a gramophone pick-up. At first sight this is quite a natural question, since the pick-up is, in principle, a very similar device to the loud-speaker (although operating in the opposite sense).

But actually the circuit connections of the two devices are totally different, the loud-speaker being, of course, in an H.T. output circuit (or an equivalent arrangement) whilst the pick-up is in a grid circuit.

The conditions in the case of the pick-up leads are very much more sensitive than in the case of the loud-speaker leads, with the result that whereas short pick-up leads are essential, quite lengthy loud-speaker leads may often be used without any really noticeable bad effect.

**A Detector Question.**

I have been asked by a reader whether it is possible to get a high amplification by using a very high value of grid leak and also a high-value anode resistance with a high-impedance detector valve.

On theoretical grounds this might at first seem possible, but in actual practice it results in all kinds of consequential complications in the circuit and finishes up by doing more harm than good.

It has been found far better to use the more conventional values for grid-leak and anode resistance.

**Pentode Comments.**

My recent remarks in these Notes on pentode valves and power valves have brought a number of letters from readers discussing various aspects of the matter. One reader, however, disagrees with something I said, and as he raises one or two other interesting points, I thought it might be useful to refer to them now.

In the first place, he wants to know why I "condemned" the pentode without discussing "maximum undistorted output." Well, before going further, I do not think I "condemned" the pentode. I merely pointed out that to get the best results it was very important to use the pentode valve in the particular conditions for which it is designed and specified and not to expect impossibilities from it.

**An Output Problem.**

My correspondent says, "Surely a valve for loud-speaker work should be judged by its output in milliwatts. Therefore, if the five-electrode type will deliver as many healthy milliwatts as the triode, is there not a great advantage in the fact that we have had to 'volume control' the grid input, or better still, slacken off the reaction coupling? I am using a 4-volt pentode P.M. 24 which, according to figures, delivers 500 milliwatts, and I find that a super-power valve by the same makers, also 4 volts, only gives 380 milliwatts and takes twice the filament amps. From this it seems

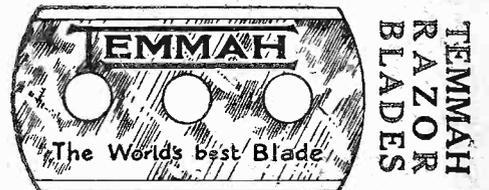
(Continued on next page.)

**EVERYBODY can SOLDER NOW**

No more conjuring — Tinkerine makes soldering as simple as using sealing wax. Nothing but heat and Tinkerine is needed. Tinkerine is solder with the flux inside. One 2d. stick will make a dozen wireless sets and mend all your pots, pans and tins. Keep a stick in the toolbox.

**TINKERINE RESIN CORED SOLDER**

Obtainable from ironmongers, wireless dealers, stores, etc. 2d. a stick—makes 1,000 joints. If any difficulty, write **TEMMAH PRODUCTS LTD., 14/16, Lower Clapton Road, London, E.** (Trade enquiries to same address.)



Makers of the famous **TEMMAH RAZOR BLADES**. Produced by the latest ribbon-steel process, giving ultra sharpness and long service. In every way equal to the most expensive American blades, yet only 2d. each. Buy them as you want them, one by one.

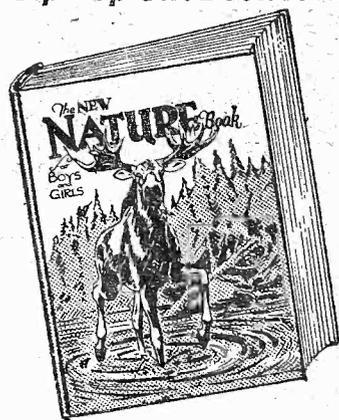
**"BROADCAST" Plug-in Coils**  
CHEAPEST AND BEST

25 .. 10d.	50 .. 1/-	125 .. 1/3	250 .. 2/-
30 .. 10d.	60 .. 1/1	150 .. 1/4	300 .. 2/3
35 .. 10d.	75 .. 1/2	175 .. 1/6	400 .. 2/9
40 .. 1/-	100 .. 1/3	200 .. 1/9	500 .. 3/3

Centre-Tapped 6d. extra. "X" Coils 9d. extra.  
ALL POST FREE. Trade Supplied.

**G. BRICE, 34 Savernake Rd., London, N.W.3**

**A Tip-Top Gift Book for Boys**



Here's a book that tells about the wonders of Bird and Animal life and is profusely illustrated with remarkable action photographs. If you want a Christmas present that cannot fail to please any boy, make sure you get

**The NEW NATURE BOOK**

At all Newsagents and Booksellers **6/- net**